

## ExpressoLivre - ExpressoMail

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Remetente: "Leonardo Fraga | Eletro Nacional" <leonardo@eletronacional.com.br>  
Para: "Comissao Permanente de Licitacoes" <cplc.appa@appa.pr.gov.br>  
Data: 27/11/2025 08:51 (02:37 horas atrás)  
Assunto: RE: Diligência LE 282/2025 LOTE 03  
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1jari4sk9.jpg (61.04 KB)  
Anexos: Outlook-agruhsjw.jpg (120.14 KB)  
RE\_ Porto.zip (3.72 MB)

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Prezado,

Segue documentação solicitada, como o arquivo é extenso, estou enviando link do drive.

[Fichas Técnicas.rar](#)

Atenciosamente / Best Regards / Atentamente

Mais informações de contato ↓ / More contact information ↓ / Más informacion de contacto ↓

**Eletro Nacional** WEG SENSE PHENIX CONTACT GEFRA Famatel COEL SIEMENS  
Especialistas da casa à indústria

**Leonardo Fraga**  
**Coordenador Técnico de Licitações e Contratos**

leonardo@eletronacional.com.br  
47 3145-4026 | 47 9 9740-0648  
Rua Benjamin Constant, 2628 -  
Costa e Silva Joinville/SC

**CLIQUE AQUI PARA VISUALIZAR NOSSO PORTFÓLIO**

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**De:** Comissao Permanente de Licitacoes <cplc.appa@appa.pr.gov.br>

**Enviado:** segunda-feira, 24 de novembro de 2025 15:34

**Para:** Leonardo Fraga | Eletro Nacional <leonardo@eletronacional.com.br>

**Assunto:** Diligência LE 282/2025 LOTE 03

Referente Licitação Eletrônica nº 282/2025 - LOTE 03

Boa tarde,

Realizada a competente análise da habilitação técnica pelo setor requisitante, conforme print abaixo, foi identificado que a empresa não atendeu aos requisitos técnicos do edital e termo de referência, para o que solicitamos, em diligência, os documentos necessários ao prosseguimento do certame.

### c) ELETRO NACIONAL COMÉRCIO E REPRESENTAÇÕES LTDA – Lote 3

Conforme análise efetuada sobre a documentação apresentada pela empresa **ELETRO NACIONAL COMÉRCIO E REPRESENTAÇÕES LTDA** acostada no documento “COMPILADO DE DOCUMENTOS LE 282 LOTE 03” do processo 1000000282, a empresa não apresentou os catálogos dos produtos ofertados para o lote 03, mas os catálogos dos produtos do lote 2, estando, portanto, **inapta** para a qualificação técnica pelo não atendimento do item 11.6 do Edital.

Foram identificadas inconsistências na proposta de preços, uma vez que os valores totais por item não correspondem ao resultado da multiplicação entre o valor unitário e a quantidade. Destacamos que todos os encargos — incluindo taxas, impostos e contribuições — devem obrigatoriamente estar incorporados aos preços unitários apresentados na proposta.

**Lote 03** – Empresa não apresentou os catálogos dos produtos. A proposta apresenta inconsistências que devem ser sanadas antes do prosseguimento do processo, sendo, portanto, necessário a realização de diligência junto a empresa para apresentação dos catálogos dos produtos ofertados e correção dos cálculos de sua proposta.

Prazo de resposta: 3 (três) dias úteis ou seja até o final do dia 27/11/2025.

Colocamo-nos à disposição para eventuais esclarecimentos.



#### COMISSÃO PERMANENTE DE LICITAÇÃO E CADASTRO - CPLC

COORDENADORIA DE LICITAÇÕES | DAF

+55 (41) 3420-1127- (41) 3420-1373

cplc.appa@appa.pr.gov.br

**[www.portosdoparana.pr.gov.br](http://www.portosdoparana.pr.gov.br)**

Palácio Taguaré- Avenida Ayrton Senna da Silva, 161  
DOM PEDRO II - Paranaguá/PR



| Item         | Fabricante    | Descrição                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Código                   | Qtde. | Valor Unitário | Valor Total           |
|--------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------|----------------|-----------------------|
| 36           | SCHMERSAL     | Sirene e Alarme Audiovisual, Área de aplicação: Zonas 21 e 22, Marcação sirene: Ex tb IIIC T100C Db IP 65, Marcação estrobo: Ex tb IIIC T85C Db IP 66, Deverá possuir certificado INMETRO, Material: estrobo em alumínio injetado, Potência consumida: Estrobo: 13W (24Vcc) / Buzina 10W, Vida útil: Estrobo 1.000.000 pulsos, Frequência dos pulsos: Aproximado. 60/min. Intensidade sonora: 105Db a 1 metro, Normas: ABNT NBR IEC 60079-0; ABNT NBR IEC 60079-1; ABNT NBR IEC 60079-31                                                                                                                                                                                                                                                                                                                                                                                                                                                             | EX SE STB                | 8     | R\$ 1.362,05   | R\$ 10.896,36         |
| 37           | LUFFT         | Sensor de Vento, tipo: ultrassônico, material: alumínio, tensão de operação: 24VCC, conexão elétrica: plugue 8 polos, temperatura de operação: -30°/60°C, direção do vento: 0°/359,9°, resolução: 0,1°, precisão: ±2°, velocidade do vento: 0°/90m/s, resolução: 0,1m/s, precisão: ±0,2m/s RMS, taxa de medição: 250ms (valores instantâneos) e 1min (RMS), grau de proteção: IP68, Fixação: poste diâmetro 2" (50mm), interface: Digital saída RS485 e analógica: 16bit (4~20mA). Fabricante: LUFFT Modelo: VENTUS-UMB-OS                                                                                                                                                                                                                                                                                                                                                                                                                           | VENTUS-UMB-OS            | 2     | R\$ 11.515,19  | R\$ 23.030,38         |
| 38           | SENSE         | Sensor indutivo, Tensão de alimentação: 10°/30Vcc, Ripple ±10%, Corrente de consumo: <10mA, Histerese ± 5%, Repetibilidade: <0,01mm, Distância operacional: 5a 8,1mm, Alvo padrão: 30x30mm, Tipo de rosca: M30x1,5mm, Diâmetro externo do cabo 4mm, Aplicação: Atmosferas com poeiras combustíveis, Conexão elétrica: Cabo, Comprimento do cabo: 10m em PVC, Número de fios: 3 Fios, Proteção de saída: curto-circuito e inversão, Queda de tensão no sensor: <2 V (carga energizada), Comprimento do tubo 50 mm, Marcação: Ex tb IIIC T100°C Db IP65, Grau de proteção Ex IP65 - Temperatura ambiente Ex - 5 °C a + 70 °C, Sinalização Traseira iluminada, Material do corpo: Metálico, Distância sensora: 10mm, Saída: VCC, Configuração elétrica: PNP, Tipo de saída: NA, Montagem: embutida, Frequência de comutação máxima: 300 Hz, Corrente máxima de chaveamento: 200 mA. Fabricante: Sense Modelo: PS10-30GISO-E2-Ex                         | PS10-30GISO-E2-Ex        | 30    | R\$ 247,05     | R\$ 7.411,57          |
| 39           | SENSE         | Sensor indutivo, Tensão de alimentação: 10°/30Vcc, Ripple ±10%, Corrente de consumo: <10mA, Histerese ± 5%, Repetibilidade: <0,01mm, Distância operacional: 5a 8,1mm, Alvo padrão: 30x30mm, Tipo de rosca: M30x1,5mm, Diâmetro externo do cabo 4mm, Aplicação: Atmosferas com poeiras combustíveis, Conexão elétrica: conector, Número de fios: 4 Fios, Proteção de saída: curto-circuito e inversão, Queda de tensão no sensor: <2 V (carga energizada), Comprimento do tubo 50 mm, Marcação: Ex tb IIIC T100°C Db IP65, Grau de proteção Ex IP65 - Temperatura ambiente Ex - 5 °C a + 70 °C, Sinalização Traseira iluminada, Material do corpo: Metálico, Distância sensora: 10mm, Saída: VCC, Configuração elétrica: PNP, Tipo de saída: NA-NF, Montagem: saliente, Frequência de comutação máxima: 300 Hz, Corrente máxima de chaveamento: 200 mA. Fabricante: Sense Modelo: PS15-30GISO-A2-V1-EX                                                | PS15-30GISO-A2-V1-EX     | 30    | R\$ 308,02     | R\$ 9.240,46          |
| 40           | IFM           | Sensor indutivo, tensão de operação: 20°/250 VAC/DC; corrente de saída (constante): 250mA AC / 100mA DC; corrente de saída (pico): máx 220mA, alcance de detecção: 5mm, grau de proteção: IP67, temperatura de operação: -25°C~+80°C, Contato: 1NA. Marcação: Ex tb IIIC T190°C Db, invólucro: aço inox, diâmetro: M18, comprimento: 66mm. Fabricante: IFM Modelo: IG0348                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | IG0348                   | 10    | R\$ 1.084,40   | R\$ 10.844,40         |
| 41           | SENSE         | Sensor Anticolisão, diâmetro: 30mm, distância sensora: 6000mm (ajustável), zona morta: 800mm, Tipo de saída: PNP (simples), frequência do transdutor: 80KHz, Resolução: 0,18mm, repetibilidade: +/- 0,15%, Tensão de alimentação: 9 a 30Vcc, Ripple: 10%, Corrente de consumo: <80mA, Frequência máxima de comutação: 2Hz, Material da frente: PBT, Programação por Software: Via RS-232 (Link Control) - Configuração de saída: NA ou NF, Tipo: Digital, Tipo de rosca: M30 x 1,5mm, Indicador de funções: Display 3 dígitos, Funções indicadas no display: mm / cm                                                                                                                                                                                                                                                                                                                                                                                 | MIC+600/D/TC             | 8     | R\$ 3.534,13   | R\$ 28.273,06         |
| 42           | BALLUFF       | Sensor de ângulo, Faixa de medição: -45° a 45°, Resolução: ±0,01°, Precisão ±0,1%, tensão de alimentação: 10-30VDC, Saída: 4-20 mA, conexão: conector M8 de 4 pinos, material: alumínio, grau de proteção: IP67. Fabricante: Balluf Modelo: BSI R11AO-XB-CX5045-S75G                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | BSI R11AO-XB-CX5045-S75G | 2     | R\$ 8.795,74   | R\$ 17.591,48         |
| 43           | PEPPERL+FUCHS | Sensor de ângulo (Inclinômetro), Tipo: Sensor de inclinação de 2 eixos, Faixa de medição: 0...360°, Precisão absoluta: ±0,5°, Atraso na resposta: ≤25ms, Resolução: ±0,1°, Precisão de repetição: ±0,1°, Influência da temperatura: ±0,027°/K, Tensão operacional: 10°/30Vcc, Atraso antes da disponibilidade: ≤200ms, Tipo de saída: 2 saídas de comutação PNP, Proteção: contra polaridade reversa e curto-circuito, Corrente de alimentação: ≤25mA (sem carga) / ≤100mA (operacional), Queda de tensão: ≤3V, Saída analógica: 2 saídas de corrente de 4-20 mA (uma saída para cada eixo), Resistor de carga: 0°/200 Ω para 10°/18 V / 0°/500 Ω para 18°/30 V, Grau de proteção: IP68, Tipo de conexão: cabo PUR 7x0,5mm² de 5m. Fabricante: Pepperl+Fuchs Modelo: INV030D-F99-2I2E2-5M                                                                                                                                                            | INV030D-F99-2I2E2-5M     | 1     | R\$ 5.772,00   | R\$ 5.772,00          |
| 44           | SENSE         | Sensor de Temperatura, Tipo: Parafuso em Instalação de Montagem Positiva, Entrada de Eletroduto: 1/2" NPT, entrada de mancal: 1/8" NPT, Graax Zerk para Lubrificação do Rolamento, Sensor PT100 – Platina RTD CSA/NRTL, Classe II. Fabricante: 48 Modelo: WDB2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SM-103-0-B75-P18-0-N-0-3 | 20    | R\$ 941,72     | R\$ 18.834,39         |
| 45           | NOVUS         | Transmissor de temperatura, Saída configurável: 4-20 mA ou 0-10 Vcc, Entrada configurável: J, K, T, E, N, R, S, B, Pt100, Pt1000, NTC e 0-50 mV, Compensação interna da junta fria, Precisão: 0,2 %, Alimentação: pelo laço 12 a 35 Vcc ou 4-20 mA), Temperatura de operação: -40 a 85 °C, Configuração através do conector USB micro-B. Fabricante: Novus Modelo: 8806037306                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 8806037306               | 10    | R\$ 384,82     | R\$ 3.848,21          |
| 46           |               | Sonda de Nível, Aclionamento: Deflexão do Diafragma, Força de atuação: min 2,5 kgf, Material: Corpo em chapa de aço 1/4", diafragma em borracha nitrílica com lona e mola de retorno em aço inoxidável, Grau de proteção: Sensor IP67, Classe de isolamento: 500 V, Pintura: Poliéster eletrostática, Cor de acabamento: Amarelo segurança, Placa de identificação: aço inoxidável, Tipo de contatos: 1 sensor indutivo NF, Tensão de alimentação: 250 Vca, Corrente: 0,2A.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          | 4     | R\$ 3.178,11   | R\$ 12.712,42         |
| 47           | SCHMERSAL     | Chave Fim de Curso, Invólucro em Alumínio, Contatos: 2NF, Saída Cabo: 1x M20 (inferior), Marcação Ex: Ex tb IIIC T 85°C Db, Grau de Proteção: IP67, Zona 21 e 22. Fabricante: Schmerchal Modelo: EX-ZS 235-022-3D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | EX-ZS 235-022-3          | 8     | R\$ 491,62     | R\$ 3.932,98          |
| 48           | IDEM          | Chave de Emergência dupla saída com acionamento por cabo, uso: Correias transportadoras, Contatos elétricos: 4NF + 2NA, Tensão: 24Vcc, Tipo de contato: segurança com ruptura positiva, Categoria: AC15 Conexão elétrica: por parafuso, entrada M20, comprimento do cabo: 100m para cada lado (isolada)/125m para cada lado (chave a chave). Fabricante: IDEM Safety Modelo: GLHD 141001A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | GLHD 141001A             | 4     | R\$ 1.447,88   | R\$ 5.791,54          |
| 49           | SIEMENS       | Chave de emergência acionado por cabo, Marcação: Ex tb IIIC T85°C Db, Materiais: Invólucro em zinco fundido sob pressão e pintado, Tampa em aço e contatos em prata, Grau de proteção: IP6X, Elementos de comutação: 2 contatos NF / 2 contatos NA - Sistema de comutação: A da NBR IEC 60947-5-1, comutação rápida com contatos de ruptura positiva, Tipo de ligação: Terminais roscados, Seção do cabo: máx. 2,5 mm² (incl. terminais de ponta de fio), Entrada de condutor: 3 x M20, Categoria de aplicação: AC-15 / DC-13 - Corrente/tensão de operação: 4A / 230Vac; 1A / 24Vcc, Proteção contra curto-circuito: 6 fusíveis A gG D conforme EN 60269-1, Temperatura ambiente: -20°C/55°C, Comprimento do cabo: 75m, Aclionamento: tracionamento ou rompimento do cabo, Prensa cabo: diâm. entre 7 mm e 12 mm, Vida útil: 20 anos Vida útil mecânica: máx. 1 milhão de ciclos de comutação, Normas: ABNT NBR IEC 60079-0, ABNT NBR IEC 60079-31. | 3SE7141-1EG10            | 22    | R\$ 2.052,05   | R\$ 45.145,01         |
| 50           | SCHMERSAL     | Chave de Desalinhamento, Área de aplicação: Zonas 21 e 22, Marcação: Ex tb IIIC T85°C Db, Material: Invólucro em ferro fundido, contatos em prata reforçada com níquel, Frequência de comutação: máximo 3000/h, Tipo de contato: 2 contatos com pontes independentes, Grau de proteção: IP65, Tensão Isolação: 500V, Velocidade de acionamento: min. 1 mm/s e máx 1 m/s. Normas: ABNT NBR IEC 60079-0, ABNT NBR IEC 600079-1, ABNT NBR IEC 600079-31                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | TV12H 441-02Y            | 30    | R\$ 876,27     | R\$ 26.288,15         |
| 51           | SCHMERSAL     | Chave de Desalinhamento, Tipo: Fim de Curso, Material: corpo em alumínio e rolete em poliuretano, Ação Contato: Rápido Com Ruptura Positiva, Tipo Atuador: Roleta, Corrente: máx. 4A, Contatos: 2NA+2NF, Grau de Proteção: IP65. Fabricante: Ace Schmersal – Modelo: ZV12HI500 11/11Y DIR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ZV12HI500 11/11Y DIR     | 8     | R\$ 1.531,85   | R\$ 12.254,76         |
| 52           | INTELBRAS     | Câmera de monitoramento IP 2 MP, Sensor de imagem: 1/2.7" 2 megapixels CMOS, Obturador eletrônico: Automático 1/3s ~ 1/100.000s, Resolução: 1920x1080, Iluminação mínima: 0,05 lux (Colorido) ou 0 lux (IR ligado), Relação sinal-ruído: >40 dB, Controle de ganho: Automático/Manual, Balanço do branco: Automático, Compensação de luz de fundo: BLC/HLC/DWDR (60dB), Perfil Dia & Noite: Automático (ICR) /Colorido/ Preto e Branco.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | VIP 5430 TL IA           | 12    | R\$ 2.156,57   | R\$ 25.878,86         |
| 53           | INTELBRAS     | Câmera IP, resolução de 4MP, lente varifocal de 2.7 a 13.5 mm motorizado; cartão micro SD, inteligência embarcada; entrada e saída de alarme de áudio, iluminação mínima: 0,05 lux (Colorido) ou 0 lux (IR ligado), Relação sinal-ruído: >40 dB, Controle de ganho: Automático/Manual, Balanço do branco: Automático, Compensação de luz de fundo: BLC/HLC/DWDR (60dB), Perfil Dia & Noite: Automático (ICR) /Colorido/ Preto e Branco.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | VIP 5460 Z IA            | 10    | R\$ 2.156,57   | R\$ 21.565,72         |
| 54           | PFANNENBERG   | Aquecedor de Painel, Potência: 100W, Tensão de Alimentação: 110V - 250V AC, Frequência: 60 Hz, Temperatura de Operação: -20°C a +40°C. Fabricante: Pfannenber Model: FLH 100W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | FLH 100W                 | 6     | R\$ 720,43     | R\$ 4.322,55          |
| 55           | SEW           | Encoder incremental senoidal, tensão de alimentação: 7~30VDC, consumo de corrente sem carga: 100 mA, diferença de amplitude seno/cosseno: < 20 mV, amplitude de saída: 1 V pico-pico; frequência de medição: máx. 150 kHz, resolução: 1024 (10bit); velocidade máxima: 6000 rpm. Interface: RS485, Marcação: Ex tb IIIC T120°C Dc. Fabricante: SEW Modelo: EK8S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | EK8S                     | 3     | R\$ 2.646,66   | R\$ 7.939,98          |
| 56           | SIEMENS       | Encoder Absoluto PROFINET Fabricante: Siemens – Modelo: 6FX2001-5QN25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 6FX2001-5QN25            | 2     | R\$ 12.435,87  | R\$ 24.871,75         |
| 57           | LAP           | Cabo Festoon, Cabo elétrico chato, Bitola: 8X1,0mm², blindado, isolamento: 750V, Encordoamento: Classe 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 211786400                | 120   | R\$ 33,09      | R\$ 3.971,34          |
| 58           | TELECAM CABOS | Cabo Festoon, Cabo elétrico chato, Bitola: 8X6mm², Isolação: 750V, Encordoamento: Classe 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 210564289                | 120   | R\$ 43,69      | R\$ 5.243,11          |
| 59           | TELECAM CABOS | Cabo Festoon, Cabo elétrico chato, Bitola: 10X2,5mm², Isolação: 750V, Encordoamento: Classe 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 210550689                | 120   | R\$ 24,56      | R\$ 2.947,75          |
| 60           | TELECAM CABOS | Cabo Festoon, Cabo elétrico chato, Bitola: 10X1,5 mm², Isolação: 750V, Encordoamento: Classe 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 210545289                | 240   | R\$ 16,15      | R\$ 3.876,90          |
| 61           | TELECAM CABOS | Cabo Festoon, Cabo elétrico chato, Bitola: 4X10mm², Isolação: 750V, Encordoamento: Classe 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 210515789                | 12    | R\$ 37,25      | R\$ 446,95            |
| 62           | SIEMENS       | Cabo de par trançado (TP) para Industrial Ethernet Fastconnect GP 4x2, CAT6A, para conexão com plugue IE FastConnect RJ45 4x2, formado por fios AWG24.Fabricante: Siemens Modelo: 6XV1878-2A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 6XV1878-2A               | 1000  | R\$ 38,94      | R\$ 38.937,74         |
| 63           | SIEMENS       | Cabo de par trançado (TP) para Industrial Ethernet Fastconnect GP 2x2, aplicação: PROFINET Tipo A, para conexão com plugue IE FastConnect RJ452x2, uso universal, CAT5E blindado.Fabricante: Siemens Modelo: 6XV1840-2AU10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 6XV1840-2AU10            | 1     | R\$ 16.377,93  | R\$ 16.377,93         |
| 64           | SIEMENS       | Conector Fastconnect RJ45 180 2x2, uso: cabo par trançado 2x2 Industrial Ethernet Fastconnect 10/100 Mbit/s, invólucro de metal resistente, saída de cabo 180°. Fabricante: Siemens Modelo: 6GK1901-1BB10-2AE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6GK1901-1BB10-2AE0       | 30    | R\$ 6.901,51   | R\$ 207.045,18        |
| 65           | SIEMENS       | Conector Fastconnect RJ45 180 4x2, uso: cabo par trançado 4x2 CAT6A Industrial Ethernet Fastconnect 10/100/1000/10000 Mbit/s, invólucro de metal resistente, saída de cabo 180°. Fabricante: Siemens Modelo: 6GK1901-1BB12-2AB0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 6GK1901-1BB12-2AB0       | 30    | R\$ 2.327,33   | R\$ 69.819,80         |
| 66           | SIEMENS       | Conector RJ45, Tipo Fastconnect, PROFINET, tipo: Macho, Padrão de Comunicação: PROFINET, taxa de transmissão: 10/100/1000Mbit/s, Proteção de Contato: Contatos dourados, Temperatura de Operação: -40 °C a +70 °C, Grau de Proteção (IP): IP20. Fabricante: Siemens Modelo: 6GK1901-1BB11-2AA0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6GK1901-1BB11-2AA0       | 10    | R\$ 288,76     | R\$ 2.887,65          |
| <b>Total</b> |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                          |       |                | <b>R\$ 678.000,00</b> |

Produção com Proteção de Ex

# SOLUÇÃO PARA ÁREAS CLASSIFICADAS

NOVO



**SCHMERSAL**  
THE DNA OF SAFETY

# DISPOSITIVOS PARA SEGURANÇA INDUSTRIAL



## Chave de Segurança Ex AZM 161

- Zonas 21 e 22
- **Marcação Ex:**  
Poeira: Ex tb IIIC T85°C Db
- IP6X, IP67
- Invólucro Termoplástico
- 4 Entradas de Cabo M16x1,5
- Força de Engate 2000N
- Princípio de Travamento por Mola ou Bobina
- 11 Tipos de Atuadores



## Chave de Segurança Ex AZ 16

- Zonas 21 e 22
- **Marcação Ex:**  
Poeira: Ex tb IIIC T85°C Db
- IP6X, IP67
- Invólucro Termoplástico
- 3 Entradas de Cabo M16x1,5
- 8 Tipos de Atuadores



## Chave de Emergência com Acionamento por Cabo Ex ZQ 900

- Zonas 21 e 22
- **Marcação Ex:**  
Poeira: Ex tb IIIC T85°C Db
- IP6X
- Invólucro em Alumínio
- Tampa em Aço Inox
- 3 Entradas de Cabos M20x1,5
- Acionamento Unilateral
- Alcance até 75m
- Rearme por Botão Incorporado



## Chave de Emergência com Acionamento por Cabo Ex T3Z 068

- Zonas 21 e 22
- **Marcação Ex:**  
Poeira: Ex tb IIIC T90°C Db
- IP65, IP66
- Invólucro em Ferro Fundido
- 2 Entradas de Cabo M20x1,5
- Rearme por Argola Incorporada



## Chave Dobradiça Ex TV S 335

- Zonas 21 e 22
- **Marcação Ex:**  
Poeira: Ex tb IIIC T85°C Db
- IP6X, IP67
- Invólucro em Alumínio
- 1 Entrada de Cabo M20x1,5
- Disponível com Furação do Eixo Ø 8 e 10mm



# BOTOEIRAS PARA COMANDO E SINALIZAÇÃO



## Botões em Alumínio Ex BC

- Zonas 1, 2, 21 e 22
- **Marcação Ex:**  
Gás: Ex db IIC T6 Gb  
Poeira: Ex tb IIIC T85°C Db
- IP66W
- Invólucro em Alumínio
- 2 Entradas de Cabo 3/4" NPT
- Personalizável com até 3 Comandos na Tampa



## Botão de Alarme Incêndio Ex BI

- Zonas 1, 2, 21 e 22
- **Marcação Ex:**  
Gás: Ex db IIC T6 Gb  
Poeira: Ex tb IIIC T85°C Db
- IP66W
- Invólucro em Alumínio com Visor de Vidro
- 2 Entradas de Cabo 3/4" NPT
- Acionamento Automático ao Quebrar o Vidro



## Botão de Comando Alumínio Ex EAL

- Zonas 1, 2, 21 e 22\*
- **Marcação Ex:**  
Gás: Ex db eb IIC T6 Gb\*  
Poeira: Ex tb IIIC T85°C Db\*
- IP65 ou IP66\*\*
- Invólucro em Alumínio
- Entrada de Cabo: M16, M20, M25 ou M32
- Configurável com até 5 Comandos Montados na Tampa



## Botão de Comando Poliamida Ex EPL

- Zonas 1, 2, 21 e 22\*
- **Marcação Ex:**  
Gás: Ex db eb IIC T6 Gb\*  
Poeira: Ex tb IIIC T85°C Db\*
- IP65 ou IP66\*\*
- Invólucro em Poliamida
- 1 Entrada de cabo M20 ou M25 (para 3 comandos)
- Configurável com até 3 Comandos Montados na Tampa



\*Conforme seleção dos comandos e bloco de contato

\*\* Conforme seleção dos comandos



# PRODUTOS PARA SINALIZAÇÃO ÁUDIO E VISUAL



## Sirene Ex SE

- Zonas 1, 2, 21 e 22
- **Marcação Ex:**  
Gás: Ex db IIC T5 Gb  
Poeira: Ex tb IIIC T100°C Db
- IP65
- Invólucro em Alumínio
- Com Cabo Injetado 1m e com Suporte de Fixação
- Intensidade Sonora (1m): 105 dB
- Alimentação 24Vcc ou 127-220 Vca



## Estrobo Ex BC STB

- Zonas 1, 2, 21 e 22
- **Marcação Ex:**  
Gás: Ex db IIC T6 Gb  
Poeira: Ex tb IIIC T85°C Db
- IP66W
- Invólucro em Alumínio e Lente Termoplástica
- Alimentação 24Vcc, 110Vca ou 220Vca



## Semáforo Ex

- Zonas 1, 2, 21 e 22
- **Marcação Ex:**  
Gás: Ex db IIC T6 Gb  
Poeira: Ex Tb IIIC T85°C Db
- IP65W
- Invólucro em Alumínio



# LUMINÁRIAS E PROJETORES



## Luminária LED PEx - LLR

- Zonas 2 e 22
- **Marcação Ex:**  
Gás: Ex ec nC IIC Gc T5/T4  
Poeira: Ex tc IIIC T100°C/135°C Dc
- IP66
- Invólucro Alumínio Fundido
- Difusor Policarbonato Translúcido
- Montagem: Arandela, Poste, Pendente, Teto e Plafonier
- Opção de montagem com bateria de emergência



## Luminárias LED para Zonas 1 e 21

- Zonas 1, 2, 21 e 22
- IP66
- Iluminação LED
- Invólucro Alumínio
- Fluxo Luminoso de 3000, 5000 e 8000lm



## Luminárias Lineares LED

- Zonas 1, 2, 21 e 22
- IP66
- Iluminação LED
- Invólucro Alumínio
- Visor Policarbonato
- Fluxo Luminoso de 2700 a 10400lm



# CHAVES FIM DE CURSO



## Chave Fim de Curso Pesada Ex 441

- Zonas 1, 2, 20, 21 e 22
- **Marcação Ex:**  
Gás: Ex db IIB T6 Gb  
Poeira: Ex ta IIIC T85°C Da  
IP65
- Invólucro em Aço Carbono
- 2 Entradas de Cabo ½" NPT
- 13 Tipos de Cabeçotes para Acionamento
- 84x107x61 (CxAxL) - s/ Cabeçote



## Chave Fim de Curso Pesada Ex 015

- Zonas 1, 2, 21 e 22
- **Marcação Ex:**  
Gás: Ex db IIB T6 Gb  
Poeira: Ex tb IIIA T85°C Db  
IP54
- Invólucro em Alumínio
- 2 Entradas de Cabo ½" NPT
- 16 Tipos de Cabeçotes para Acionamento
- 78x106x59,5 (CxAxL) - s/ Cabeçote



## Chave Fim de Curso Leve Ex Z/T 235

- Zonas 21 e 22
- **Marcação Ex:**  
Poeira: Ex tb IIIC T85°C Db  
IP6X, IP67
- Invólucro em Alumínio
- 1 Entrada de Cabo M20x1,5
- 14 Tipos de Cabeçotes para Acionamento
- 30x65,5x30 (CxAxL) - s/ Cabeçote



## Chave Fim de Curso Leve Ex Z/T 335

- Zonas 21 e 22
- **Marcação Ex:**  
Poeira: Ex tb IIIC T85°C Db  
IP6X, IP67
- Invólucro em Alumínio
- 1 Entrada de Cabo M20x1,5
- 8 Tipos de Cabeçotes para Acionamento
- 40,5x66,5x38 (CxAxL) - s/ Cabeçote



## Chave Fim de Curso Leve Ex T 335

- Zonas 1, 2, 21 e 22
- **Marcação Ex:**  
Gás: Ex db eb IIC T6 Gb  
Poeira: Ex tb IIIC 80°C Db  
IP65
- Invólucro em Alumínio
- 1 Entrada de Cabo M20x1,5
- 7 Tipos de Cabeçotes para Acionamento
- 10,5x76x38 (CxAxL) - s/ Cabeçote



# SENSORES, RELÊS E AUTOMAÇÃO



## Sensor Indutivo Ex IFL

- Zonas 20, 21 e 22
- **Marcação Ex:**  
Poeira: Ex ta IIIC T85°C Da  
IP66, IP67
- Invólucro em Latão Niquelado
- Cabo Injetado de 2 a 15m
- Saída PNP
- Sn = 10mm



## Relé de Segurança Exi SRB 101 e 200

- Zonas 1, 2, 21 e 22
- **Marcação Ex:**  
Gás: [Ex ib Gb] IIB / [Ex ib Gb] IIC  
Poeira: [Ex ib Db] IIIC  
Tensão Alimentação: 24Vcc
- Para Instalações Elétricas Intrinsecamente Seguras
- Instalação em Invólucros Adequados Fora da Área Ex



## Relé Fotoelétrico Ex REP

- Zonas 1, 2, 21 e 22
- **Marcação Ex:**  
Gás: Ex db IIC T6 Gb  
Poeira: Ex tb IIIC T85°C Db
- IP66W
- Rosca M32x1,5



# PRENSA

## CABOS POL E ACESSÓRIOS PEX



### Linha POL - A2F

- Cabo: Não armado
- Zonas 1, 2, 21 e 22
- **Marcação Ex:**  
Gás: Ex db IIC Gb  
Poeira: Ex tb IIIC Db
- IP66 e IP66W\*
- Aço Inox 304, 316L, alumínio ou latão
- Rosca (NPT/BSP): 1/2" até 3"
- Rosca Métrica: M16 até M75



### Linha POL - E1F

- Cabo: Armado
- Zonas 1, 2, 21 e 22
- **Marcação Ex:**  
Gás: Ex db IIC Gb  
Poeira: Ex tb IIIC Db
- IP66 e IP66W\*
- Aço Inox 304, 316L, alumínio ou latão
- Rosca (NPT/BSP): 1/2" até 3"
- Rosca Métrica: M16 até M75



### Adaptadores PEX - AR e Redutores PEX - RR

- Zonas 1, 2, 21 e 22
- **Marcação Ex:**  
Gás: Ex db eb IIC Gb  
Poeira: Ex tb IIIC Db
- IP66W, IP67W, IP68W (até 10m)
- Aço Inox 304, 316L, alumínio, latão ou latão niquelado
- Roscas: sob consulta



### Bujões Metálicos PEX - TA

- Zonas 1, 2, 21 e 22
- **Marcação Ex:**  
Gás: Ex eb IIC Gb  
Poeira: Ex tb IIIC Db
- IP67, IP66W (alumínio, aço inox)
- Aço Inox 304, 316L, alumínio, latão ou latão niquelado
- Rosca (NPT/BSP): 1/2" até 4"
- Rosca Métrica: M16 até M100
- Modelo: Cabeça Sextavada



\*IP66 (latão e alumínio) e IP66W (aço inox)



# PRENSA

## CABOS COLDFLOW



### Linha PEX - A2F

- Cabo: Não armado
- Zonas: 1, 2, 20, 21 e 22
- **Marcação Ex:**
  - Gás: Ex db IIC Gb / Ex db IIB+H2 Gb (Latão)
  - Ex eb IIC Gb / Ex nR IIC Gc
  - Poeira: Ex ta IIIC Da
- IP66W, IP67W, IP68W (até 10m)\*
- Aço Inox 304, 316L, alumínio, latão ou latão niquelado
- Rosca (NPT/BSP): 1/2" até 4"
- Rosca Métrica: M16 até M100



### Linha PEX - A2FUG c/ União Giratória

- Cabo: Não armado
- Zonas: 1, 2, 20, 21 e 22
- **Marcação Ex:**
  - Gás: Ex db IIC Gb / Ex db IIB+H2 Gb (Latão)
  - Ex eb IIC Gb / Ex nR IIC Gc
  - Poeira: Ex ta IIIC Da
- IP66W, IP67W, IP68W (até 10m)\*
- Aço Inox 304, 316L, alumínio, latão ou latão niquelado
- Rosca (NPT/BSP): 1/2" até 4"
- Rosca Métrica: M16 até M100



### Linha PEX - E1F

- Cabo: Armado
- Zonas: 1, 2, 21 e 22
- **Marcação Ex:**
  - Gás: Ex db IIC Gb / Ex db IIB+H2 Gb (Latão)
  - Ex eb IIC Gb / Ex nR IIC Gc
  - Poeira: Ex ta IIIC Da
- IP67W, IP67W, IP68W (até 10m)\*
- Aço Inox 304, 316L, alumínio, latão ou latão niquelado
- Rosca (NPT/BSP): 1/2" até 4"
- Rosca Métrica: M16 até M100



### Linha Prensa Cabos PEX - C

- Cabo: Armado
- Zonas: 1, 2, 21 e 22
- **Marcação Ex:**
  - Gás: Ex eb IIC Gb / Ex nR IIC Gc
  - Poeira: Ex ta IIIC Da
- IP66W, IP67W, IP68W (até 10m)\*
- Aço Inox 304, 316L, alumínio, latão ou latão niquelado
- Rosca (NPT/BSP): 1/2" até 4"
- Rosca Métrica: M16 até M100



\*W apenas para aço inox

# CAIXAS DE JUNÇÃO, PLUGUES E TOMADAS



## Caixa de Passagem Ex EAL 1081

- Zonas 1, 2, 21 e 22
- **Marcação Ex:**
  - Gás: Ex e IIC, Ex ia IIC T6 Gb
  - Poeira: Ex tb IIIC T85°C Db\*
- IP66
- Invólucro em Alumínio
- Entrada de Cabo: M16, M20, M25 ou M32 (quantidades variadas sob consulta)
- Montagem possível com 8 até 43 bornes



## Caixa de Junção PEx - CJ

- Zonas 1, 2, 21 e 22
- **Marcação Ex:**
  - Gás: Ex eb IIC Gb ia IIC Gb ib IIC Gb
  - Poeira: Ex tb IIIC T85°C/100°C Db
- IP66 e IP66W
- Invólucro e Tampa Aço Inox 304, 316, 316L ou aço carbono



## Plugues e Tomadas

- Zonas 1, 2, 21 e 22
- **Marcação Ex:**
  - Gás: Ex db eb IIC
  - Poeira: Ex tb IIIC
- IP66
- Invólucro em Poliéster
- Modelos de Sobrepor e Embutir
- 16A, 32A, 63A e 125A
- Alimentação de 110V a 690V
- 3, 4 ou 5 polos



\*Conforme seleção dos bornes



Todos os Produtos Ex fornecidos pela  
Schmersal possuem Certificação INMETRO



A Academia Schmersal tem o objetivo de explorar e ampliar o capital de conhecimento. O intuito é a formação e desenvolvimento de clientes, funcionários e futuros profissionais, através de um processo ativo e contínuo de aprendizagem que estimule a criação, difusão, assimilação e aplicação da troca de conhecimento para o crescimento mútuo.

**tec.nicum**  
excelência em segurança



O programa de treinamentos da Academia tec.nicum Schmersal oferece treinamentos das linhas de produtos para Segurança, Automação e Atmosferas Explosivas da Schmersal.

Os treinamentos são específicos e tratam sobre as normas técnicas brasileiras para segurança de máquinas, equipamentos e usuários, além de treinamentos desenvolvidos para segmentos específicos de acordo com o portfólio indicado para cada mercado que atendemos.



## Programa de Treinamento sobre Áreas com Risco de Explosão



Todos os treinamentos foram desenvolvidos e formatados para disseminar o conhecimento nas mais diversas áreas de sua competência e permitem a personalização de acordo com a necessidade.

Sugerimos esse treinamento para todos os profissionais envolvidos com as atividades de projeto, seleção, instalação e inspeção de equipamentos elétricos e de instrumentação em áreas classificadas, relacionadas com as Normas Técnicas Brasileiras da Série ABNT NBR IEC 60079.

### Conheça abaixo o portfólio de treinamentos oferecidos:

#### ■ EXPERT – Treinamento de 8h

Nesse curso apresentamos conhecimentos necessários para instalações em áreas classificadas, princípios básicos de segurança em atmosferas explosivas e aplicações de produtos e soluções para estes ambientes.

#### ■ EXPERT – Palestra de 2h a 4h

Palestra sobre princípios básicos de segurança em atmosferas explosivas.

# GRUPO SCHMERSAL

## PROTEÇÃO PARA HOMEM E MÁQUINA

O grupo Schmersal é líder mundial do exigente mercado de componentes de segurança para máquinas. A empresa fundada em 1945 emprega aproximadamente 2.000 funcionários e é representada por sete fábricas em três continentes, com empresas e parceiros de vendas próprios em mais de 60 países.

Entre os clientes do Grupo Schmersal estão nomes mundiais nas áreas de engenharia mecânica, fábricas e usuários de máquinas. Eles recorrem ao abrangente know-how da empresa para integrar tecnologia de segurança nos processos de produção em conformidade com as normas. A Schmersal também tem experiência específica em áreas de aplicação que exigem alta qualidade e características especiais de sistemas de comutação de segurança. São áreas como produção de alimentos, indústria de embalagens, construção de ferramentas para máquinas, engenharia de elevadores, indústria pesada e indústria automotiva, entre outras.

No contexto do crescente número de normas e diretivas, a divisão tec.nicum oferece uma ampla variedade de serviços de segurança. Como parte da divisão de serviços do Grupo Schmersal, engenheiros de segurança funcional certificados aconselham os clientes sobre a escolha de equipamentos de segurança adequados, fazem avaliações de conformidade CE e avaliações de riscos em nível mundial.



### LINHAS DE PRODUTOS

#### SEGURANÇA

- Monitoramento de Proteções Móveis
- Relés e CLPs de Segurança
- Dispositivos Óticos de Segurança
- Proteções Mecânicas
- Comandos e Dispositivos Táteis de Segurança

#### AUTOMAÇÃO

- Dispositivos de Comandos e Sinalização
- Chaves Fim de Curso Leve e Pesada
- Sensores Indutivos, Fotoelétricos, Magnéticos e Ultrassônicos
- Produtos EX para Áreas Classificadas
- Dispositivos Lógicos de Monitoramento e Controle

### SETORES DE COMPETÊNCIA

- Elevadores e Escadas Rolantes
- Alimentos
- Embalagem
- Indústria Pesada
- Áreas Classificadas EX

#### COMPETÊNCIAS

- Segurança em Máquinas
- Soluções para Elevadores
- Automação Industrial
- Soluções EX para Atmosferas Explosivas

### SERVIÇOS

- Avaliação de Riscos
- Planejamento Técnico e Projetos de Adequação
- Implementação e Comissionamento
- Suporte a Aplicações
- Avaliação de Conformidade CE
- Medições em Campo
- Treinamentos de Normas e Produtos de Segurança



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## Extremely precise and maintenance-free measurement of wind speed and wind direction even in the lowest temperature

- **Parameters measured**  
Wind speed, wind direction, virtual temperature, barometric pressure
- **Measurement technology**  
Ultrasonic
- **Product highlights**  
Wind detection with birdproof construction, maintenance-free measurement, suitable for extreme ambient conditions, ice-free operation, vibration and seawater resistant, compatible interfaces
- **Interfaces**  
SDI-12, RS-485 with supported protocols Binary, ASCII, NMEA, Modbus & analogue output
- **Article number**  
8371.UMT

The accurate wind sensor uses the run-time differential method for determining the wind speed and wind direction. It provides output for instantaneous values, vector and scalar means, the maximum gust of wind and wind direction, the maximum/minimum values and the virtual temperature. Data output through serial or analogue interfaces provides compatibility of the Lufft Ventus for commercially available hydrometeorological dataloggers and PLC systems. An automatic heater ensures reliable operation even in harsh environmental conditions.

| General                         |                                         |
|---------------------------------|-----------------------------------------|
| Dimensions                      | Ø approx. 150 mm, height approx. 170 mm |
| Weight                          | Approx. 1.62 kg                         |
| Permissible ambient temperature | -40...60 °C                             |
| with heating                    | 24 VDC / 240 VA (140 VA + 100 VA)       |
| Bus operation                   | Up to 32 devices                        |
| Operating voltage electronics   | 12 - 24 VDC / 1.9 VA, without heating   |
| Electrical connection           | 8 pole plug                             |
| Housing material                | Aluminium, seawater - proof             |
| Protection type                 | IP68                                    |
| Pole diameter                   | 50 mm/2"                                |
| Factory certificate             | Yes                                     |

| Data output digital                                 |                                   |
|-----------------------------------------------------|-----------------------------------|
| Interface                                           | RS485 semi-/full duplex, isolated |
| Baud rate                                           | 1200 - 57600                      |
| Measurement rate instantaneous value                | 250 ms; 1 - 10 s                  |
| Measurement rate Avg (arithmetic, vector), Min, Max | 1...10 min                        |
| Status                                              | Heating, sensor failure           |

| Data output analog       |                                                                                              |
|--------------------------|----------------------------------------------------------------------------------------------|
| Data output analog       | Only semi - duplex mode                                                                      |
| Output signal            | 0...20 mA, 4...20 mA, 0...10 V, 2...10 V, 2...2,000 frequency (instantaneous, avg, min, max) |
| Load                     | Max. 500 Ohm                                                                                 |
| Resolution               | 16 bit                                                                                       |
| Jarring test             | According to IEC 60945                                                                       |
| Corrosion test           | According to MIL-STD-810 Method 509.3                                                        |
| Ice-free test            | According to MIL-STD-810F Method 521.2                                                       |
| HALT                     | Highly Accelerated Life Test                                                                 |
| Maximum operating height | 3500 m                                                                                       |

| Wind direction  |                   |
|-----------------|-------------------|
| Principle       | Ultrasonic        |
| Measuring range | 0...359.9 °       |
| Unit            | °                 |
| Accuracy        | ±2° RMSE >1.0 m/s |
| Resolution      | 0.1 °             |

| Wind speed      |            |
|-----------------|------------|
| Principle       | Ultrasonic |
| Measuring range | 0...90 m/s |
| Unit            | m/s        |

|            |                                                                                                       |
|------------|-------------------------------------------------------------------------------------------------------|
| Accuracy   | $\pm 0.2$ m/s or $\pm 2$ % RMS of reading (whichever is greater) for 0...65 m/s - otherwise $\pm 5$ % |
| Resolution | 0.1 m/s                                                                                               |

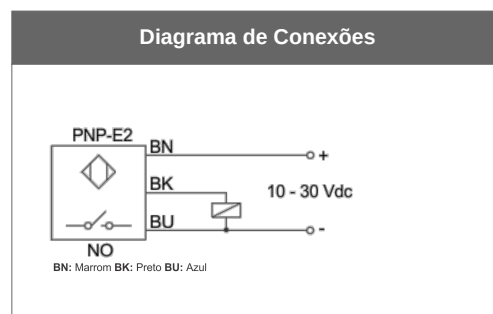
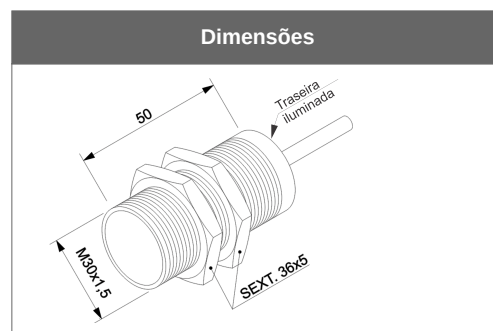
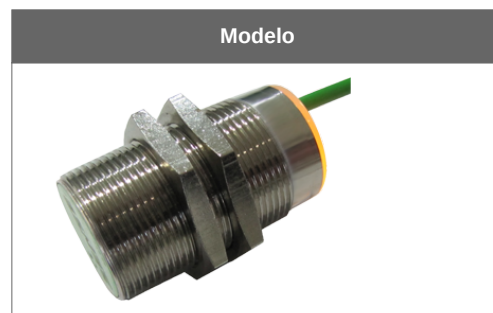
| Virtual temperature |                                                                        |
|---------------------|------------------------------------------------------------------------|
| Principle           | Ultrasonic                                                             |
| Measuring range     | -50...70 °C                                                            |
| Unit                | °C                                                                     |
| Accuracy            | $\pm 2.0$ °C (without heater and without sun exposure or wind > 4 m/s) |
| Resolution          | 0.1 °C                                                                 |

| Air pressure    |                 |
|-----------------|-----------------|
| Principle       | MEMS capacitive |
| Measuring range | 300...1200 hPa  |
| Unit            | hPa             |
| Accuracy        | $\pm 1.5$ hPa   |
| Resolution      | 0.1 hPa         |



## PS10-30GI50-E2-Ex

| Características técnicas                        |                                                                 |
|-------------------------------------------------|-----------------------------------------------------------------|
| Tensão de alimentação                           | 10 a 30Vcc                                                      |
| Ripple                                          | ±10 %                                                           |
| Corrente de consumo                             | <10 mA                                                          |
| Diâmetro                                        | M30                                                             |
| Distancia sensora Sn                            | 10 mm                                                           |
| Montagem                                        | Embutida                                                        |
| Histerese                                       | ± 5 %                                                           |
| Repetibilidade                                  | <0,01 mm                                                        |
| Distancia operacional Sa                        | 8,1 mm                                                          |
| Alvo padrão                                     | 30x30 mm                                                        |
| Opções de cabo                                  | PU                                                              |
| Peso                                            | 205 g                                                           |
| Tipo de rosca                                   | M30 x 1,5mm                                                     |
| Diâmetro externo do cabo                        | 4 mm                                                            |
| Aplicação                                       | Áreas industriais comuns ou Atmosferas com poeiras combustíveis |
| Conexão elétrica                                | Cabo                                                            |
| Comprimento do cabo                             | 2 m PVC                                                         |
| Opções de comprimento do cabo                   | PVC 6 m PVC 10 m PVC 15 m PVC 20m PVC 25 m                      |
| Número de fios                                  | 3 Fios                                                          |
| Configuração elétrica                           | CC - PNP                                                        |
| Tipo de Contato                                 | NA                                                              |
| Corrente máxima de chaveamento                  | 200 mA                                                          |
| Proteção de saída                               | curto-circuito e inversão                                       |
| Queda de tensão no sensor<br>(carga energizada) | <2 V                                                            |
| Frequência de comutação<br>maxima               | 300 Hz                                                          |
| Involúcro                                       | roscado; latão com banho de níquel                              |
| Temperatura de operação uso<br>geral            | - 25 °C a + 70 °C                                               |
| Grau de proteção uso geral                      | IP67, IP69K                                                     |
| Opções materiais do involucro                   | GX (inox), GT (PTFE), GP (plástico)                             |
| Comprimento do tubo                             | 50 mm                                                           |
| Proteção Ex                                     | Proteção por invólucro contra poeiras explosivas                |
| Marcação                                        | Ex tb IIIC T100 °C Db IP65                                      |
| Grau de proteção Ex                             | IP65                                                            |
| Temperatura ambiente Ex                         | - 5 °C a + 70 °C                                                |
| Torque de aperto Recomendado                    | 3 Nm                                                            |



|                         |                           |
|-------------------------|---------------------------|
| Sinalização             | Traseira iluminada        |
| Certificado             | NCC 24.0194 X             |
| Validade                | 16/05/2027                |
| para poeira combustível | Ex tb IIIC T100°C Db IP65 |

## Accesório: Controles - Linha KMV

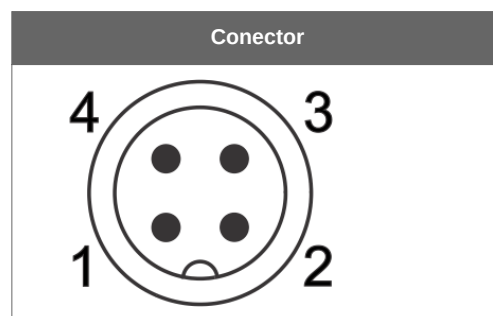
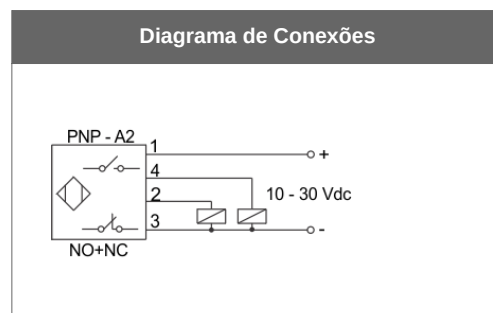
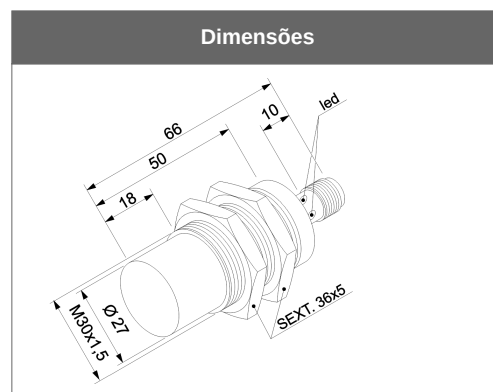
| Part Number | Modelo             | No canais  | Aplicação                  | Tensão de alimentação | Potência consumida                  |
|-------------|--------------------|------------|----------------------------|-----------------------|-------------------------------------|
| 52920552    | KMV-100/110-220Vac | Mono canal | Fonte com relé para sensor | 110Vca ou 220Vca      | 1 VA em 110 Vac e 1,7 VA em 220 Vac |

## Accesório: Suporte - Suporte Sensor Tubular

| Part Number | Modelo | Aplicação                          | Material     | Fixação                            |
|-------------|--------|------------------------------------|--------------|------------------------------------|
| 5000010249  | MS-30  | montagem de sensores tubulares M30 | aço inox 304 | através de parafusos M5x1 inclusos |

## PS15-30GI50-A2-V1-Ex

| Características técnicas          |                                                                 |
|-----------------------------------|-----------------------------------------------------------------|
| Tensão de alimentação             | 10 a 30Vcc                                                      |
| Ripple                            | ±10 %                                                           |
| Corrente de consumo               | <15 mA                                                          |
| Diâmetro                          | M30                                                             |
| Distancia sensora Sn              | 15 mm                                                           |
| Montagem                          | Não embutida                                                    |
| Histerese                         | ± 5 %                                                           |
| Repetibilidade                    | <0,01 mm                                                        |
| Distancia operacional Sa          | 12,15 mm                                                        |
| Alvo padrão                       | 45x45 mm                                                        |
| Peso                              | 125 g                                                           |
| Tipo de rosca                     | M30 x 1,5mm                                                     |
| Aplicação                         | Áreas industriais comuns ou Atmosferas com poeiras combustíveis |
| Conexão elétrica                  | Conector 4 pinos                                                |
| Configuração elétrica             | CC - PNP                                                        |
| Tipo de Contato                   | NA+NF                                                           |
| Corrente máxima de chaveamento    | 200 mA                                                          |
| Proteção de saída                 | curto-circuito e inversão                                       |
| Frequência de comutação máxima    | 100 Hz                                                          |
| Invólucro                         | roscado; latão com banho de níquel                              |
| Opções de comprimento do tubo     | 70 mm                                                           |
| Temperatura de operação uso geral | - 25 °C a + 70 °C                                               |
| Grau de proteção uso geral        | IP67, IP69K                                                     |
| Opções materiais do invólucro     | GX (inox), GT (PTFE), GP (plástico)                             |
| Comprimento do tubo               | 50 mm                                                           |
| Proteção Ex                       | Proteção por invólucro contra poeiras explosivas                |
| Marcação                          | Ex tb IIIC T100 °C Db IP65                                      |
| Grau de proteção Ex               | IP65                                                            |
| Temperatura ambiente Ex           | - 5 °C a + 70 °C                                                |
| Torque de aperto Recomendado      | 3 Nm                                                            |
| Sinalização                       | Micro led no conector                                           |
| Certificado                       | NCC 24.0194 X                                                   |
| Validade                          | 16/05/2027                                                      |
| para poeira combustível           | Ex tb IIIC T100°C Db IP65                                       |



## Accesório: Cabos Injetados - Conectores M12

| Part Number | Modelo   | Montagem | Número de contatos | Configuração elétrica | Número de fios |
|-------------|----------|----------|--------------------|-----------------------|----------------|
| 5000004847  | CF-V1R/2 | Reto     | 4 contatos         | CC                    | 4 fios         |

## Accesório: Controles - Linha KMV

| Part Number | Modelo             | No canais  | Aplicação                  | Tensão de alimentação | Potência consumida                  |
|-------------|--------------------|------------|----------------------------|-----------------------|-------------------------------------|
| 52920552    | KMV-100/110-220Vac | Mono canal | Fonte com relé para sensor | 110Vca ou 220Vca      | 1 VA em 110 Vac e 1,7 VA em 220 Vac |

## Accesório: Segurança - Trava de Segurança para Conector Reto

| Part Number | Modelo   | Função             | Aplicável à                     | Material do invólucro | Marcação |
|-------------|----------|--------------------|---------------------------------|-----------------------|----------|
| 5000006962  | CP-V1-Ex | Trava de segurança | equipamentos com conectores M12 | plastico engenharia   |          |

## Accesório: Conversor - Conversor de Sinal PNP para NPN

| Part Number | Modelo              | Montagem | Número de contatos | Configuração elétrica | Número de fios |
|-------------|---------------------|----------|--------------------|-----------------------|----------------|
| 5000009969  | CF-V190/2PU-PNP>NPN | 90°      | 4 contatos         | CC ? PNP / NPN        | 4 fios         |

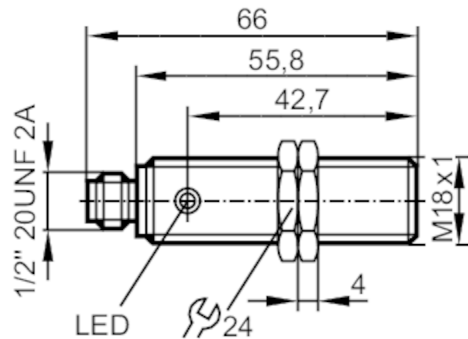
## Accesório: Suporte - Suporte Sensor Tubular

| Part Number | Modelo | Aplicação                          | Material     | Fixação                            |
|-------------|--------|------------------------------------|--------------|------------------------------------|
| 5000010249  | MS-30  | montagem de sensores tubulares M30 | aço inox 304 | através de parafusos M5x1 inclusos |



Sensor indutivo

IGB2005-ABOA/SL/LS-100AK/RT



Características do produto

|                          |                             |
|--------------------------|-----------------------------|
| Saída                    | normalmente aberto          |
| Alcance de detecção [mm] | 5                           |
| Invólucro                | forma construtiva de roscas |
| Dimensões [mm]           | M18 x 1 / L = 66            |

Dados elétricos

|                                        |                |
|----------------------------------------|----------------|
| Tensão de operação [V]                 | 20...250 AC/DC |
| Classe de proteção                     | I              |
| Proteção contra inversão de polaridade | não            |

Saídas

|                                                                        |                                                 |
|------------------------------------------------------------------------|-------------------------------------------------|
| Saída                                                                  | normalmente aberto                              |
| Queda de tensão máx. da saída de comutação DC [V]                      | 6                                               |
| Queda de tensão máx. da saída de comutação AC [V]                      | 6,5                                             |
| Corrente de saída mínima [mA]                                          | 5                                               |
| Corrente residual máx. [mA]                                            | 2,5 (250 V AC) / 1,3 (110 V AC) / 0,8 (24 V DC) |
| Intensidade de corrente máxima constante da saída de comutação AC [mA] | 250; (350 (...50 °C))                           |
| Intensidade de corrente máxima constante da saída de comutação DC [mA] | 100                                             |
| Intensidade de corrente máxima de pico da saída de comutação [mA]      | 2200; (20 ms / 0,5 Hz)                          |
| Frequência de comutação AC [Hz]                                        | 25                                              |
| Frequência de comutação DC [Hz]                                        | 100                                             |
| Proteção contra curto-circuitos                                        | não                                             |
| Proteção contra sobrecarga                                             | não                                             |



## Sensor indutivo

IGB2005-ABOA/SL/LS-100AK/RT

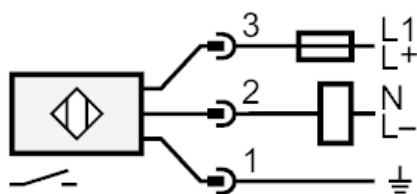
| Faixa de registro                |                       |                                                                                                        |
|----------------------------------|-----------------------|--------------------------------------------------------------------------------------------------------|
| Alcance de detecção              | [mm]                  | 5                                                                                                      |
| Distância real de comutação Sr   | [mm]                  | 5 ± 10 %                                                                                               |
| Distância de trabalho            | [mm]                  | 0...4,05                                                                                               |
| Precisão / desvios               |                       |                                                                                                        |
| Fator de correção                |                       | aço: 1 / aço inoxidável: 0,7 / latão: 0,4 / alumínio: 0,4 / cobre: 0,3                                 |
| Histerese                        | [% de Sr]             | 3...15                                                                                                 |
| Variação no ponto de comutação   | [% de Sr]             | -10...10                                                                                               |
| Condições ambientais             |                       |                                                                                                        |
| Temperatura ambiente             | [°C]                  | -25...80                                                                                               |
| Proteção                         |                       | IP 67                                                                                                  |
| Certificações / testes           |                       |                                                                                                        |
| EMC                              | EN 60947-5-2          |                                                                                                        |
|                                  | EN 55011              | classe B                                                                                               |
| MTTF                             | [anos]                | 609                                                                                                    |
| Certificado UL                   | Ta                    | 0...40 °C                                                                                              |
|                                  | Enclosure type        | Type 1                                                                                                 |
|                                  | Número do arquivo UL  | E174191                                                                                                |
| Dados mecânicos                  |                       |                                                                                                        |
| Peso                             | [g]                   | 62,6                                                                                                   |
| Invólucro                        |                       | forma construtiva de roscas                                                                            |
| Montagem                         |                       | embutido                                                                                               |
| Dimensões                        | [mm]                  | M18 x 1 / L = 66                                                                                       |
| Designação da rosca              |                       | M18 x 1                                                                                                |
| Materiais                        |                       | invólucro: latão revestido com bronze branco;<br>superfície ativa: PBT branco; janela LEDs: PBT branco |
| Máx. torque de aperto            | [Nm]                  | A = 4 mm: 13 Nm; B: 25 Nm                                                                              |
| Displays / elementos de operação |                       |                                                                                                        |
| Display                          | Status de chaveamento | 1 x LED, vermelho                                                                                      |
| Conexão elétrica                 |                       |                                                                                                        |
| Proteção necessária              |                       | fusível miniatura conforme a norma IEC60127-2 Folha 1; ≤ 2 A; rápido                                   |
| Acessórios                       |                       |                                                                                                        |
| Material incluído                |                       | porcas de fixação: 2                                                                                   |
| Observações                      |                       |                                                                                                        |
| Observações                      |                       | Dica: Depois de um curto circuito, testar as funções operacionais do aparelho.                         |
| Unidades por embalagem           |                       | 1 peça                                                                                                 |

## Sensor indutivo

IGB2005-ABOA/SL/LS-100AK/RT

### Conexão elétrica - conector

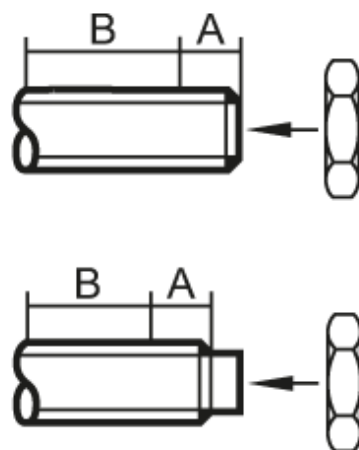
Conexão: 1 x 1/2"; codificação: C



Nota fusível miniatura conforme a norma IEC60127-2 Folha 1 ≤ 2 A rápido

### Diagramas e curvas

Montagem

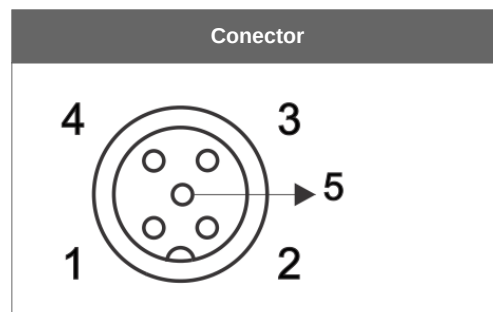
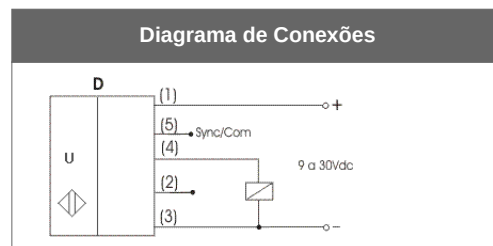
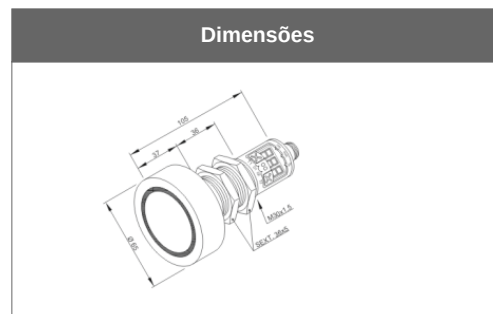




## MIC+600/D/TC

| Características técnicas       |                           |
|--------------------------------|---------------------------|
| Tipo                           | Digital                   |
| Fabricante                     | Microsonic                |
| Série                          | MIC+                      |
| Tensão de alimentação          | 09 a 30Vcc                |
| Ripple                         | 10 %                      |
| Corrente de consumo sem carga  | <80 mA                    |
| Diâmetro                       | M30                       |
| Distância sensora              | 6000 mm (ajustável)       |
| Zona morta                     | 600 mm                    |
| Distância máxima               | 8000 mm                   |
| Repetibilidade                 | +/- 0,15%                 |
| Material da frente             | PBT                       |
| Peso                           | 360 g                     |
| Tipo de rosca                  | M30 x 1,5mm               |
| Conexão                        | Conector M12 - 5 pinos    |
| Número de fios                 | 3 fios                    |
| Tipo de saída                  | PNP (simples)             |
| Frequência do Transdutor       | 80 KHz                    |
| Resolução                      | 0,18 mm                   |
| Corrente máxima de comutação   | 200 mA                    |
| Proteção de saída              | Curto-circuito e inversão |
| Frequência máxima de comutação | 2 Hz                      |
| Configuração de saída          | NA ou NF                  |
| Invólucro                      | Latão cromado             |
| Grau de Proteção               | IP 67                     |
| Temperatura de operação        | -25°C a +70°C             |
| Tipo de programação            | Touch control ou software |
| Programação por Software       | Via RS-232 (Link Control) |
| Indicador de funções           | Display 3 dígitos         |
| Funções indicadas no display   | mm / cm                   |
| Sinalização                    | LED's tricolor            |
| OBSERVAÇÕES                    |                           |

OBS: Para os sensores da linha MIC+ deve ser solicitado o cabo de conexão modelo CF-V15R/2PU ou CF-V1590/2PU



## Accesório: Conectores M12

| Part Number | Modelo       | Montagem | Número de contatos | Configuração elétrica | Número de fios |
|-------------|--------------|----------|--------------------|-----------------------|----------------|
| 5000005852  | CF-V1590/2PU | 90°      | 5 contatos         | CC                    | 5 fios         |

|            |             |      |            |    |        |
|------------|-------------|------|------------|----|--------|
| 5000004886 | CF-V15R/2PU | Reto | 5 contatos | CC | 5 fios |
|------------|-------------|------|------------|----|--------|

## Accesório: Fontes - Fontes KFT

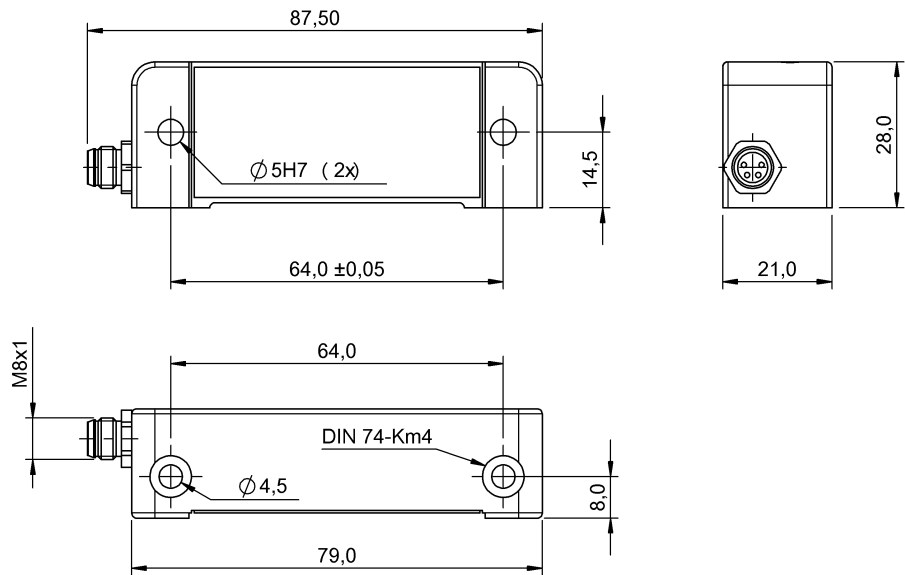
| Part Number | Modelo                | Fase       | Aplicação                  | Ajuste fino da tensão de saída | Potência consumida |
|-------------|-----------------------|------------|----------------------------|--------------------------------|--------------------|
| 5000003893  | KFT-24025R/110-220Vac | Monofásica | Uso geral 24Vdc/02,5A(máx) |                                | 75VA               |

## Accesório: Configurador - Configurador Link Control

| Part Number | Modelo    | Função       | Consumo sem carga | Tipo de conexão com sensor | Tipo de conexão com PC |
|-------------|-----------|--------------|-------------------|----------------------------|------------------------|
| 5000005726  | LCA-2     | Configurador | ? 25 mA           | Conector M12 4 pinos       | USB                    |
| 5000005819  | LCA-2-KIT | Configurador | ? 25 mA           | Conector M12 4 pinos       | USB                    |

## Accesório: Suporte - Suporte Sensor Tubular

| Part Number | Modelo | Aplicação                          | Material     | Fixação                            |
|-------------|--------|------------------------------------|--------------|------------------------------------|
| 5000010249  | MS-30  | montagem de sensores tubulares M30 | aço inox 304 | através de parafusos M5x1 inclusos |



#### Basic features

|                           |                                       |
|---------------------------|---------------------------------------|
| Certificação/conformidade | CE<br>WEEE                            |
| Norma básica              | EN 61326-1                            |
| Princípio de medição      | Sistema de medição baseado em fluidos |

#### Electrical connection

|                                              |      |
|----------------------------------------------|------|
| Conexão                                      | M8x1 |
| Protegido contra a possibilidade de inversão | sim  |
| Protegido contra inversão de polaridade      | sim  |
| Proteção contra curto-circuito               | sim  |

#### Electrical data

|                                              |             |
|----------------------------------------------|-------------|
| Classe de proteção                           | III         |
| Consumo de corrente, máx.                    | 33 mA       |
| Retardo da prontidão tv, máx.                | 1 s         |
| Tensão de serviço UB                         | 10...30 VDC |
| Tensão de serviço para dimensionamento Ue CC | 24 V        |

#### Environmental conditions

|                              |                      |
|------------------------------|----------------------|
| Classe de proteção           | IP67                 |
| EN 60068-2-27, choque        | sim                  |
| EN 60068-2-6, vibração       | sim                  |
| Grau de sujeira              | 2                    |
| Temperatura ambiente         | -40...85 °C          |
| Temperatura de armazenamento | -40...85 °C          |
| Umidade relativa do ar       | 95%, sem condensação |

#### Functional safety

|             |       |
|-------------|-------|
| MTTF (40°C) | 256 a |
|-------------|-------|

#### Interface

|                 |                               |
|-----------------|-------------------------------|
| Saída analógica | Análogica, corrente 4...20 mA |
|-----------------|-------------------------------|

#### Material

|                       |          |
|-----------------------|----------|
| Material do invólucro | Alumínio |
|-----------------------|----------|

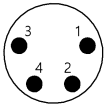
#### Mechanical data

|                    |                    |
|--------------------|--------------------|
| Dimensões          | 21 x 28 x 87.5 mm  |
| Eixos de medição   | 1                  |
| Fixação            | Parafusos          |
| Peso               | 80.00 g            |
| Sentido de rotação | No sentido horário |

#### Range/Distance

|                             |                     |
|-----------------------------|---------------------|
| Desvio de temperatura, máx. | ±0,01%/10 K         |
| Precisão                    | ±0,1 % FS mín. 0,1° |
| Resolução                   | ≤ 0,01 °            |
| Taxa de varredura           | 150 ms              |

## Connector Drawings



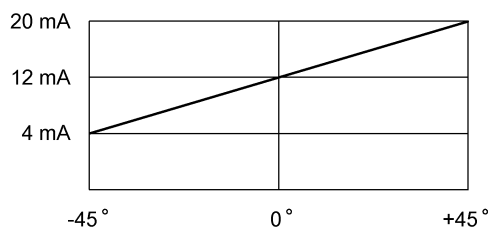
PINO 1: tensão de alimentação +

PINO 2: n.c.

PINO 3: GND

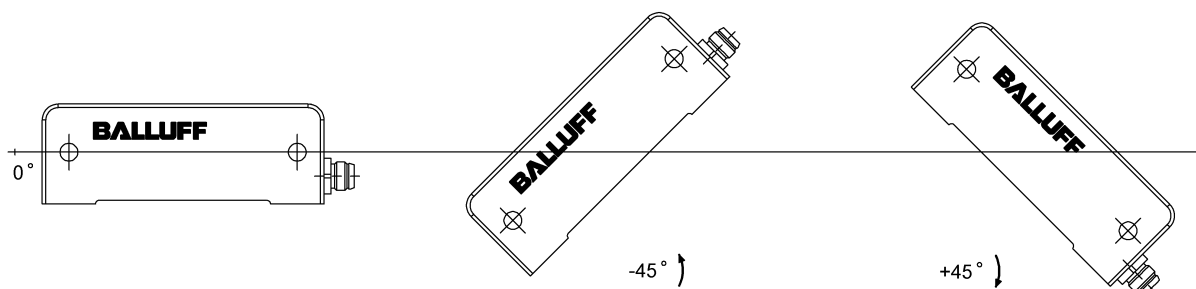
PINO 4: saída analógica

## Technical Drawings



Faixa de medição do sinal de saída

## Help Views



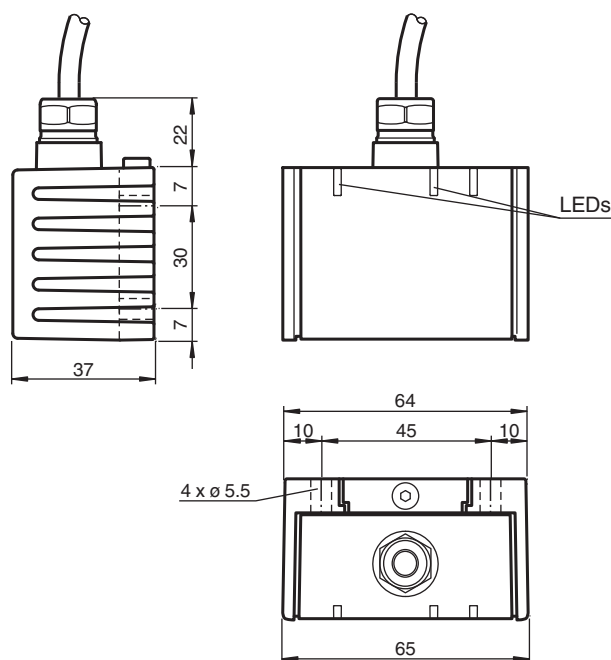


## Inclination sensor INY030D-F99-2I2E2-5M

- E1-Type approval
- Measuring range  $-15^{\circ} \dots +15^{\circ}$
- Analog output 4 mA ... 20 mA
- Fixed evaluation limits
- High shock resistance
- Increased noise immunity 100 V/m



### Dimensions



### Technical Data

#### General specifications

|                       |                               |
|-----------------------|-------------------------------|
| Type                  | Inclination sensor, 2-axis    |
| Measurement range     | $-15 \dots 15^{\circ}$        |
| Absolute accuracy     | $\leq \pm 0.2^{\circ}$        |
| Response delay        | $\leq 25 \text{ ms}$          |
| Resolution            | $\leq 0.01^{\circ}$           |
| Repeat accuracy       | $\leq \pm 0.02^{\circ}$       |
| Temperature influence | $\leq 0.004^{\circ}/\text{K}$ |

#### Functional safety related parameters

Release date: 2020-04-24 Date of issue: 2020-06-03 Filename: 222357\_eng.pdf

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

Pepperl+Fuchs Group  
www.pepperl-fuchs.com

USA: +1 330 486 0001  
fa-info@us.pepperl-fuchs.com

Germany: +49 621 776 1111  
fa-info@de.pepperl-fuchs.com

Singapore: +65 6779 9091  
fa-info@sg.pepperl-fuchs.com

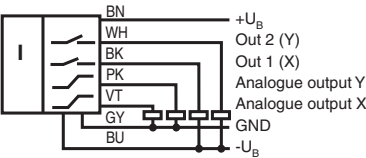
**PEPPERL+FUCHS**

## Technical Data

|                                                 |                |                                                                                            |
|-------------------------------------------------|----------------|--------------------------------------------------------------------------------------------|
| MTTF <sub>d</sub>                               |                | 304 a                                                                                      |
| Mission Time (T <sub>M</sub> )                  |                | 20 a                                                                                       |
| Diagnostic Coverage (DC)                        |                | 0 %                                                                                        |
| <b>Indicators/operating means</b>               |                |                                                                                            |
| Operation indicator                             |                | LED, green                                                                                 |
| Switching state                                 |                | 2 yellow LEDs: Switching status (each output)                                              |
| <b>Electrical specifications</b>                |                |                                                                                            |
| Operating voltage                               | U <sub>B</sub> | 10 ... 30 V DC                                                                             |
| No-load supply current                          | I <sub>0</sub> | ≤ 25 mA                                                                                    |
| Time delay before availability                  | t <sub>v</sub> | ≤ 200 ms                                                                                   |
| <b>Switching output</b>                         |                |                                                                                            |
| Output type                                     |                | 2 switch outputs PNP, NO , reverse polarity protected , short-circuit protected            |
| Operating current                               | I <sub>L</sub> | ≤ 100 mA                                                                                   |
| Voltage drop                                    |                | ≤ 3 V                                                                                      |
| <b>Analog output</b>                            |                |                                                                                            |
| Output type                                     |                | 2 current outputs 4 ... 20 mA<br>(one output for each axis)                                |
| Load resistor                                   |                | 0 ... 200 Ω at U <sub>B</sub> = 10 ... 18 V<br>0 ... 500 Ω at U <sub>B</sub> = 18 ... 30 V |
| <b>Compliance with standards and directives</b> |                |                                                                                            |
| Standard conformity                             |                |                                                                                            |
| Shock and impact resistance                     |                | 100 g according to DIN EN 60068-2-27                                                       |
| Standards                                       |                | EN 60947-5-2:2007<br>IEC 60947-5-2:2007                                                    |
| <b>Approvals and certificates</b>               |                |                                                                                            |
| UL approval                                     |                | cULus Listed, Class 2 Power Source                                                         |
| E1 Type approval                                |                | 10R-04                                                                                     |
| <b>Ambient conditions</b>                       |                |                                                                                            |
| Ambient temperature                             |                | -40 ... 85 °C (-40 ... 185 °F)                                                             |
| Storage temperature                             |                | -40 ... 85 °C (-40 ... 185 °F)                                                             |
| <b>Mechanical specifications</b>                |                |                                                                                            |
| Connection type                                 |                | 5 m, PUR cable 7 x 0.5 mm <sup>2</sup>                                                     |
| Housing material                                |                | PA                                                                                         |
| Degree of protection                            |                | IP68 / IP69K                                                                               |
| Mass                                            |                | 240 g                                                                                      |
| <b>Factory settings</b>                         |                |                                                                                            |
| Analog output (X)                               |                | -15 ° ... 15 °                                                                             |
| Analog output (Y)                               |                | -15 ° ... 15 °                                                                             |
| Switching output (X)                            |                | -15 ° ... 15 °                                                                             |
| Switching output (Y)                            |                | -15 ° ... 15 °                                                                             |

Connection

Standard symbol/Connection:



## Mounting

### Sensor Orientation

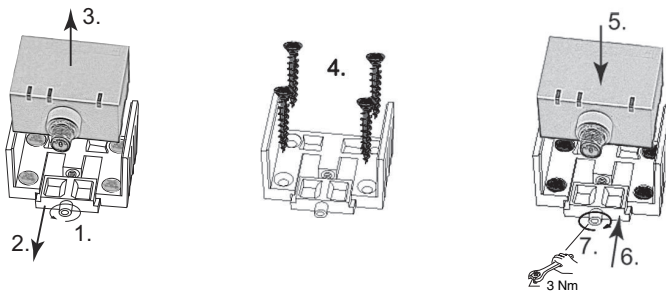
In the default setting the zero position of the sensor is reached, when the sensor is mounted on a horizontal plane and electrical connection faces sideways.

## Mounting

### Mounting of the sensor

Sensors from the -F99 series consist of a sensor module and accompanying cast aluminum housing. Select a horizontal flat surface with minimum dimensions of 70 mm x 50 mm to mount the sensor.

Mount the sensor as follows:



1. Loosen the central screw under the sensor connection.
  2. Slide back the clamping element until you are able to remove the sensor module from the housing.
  3. Remove the sensor module from the housing
  4. Position the housing at the required mounting location and secure using four countersunk screws. Make sure that the heads of the screws do not protrude.
  5. Place the sensor module in the housing.
  6. Slide the clamping element flush into the housing. Check that the sensor element is seated correctly.
  7. Finally tighten the central screw.
- The sensor is now mounted correctly.

## Technical Features

### EMC Properties

Interference immunity in accordance with  
DIN ISO 11452-2: 100 V/m

Frequency band 20 MHz up to 2 GHz

Mains-borne interference in accordance with ISO 7637-2:

|                   |                        |   |   |           |   |   |
|-------------------|------------------------|---|---|-----------|---|---|
| Pulse             | 1                      | 2 | 2 | 3         | 3 | 4 |
|                   |                        | a | b | a         | b |   |
| Severity level    | I                      | I | I | I         | I | I |
|                   | I                      | I | I | I         | I | I |
|                   | I                      | I | I | I         | I | I |
| Failure criterion | C                      | A | C | A         | A | C |
| EN 61000-4-2:     | CD: 8 kV               |   |   | AD: 15 kV |   |   |
|                   | /                      |   |   |           |   |   |
| Severity level    | IV                     |   |   | IV        |   |   |
| EN 61000-4-3:     | 30 V/m (80...2500 MHz) |   |   |           |   |   |
| Severity level    | IV                     |   |   |           |   |   |
| EN 61000-4-4:     | 2 kV                   |   |   |           |   |   |
| Severity level    | III                    |   |   |           |   |   |
| EN 61000-4-6:     | 10 V (0.01...80 MHz)   |   |   |           |   |   |
| Severity level    | III                    |   |   |           |   |   |
| EN 55011:         | Klasse A               |   |   |           |   |   |



## SM

### Características técnicas

Aplicação Áreas industriais comuns

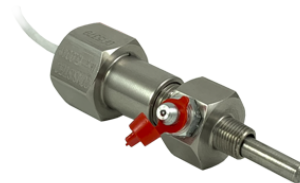
Sensor de temperatura Pt-100 ou termostato

Transmissor de temperatura 4-20 mA (opcional)

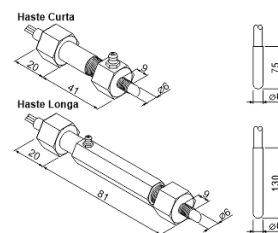
### OBSERVAÇÕES

Para maiores detalhes, consulte nossa engenharia de aplicações. Utilize a opção cutoomize para gerar o código completo do produto.

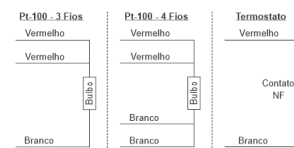
### Modelo



### Dimensões



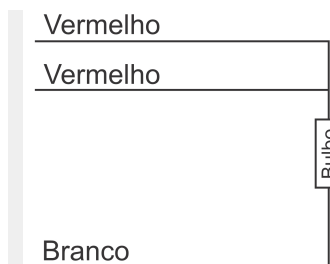
### Diagrama de Conexões



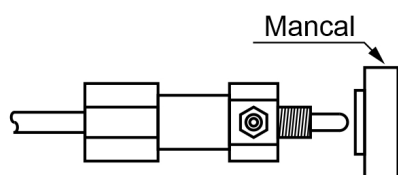
SM

Código Composto: SM-103-0-B75-P18-0-N-0-3

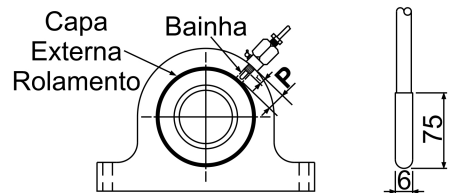
1 - Áreas industriais comuns



2 - PT 100 - 3 fios (standard)

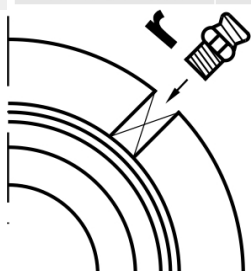


3 - Curto para diversas aplicações

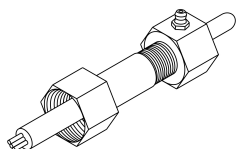


4 - Comprimento 75 mm (standard)

| Profundidade (P) | Bainha Recomendada |
|------------------|--------------------|
| 15 a 50 mm       | 75 mm              |



5 - Rosca 1/8 NPT (standard)



6 - Sem Transmissor Temperatura, somente os termoelementos (standard)

Reservamo-nos o direito de modificar as informações aqui contidas sem prévio aviso.

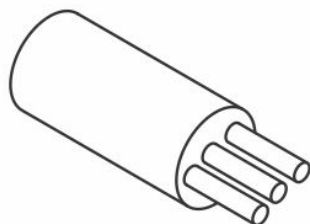




7 - Rosca fêmea 1/2" NPT (standard)



8 - Sem prensa cabo (standard)



9 - Com cabo 3 metros, para modelos com termoelementos (sem transmissor)



# TxRail-USB

## TRANSMISSOR DE TEMPERATURA – MANUAL DE OPERAÇÃO – V2.0x G

### 1. INTRODUÇÃO

O TxRail-USB é um avançado transmissor de temperatura programável e com conectores destacáveis para montagem em trilho DIN. Sua tecnologia microprocessada aceita configuração via USB, o que permite selecionar o tipo de entrada, a faixa de medição, o tipo de saída e realizar o processo de calibração. A saída do equipamento pode ser configurada via software para 4-20 mA ou 0-10 Vcc.

A corrente ou tensão de saída é linearizada de acordo com o sinal aplicado à entrada do transmissor e ajustada em função da escala configurada.

### 2. ESPECIFICAÇÕES

**Entrada de sensor:** Configurável. Os sensores aceitos estão listados na **Tabela 1**, com as respectivas faixas máximas de medida.

**Termopares:** Tipos J, K, R, S, T, N, E e B, conforme NBR 12771.

Impedância >> 1 MΩ

**Pt100:** Excitação de 0,8 mA,  $\alpha = 0.00385$ , conforme NBR 13773.

Para utilizar Pt100 2 fios, interligar terminais 3 e 4.

**Pt1000:** Tipo 3 fios, Excitação de 0,8 mA,  $\alpha = 0.00385$ , conforme NBR 13773.

Para utilizar Pt1000 2 fios, interligar terminais 3 e 4.

**NTC R<sub>25°C</sub>:** 10 kΩ ± 1 %, B<sub>25/85</sub> = 3435

**Tensão:** 0 a 50 mVcc. Impedância >> 1 MΩ

0 a 100 mVcc. Impedância >> 1 MΩ (\*)

(\*) Recurso disponível para equipamentos com versão de firmware a partir de V2.0x.

| Tipo de Sensor | Faixa Máxima de Medição | Faixa Mínima de Medição |
|----------------|-------------------------|-------------------------|
| Tensão         | 0 a 50 mV               | 5 mV                    |
| Tensão         | 0 a 100 mV              | 10 mV                   |
| Termopar K     | -150 a 1370 °C          | 100 °C                  |
| Termopar J     | -100 a 760 °C           | 100 °C                  |
| Termopar R     | -50 a 1760 °C           | 400 °C                  |
| Termopar S     | -50 a 1760 °C           | 400 °C                  |
| Termopar T     | -160 a 400 °C           | 100 °C                  |
| Termopar N     | -270 a 1300 °C          | 100 °C                  |
| Termopar E     | -90 a 720 °C            | 100 °C                  |
| Termopar B     | 500 a 1820 °C           | 400 °C                  |
| Pt100          | -200 a 650 °C           | 40 °C                   |
| Pt1000         | -200 a 650 °C           | 40 °C                   |
| NTC            | -30 a 120 °C            | 40 °C                   |

Tabela 1 – Sensores aceitos pelo transmissor

**Tempo entre energizar e estabilizar a medida:** < 2,5 s. A exatidão só será garantida após um período de 15 minutos.

**Condições de referência:** Ambiente: 25 °C, alimentação: 24 V, carga: 250 Ω. Tempo de estabilização: 10 minutos.

**Influência da temperatura:** < 0,16 % / 25 °C

**Tempo de resposta:** Típico 1,6 s

**Tensão máxima admissível nos terminais de entrada no sensor:** 3 V

**Corrente RTD:** 800 μA

**Efeito da resistência dos cabos de RTD:** 0,005 °C / Ω

**Resistência máxima admissível do cabo RTD:** 25 Ω

| Tipo de Sensor                 | Exatidão Típica | Exatidão Máxima |
|--------------------------------|-----------------|-----------------|
| Pt100 / Pt1000 (-150 a 400 °C) | 0,10 %          | 0,12 %          |
| Pt100 / Pt1000 (-200 a 650 °C) | 0,13 %          | 0,19 %          |
| K, J, T, E, N, R, S, B         | 0,1 % (*)       | 0,15 % (*)      |
| mV                             | 0,1 %           | 0,15 %          |
| NTC                            | 0,3 °C          | 0,7 °C          |

Tabela 2 – Erro de calibração, percentuais da faixa máxima do sensor

(\*) Adicionar compensação da Junta Fria: <± 1 °C

**Influência da alimentação:** 0,006 % / V típico (percentual da faixa máxima).

**Saída (4-20 mA):** Corrente de 4-20 mA ou 20-4 mA, tipo 2 fios; linear e proporcional a faixa configurada.

**Resolução da saída (4-20 mA):** 2 μA

**Saída (0-10 Vcc):** Tensão elétrica de 0-10 Vcc ou 10-0 Vcc, linear e proporcional à faixa configurada.

**Resolução da saída (0-10 Vcc):** 0,0025 V (12 bits)

**Alimentação:** 10 a 30 Vcc (saída 4-20 mA) e

12 a 30 Vcc (saída 0-10 Vcc).

**Carga Máxima (RL):** RL (máx.) = (Vcc – 10) / 0,02 [Ω]

Onde: Vcc = Tensão de Alimentação em Volts (de 10 a 30 Vcc)

**Temperatura de Operação:** -40 a 85 °C

**Umidade Ambiente:** 0 a 90 % UR

**Compatibilidade Eletromagnética:** EN 61326-1:2006

**Não apresenta isolamento elétrico entre entrada e saída.**

**Proteção interna contra inversão da polaridade da tensão de alimentação.**

**Compensação interna da Junta Fria para termopares.**

**Secção do fio utilizado:** 0,14 a 1,5 mm<sup>2</sup>

**Torque recomendado:** 0,8 Nm

**Caixa:** ABS UL94-HB

**Certificação:** CE, UKCA

### 3. CONFIGURAÇÃO

Quando for necessário alterar a configuração do equipamento, deve-se utilizar o software **SigNow**, o software **TxConfig II** ou o aplicativo **SigNow**.

No website da **NOVUS**, é possível baixar gratuitamente quaisquer dos softwares de configuração. Para realizar a instalação, basta executar o arquivo **SigNowSetup.exe** ou o arquivo **TxConfigIISetup.exe** e seguir as instruções do instalador.

Para configurar o equipamento por meio do software, deve-se utilizar a interface de configuração do transmissor (cabo USB), que pode ser adquirida junto ao fabricante ou em seus representantes autorizados:

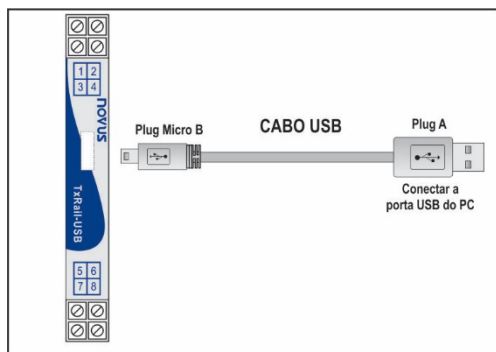


Figura 1 – Conexão do cabo USB

Durante a configuração, o transmissor é alimentado pela USB e não necessita de fonte externa.

Ao utilizar a energia da fonte que alimenta o processo, também é possível configurar o transmissor com este conectado ao loop.

Não há isolamento elétrico entre a entrada do transmissor e a porta (interface) de comunicação. Não se recomenda configurá-lo com a entrada de sensor ligada ao processo. Ver **Figura 2**.

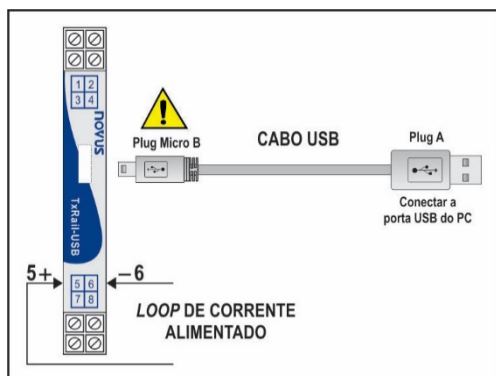


Figura 2 – Conexões do cabo USB – Alimentação pelo loop

Após realizar a conexão entre o equipamento e o computador utilizado, basta executar o **SigNow** ou o **TxConfig II**.

O aplicativo de configuração **SigNow** pode ser baixado gratuitamente na **Google Play Store**.

Para configurar o equipamento por meio do aplicativo, deve-se utilizar um adaptador *On The Go* (OTG). O procedimento de uso deste adaptador será explicado na seção [CONEXÕES DO SMARTPHONE](#).

Nela também será possível obter mais informações sobre como conectar o **TxRail-USB** ao próprio smartphone e configurar o equipamento.



A porta (interface) de comunicação USB do TxRail-USB não é isolada eletricamente da entrada do transmissor.

### 3.1 SOFTWARES E APLICATIVO

#### 3.1.1 SOFTWARE SIGNOW

Ao executar o software **SigNow** e realizar a conexão com o equipamento, a seguinte tela será exibida:

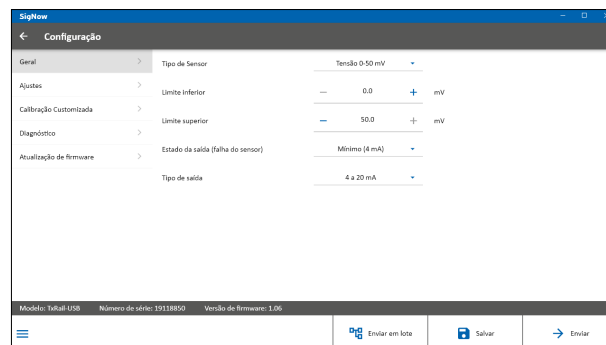


Figura 3 – Tela de configuração do SigNow

A parte inferior da tela apresenta informações sobre o modelo, número de série e versão de firmware.

A tela de configuração está dividida em 5 seções: Geral, Ajustes, Calibração Customizada, Diagnóstico e Atualização de Firmware.

Nas telas Geral (vista acima) e Ajustes, é possível configurar o equipamento ao definir valores e informações para os seguintes parâmetros:

- 1. Tipo de Sensor:** Permite selecionar o sensor a ser utilizado. Ver **Tabela 1**.
- 2. Limite Inferior:** Permite definir a temperatura desejada para o valor mínimo de retransmissão.
- 3. Limite Superior:** Permite definir a temperatura desejada para o valor máximo de retransmissão.
- 4. Estado da Saída (Falha do Sensor):** Permite estabelecer o comportamento da saída quando o transmissor indicar falha:  
**Mínimo:** A corrente de saída vai para < 3,8 mA ou a tensão de saída fica em 0 V (*down-scale*). Tipicamente utilizado em refrigeração.  
**Máximo:** A corrente de saída vai para > 20,5 mA ou a tensão de saída fica em 10 V (*up-scale*). Tipicamente utilizado em aquecimento.
- 5. Tipo de Saída:** Permite definir o tipo de saída a ser utilizado.
- 6. Offset (Ajuste de Zero):** Permite corrigir pequenos desvios apresentados na saída do transmissor, como, por exemplo, quando ocorrer a troca do sensor.

No manual do **SigNow**, disponível no website da **NOVUS**, é possível obter informações mais específicas sobre os botões e processo de diagnóstico e atualização de firmware.

### 3.1.2 SOFTWARE TXCONFIG II

Ao executar o software **TxConfig II** e realizar a conexão com o equipamento, a seguinte tela será exibida:

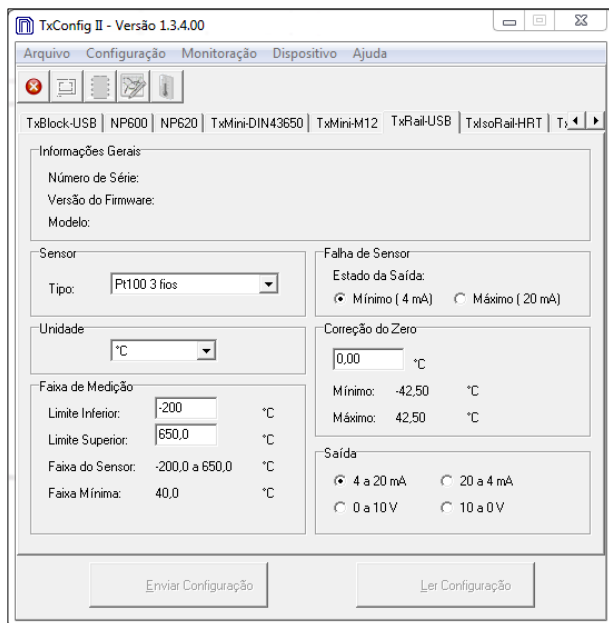


Figura 4 – Tela principal do TxConfig II

Os campos desta tela têm as seguintes funcionalidades:

- Informações Gerais:** Neste campo constam os dados que identificam o transmissor. Durante eventuais consultas, essas informações devem ser apresentadas ao fabricante.
- Sensor:** Permite selecionar o sensor a ser utilizado. Ver [Tabela 1](#).
- Faixa de Medição:** Permite definir a faixa de medição do transmissor.  
**Limite Inferior** de Faixa: Temperatura desejada para o valor mínimo de retransmissão.  
**Limite Superior** de Faixa: Temperatura desejada para o valor máximo de retransmissão.
- Faixa do Sensor**  
Os valores escolhidos não podem ultrapassar a **Faixa do Sensor** mostrada neste mesmo campo. Ver [Tabela 1](#).
- Faixa Mínima**  
Não podem estabelecer faixa com largura (*span*) menor que o valor de **Faixa Mínima** indicado mais abaixo neste mesmo campo. Ver [Tabela 1](#).
- Falha de Sensor:** Permite estabelecer o comportamento da saída quando o transmissor indicar falha:  
**Mínimo:** A corrente de saída vai para < 3,8 mA ou a tensão de saída fica em 0 V (*down-scale*). Tipicamente utilizado em refrigeração.  
**Máximo:** A corrente de saída vai para > 20,5 mA ou a tensão de saída fica em 10 V (*up-scale*). Tipicamente utilizado em aquecimento.
- Correção do Zero:** Permite corrigir pequenos desvios apresentados na saída do transmissor, como, por exemplo, quando ocorrer a troca do sensor.
- Enviar Configuração:** Permite enviar a nova configuração. Uma vez enviada, a configuração será imediatamente adotada pelo transmissor.
- Ler Configuração:** Permite ler a configuração presente no transmissor conectado. A tela passa a apresentar a configuração atual, que poderá ser alterada pelo usuário.

### 3.1.3 APLICATIVO SIGNOW

Ao executar o aplicativo **SigNow** e realizar a conexão com o equipamento, a seguinte tela será exibida:

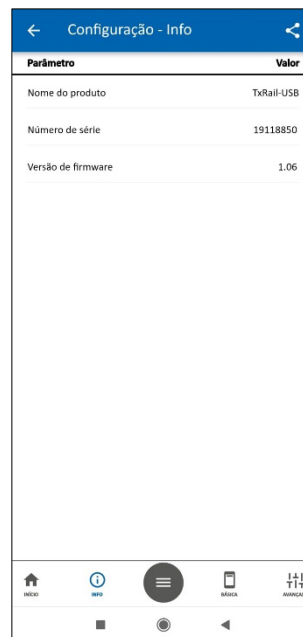


Figura 5 – Tela de informações

Nela, é possível visualizar informações sobre o equipamento, como nome, número de série e versão de firmware.

Ao abrir a seção **Básica** ou a seção **Avançada**, é possível configurar os parâmetros expostos na seção [SOFTWARE SIGNOW](#).

No manual do **SigNow**, disponível no website da **NOVUS**, é possível obter informações mais específicas sobre os botões e processo de diagnóstico e atualização de firmware.

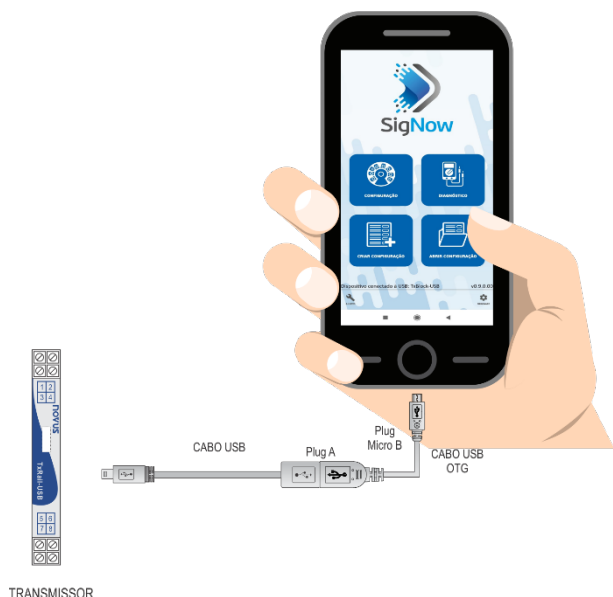
## 3.2 CONFIGURAÇÃO DE FÁBRICA

- Sensor: Pt100 3 fios, faixa: 0 a 100 °C;
- Saída em máximo para falha de sensor;
- 0 °C de correção de zero;
- Unidade: °C;
- Saída: 4-20 mA.

## 4. CONEXÕES DO SMARTPHONE

Smartphones com a tecnologia *On the Go* (OTG) podem ser diretamente conectados ao equipamento por meio da entrada Micro-USB. Isso permite reconhecer e configurar o **TxRail-USB** ao executar o aplicativo **SigNow**.

Para tanto, como pode ser visto na **Figura 6**, é necessário observar o modo de conexão do cabo *On the Go* no equipamento:



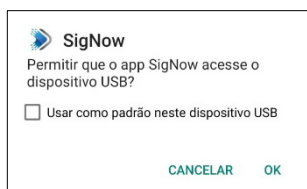
**Figura 6 –** Conexão do cabo *On the Go*



O posicionamento incorreto da ponta do cabo pode fazer com que o equipamento não seja reconhecido pelo aplicativo.

### 4.1 CONFIGURANDO O TXRAIL-USB COM O APLICATIVO SIGNED

Uma vez feita a conexão entre o smartphone e o **TxRail-USB**, o smartphone enviará a seguinte mensagem:



**Figura 7 –** Dispositivo USB conectado

Para o correto funcionamento do aplicativo, deve-se marcar a opção "Usar como padrão neste dispositivo USB" e, em seguida, clicar no botão OK.

Depois disso, o smartphone executará automaticamente o aplicativo **SigNow**, tendo este já sido previamente instalado, e exibirá a seguinte tela inicial:



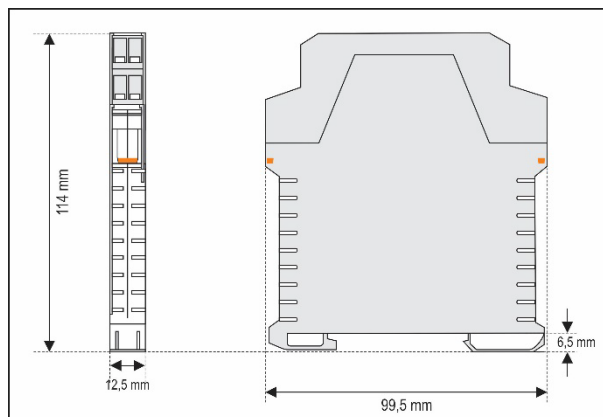
**Figura 8 –** Tela inicial do SigNow

Ao clicar na opção **Configuração**, o aplicativo se conectará ao equipamento e permitirá configurar o **TxRail-USB**.

## 5. INSTALAÇÃO MECÂNICA

O transmissor **TxRail-USB** é próprio para ser instalado em trilho DIN 35 mm. Vibrações, umidade e temperatura excessivas, interferências eletromagnéticas, alta tensão e outras interferências podem danificar o equipamento permanentemente, além de poder causar erro no valor medido.

### 5.1 DIMENSÕES



**Figura 9 –** Dimensões do transmissor



## 5.2 ABRINDO O TRANSMISSOR

Para abrir o transmissor, devem-se pressionar os dois bornes laterais em laranja e puxar a tampa frontal do equipamento com cuidado, conforme **Figura 10**:

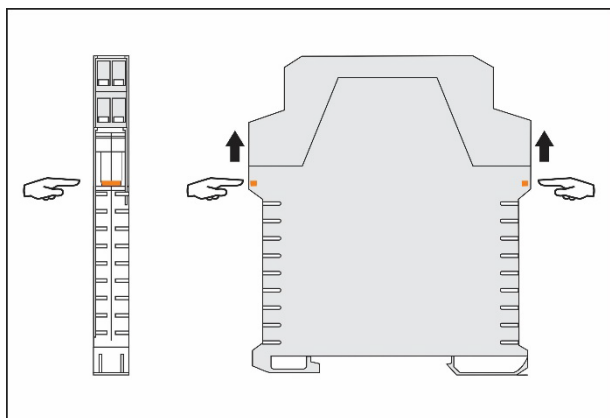


Figura 10 – Abrindo o transmissor

## 5.3 REMOVENDO OS CONECTORES

Os conectores do transmissor são destacáveis, podendo ser removidos manualmente ou com a ajuda de uma chave de fenda:

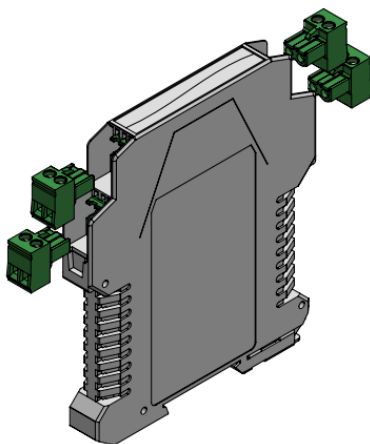


Figura 11 – Conectores removíveis

## 6. INSTALAÇÃO ELÉTRICA

A **Figura 11** mostra as conexões elétricas necessárias. Para conexões de entrada termopar, RTD, resistência e tensão no transmissor **TxRail-USB**, seguir conforme figura abaixo:

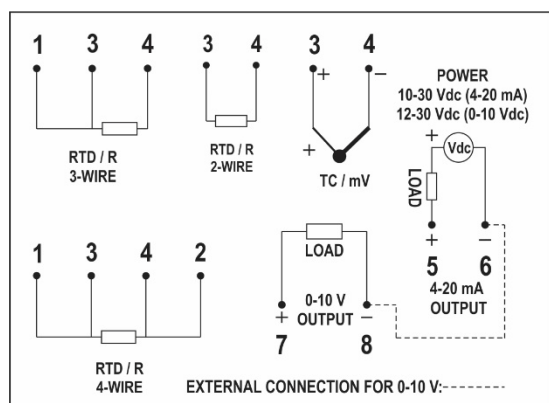


Figura 12 – Conexões elétricas

Onde **CARGA (LOAD)** representa o instrumento medidor de corrente 4-20 mA ou tensão 0-10 V (indicador, controlador, registrador etc.).

- Invólucro dos terminais em poliamida.
- Secção do fio utilizado: 0,14 a 1,5 mm².

- Torque recomendado no terminal: 0,8 Nm.

## 6.1 RECOMENDAÇÕES PARA A INSTALAÇÃO

- Condutores de sinais de entrada devem percorrer a planta do sistema em separado dos condutores de saída e de alimentação. Se possível, em eletrodutos aterrados.
- A alimentação dos instrumentos deve vir de uma rede própria para a instrumentação.
- Em aplicações de controle e monitoração, é essencial considerar o que pode acontecer quando qualquer parte do sistema falhar.
- É recomendável o uso de FILTROS RC ( $47 \Omega$  e  $100 \text{ nF}$ , série) em bobinas de contactoras, solenoides etc.

## 6.2 CONEXÕES ELÉTRICAS

As figuras abaixo mostram as conexões elétricas necessárias. Os terminais 1, 2, 3 e 4 são dedicados à conexão do sensor. **CARGA** representa o aparelho medidor de corrente 4-20 mA ou tensão 0-10 V (indicador, controlador, registrador etc.).

### 6.2.1 PT100 / PT1000 2 FIOS / NTC

**Nota:** Ao utilizar o Pt100 / Pt1000 2 fios, os terminais 1 e 3 devem ser interligados, conforme figura abaixo.

Para utilizar o Pt100 / Pt1000 2 fios, é necessário configurar a opção Pt100 / Pt1000 3 fios nos softwares **SigNow** ou **TxConfig II** ou no aplicativo **SigNow**.

Para que não ocorram erros na resistência do cabo, o comprimento do cabo do Pt100 / Pt1000 **deverá ser menor que 30 cm**.

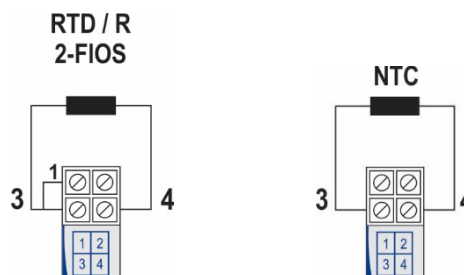


Figura 13 – Pt100 / Pt1000 2 fios e NTC

### 6.2.2 PT100 / PT1000 3 FIOS

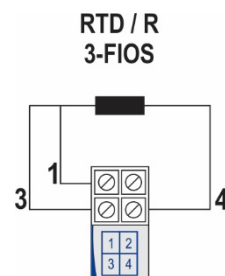


Figura 14 – Pt100 / Pt1000 3 fios

### 6.2.3 PT100 4 FIOS

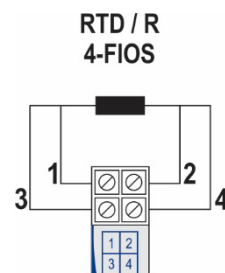


Figura 15 – Pt100 4 fios

**Pt100 3 e 4 fios / Pt1000 3 fios:** Para compensar corretamente as resistências do cabo do RTD, elas devem ser iguais em todos os terminais e não podem ultrapassar 25  $\Omega$  por cabo. A fim de garantir essas condições, recomenda-se usar um cabo de 3 ou 4 fios com o mesmo comprimento e a mesma bitola.

#### 6.2.4 TERMOPARES

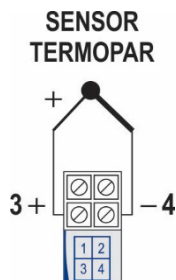


Figura 16 – Termopar

#### 6.2.5 TENSÃO (0-50 mV / 0-100 mV)

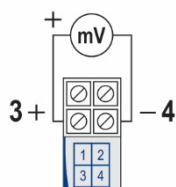


Figura 17 – 0-50 mV / 0-100 mV

#### 6.2.6 SAÍDAS (0-10 V E 4-20 mA)

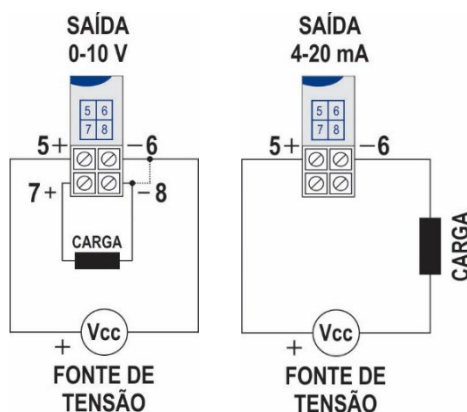


Figura 18 – 0-10 V e 4-20 mA

## 7. OPERAÇÃO

É possível alterar o Offset do sensor por meio dos softwares **SigNow** e **TxConfig II** ou do aplicativo **SigNow**.

A conexão USB pode ser feita mesmo com o transmissor ligado ao processo e operando, sem ocasionar erros na medida (ver informações sobre o parâmetro **Ajuste de Zero** no capítulo [CONFIGURAÇÃO](#)).

O usuário deve escolher o sensor e a faixa mais adequados ao processo. A faixa escolhida não deve ultrapassar a faixa máxima de medição definida para o sensor e não deve ser menor que a faixa mínima para esse mesmo sensor.

É importante observar que, mesmo ao configurar uma faixa intermediária, a exatidão do transmissor é sempre baseada na faixa máxima do sensor utilizado. **Exemplo:**

- Se o sensor Pt100 estiver na faixa de 0 a 100  $^{\circ}\text{C}$  e a exatidão for de 0,12 %, haverá um erro máximo de até 1,02  $^{\circ}\text{C}$  (0,12 % de 850  $^{\circ}\text{C}$ ).

- Se o sensor Pt100 estiver na faixa 500 a 600  $^{\circ}\text{C}$  e exatidão for de 0,19 %, haverá um erro máximo de até 1,61  $^{\circ}\text{C}$  (0,19 % de 850  $^{\circ}\text{C}$ ).

**Nota:** Ao efetuar aferições no transmissor, deve-se observar se a corrente de excitação de Pt100 exigida pelo calibrador utilizado é compatível com a corrente de excitação de Pt100 usada no transmissor: 0,8 mA.

## 8. GARANTIA

As condições de garantia se encontram em nosso website [www.novus.com.br/garantia](http://www.novus.com.br/garantia).



## Dados

### Dados para encomenda

|                   |                  |
|-------------------|------------------|
| PM_TYPE_NAME      | EX-ZS 235-02Z-3D |
| PM_ORDER_NUMBER   | 101214399        |
| SAP_EAN           | 4030661398570    |
| CODE_ECLASS_V12P0 | 27-27-26-01      |
| CODE_ECLASS_V11P0 | 27-27-26-01      |
| CODE_ECLASS_V09P0 | 27-27-26-01      |
| CODE_ETIM_V07P0   | EC000030         |
| CODE_ETIM_V06P0   | EC000030         |

### Homologações - Instruções

|                        |                              |
|------------------------|------------------------------|
| PNV_NORM_CERTIFICATION | ATEX (Konformitätserklärung) |
|------------------------|------------------------------|

### Proteção contra explosão

|                       |                                                  |
|-----------------------|--------------------------------------------------|
| EXPL_PROTECT_STANDARD | EN IEC 60079-0<br>EN IEC 60079-15<br>EN 60079-31 |
| EXPL_PROTECT_ZONE     | 2<br>22                                          |

|                            |                                                                                                                                                                                                                            |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EXPL_PROTECT_CAT           | 3G<br>3D                                                                                                                                                                                                                   |
| EXPL_PROTECT_MARK          |  II 3G Ex nC IIC T5 Gc X<br> II 3D Ex tc IIIC T90°C Dc X |
| EXPL_MANUFACTURER_DECLARAT | Zona ATEX 2 e 22                                                                                                                                                                                                           |

### Propriedades globais

|                              |                                           |
|------------------------------|-------------------------------------------|
| NORM_STANDARD                | BG-GS-ET-15<br>EN IEC 60947-5-1           |
| DESIGN_HOUSING               | Design construtivo padrão                 |
| DESIGN_ACT_TYPE_DIN_EN_50047 | B                                         |
| MAT_HOUSING                  | Filme metálico, zinco fundido sob pressão |
| MAT_HOUSING_COATING          | pintura de fábrica                        |
| SAP_WEIGHT_GROSS             | 195                                       |

### Propriedades globais - Características

|                      |     |
|----------------------|-----|
| YN_FIT_FOR_SAFE_FUNC | Sim |
| NUM_OF_CONT_SUB      | 0   |
| NUM_OF_SAFE_CONT     | 2   |

### Classificação

|                    |                |
|--------------------|----------------|
| SAFE_NORM_STANDARD | EN ISO 13849-1 |
| SAFE_MISSION_TIME  | 20             |

### Classificação - saídas de segurança

|                   |            |
|-------------------|------------|
| SAFE_B10D_NC_SOUT | 20.000.000 |
|-------------------|------------|

### Dados mecânicos

|                                 |                  |
|---------------------------------|------------------|
| DESIGN_ACT_ELEMENT              | Pinos de pressão |
| DESIGN_MECH_LIFETIME_SWITCH_MIN | 20.000.000       |
| FORCE_ACT_MIN                   | 9                |

|                          |    |
|--------------------------|----|
| FORCE_POSITIVE_BREAK_MIN | 19 |
| MOTION_ACT_SPEED_MIN     | 10 |
| MOTION_ACT_SPEED_MAX     | 1  |

### Dados mecânicos - Tecnologia conectiva

|                                  |                                                      |
|----------------------------------|------------------------------------------------------|
| REVIEW_ELEC_WIRING_GENERAL       | Ligação por parafuso M20 x 1.5                       |
| DIM_DIAM_CABLE_GLAND_HOLDING_MIN | 7                                                    |
| DIM_DIAM_CABLE_GLAND_HOLDING_MAX | 12                                                   |
| ELEC_CABLE_SECTION_MIN           | 0,75 mm <sup>2</sup>                                 |
| ELEC_CABLE_SECTION_MAX           | 2,5 mm <sup>2</sup>                                  |
| NOTE_ELEC_CABLE_SECTION          | Todas as especificações incluindo ponteiros de cabo. |
| DIM_DIAM_AWG_WIRE                | 13                                                   |

### Dados mecânicos - dimensões

|                   |      |
|-------------------|------|
| DIM_LENGTH_SENSOR | 30   |
| DIM_WIDTH_SENSOR  | 30   |
| DIM_HEIGHT_SENSOR | 75,5 |

### Ambiente

|                         |                |
|-------------------------|----------------|
| DESIGN_IP_CLASS_GENERAL | IP67           |
| TEMP_AMB_GPV            | -20 ... +60 °C |

### Ambiente - Parâmetros de isolamento

|                              |       |
|------------------------------|-------|
| VOLT_RATED_INSULAT           | 500 V |
| VOLT_RATED_IMPULSE_WITHSTAND | 6     |

### Dados elétricos

|                         |     |
|-------------------------|-----|
| CURR_THERMAL_CONTINUOUS | 10  |
| VOLT_UTILISAT_CAT_AC15  | 230 |
| CURR_UTILISAT_CAT_AC15  | 4   |

|                              |                                       |
|------------------------------|---------------------------------------|
| VOLT_UTILISAT_CAT_DC13       | 24                                    |
| CURR_UTILISAT_CAT_DC13       | 1                                     |
| REVIEW_DESIGN_SWITCH_ELEMENT | 2 contactos normalmente fechados (NF) |
| DESIGN_SWITCH                | Comutação de ação rápida              |
| TIME_BOUNCE_DURAT_MAX        | 3                                     |
| TIME_FREQ_OF_OPERAT_MAX      | 5.000                                 |
| TIME_SWITCHOVER_MIN          | 5,5                                   |
| MAT_CONT_ELEC                | Prata                                 |

### Escopo do fornecimento

|                        |                                  |
|------------------------|----------------------------------|
| SCOPE_OF_DELIV_GENERAL | Bucin roscado com certificado EX |
|------------------------|----------------------------------|

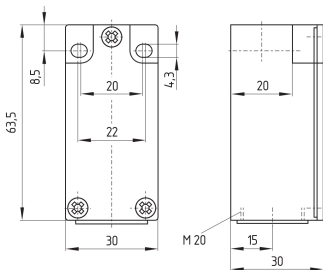
### Imagens

#### Foto do produto (foto individual do catálogo )



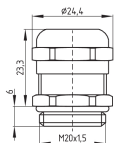
ID: k235sf01  
| 620,3 kB | .jpg | 352.778 x 668.867 mm - 1000 x 1896 px - 72 dpi  
| 79,6 kB | .png | 74.083 x 140.406 mm - 210 x 398 px - 72 dpi  
| 71,8 kB | .png | 65.264 x 123.472 mm - 185 x 350 px - 72 dpi  
| 31,1 kB | .png | 74.083 x 74.083 mm - 210 x 210 px - 72 dpi

#### Desenho dimensional componente básico



ID: k-235g01  
| 24,5 kB | .cdr |  
| 3,6 kB | .png | 74.083 x 61.736 mm - 210 x 175 px - 72 dpi  
| 111,2 kB | .jpg | 352.778 x 293.511 mm - 1000 x 832 px - 72 dpi

#### Desenho dimensional componente básico

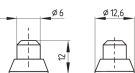


ID: 1xzm1g07

| 2,5 kB | .png | 74.083 x 51.153 mm - 210 x 145 px - 72 dpi

| 46,3 kB | .jpg | 352.778 x 243.769 mm - 1000 x 691 px - 72 dpi

## Desenho dimensional Atuador



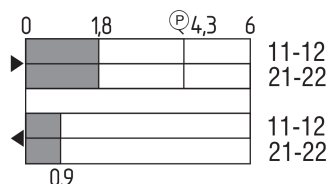
ID: 1s236g01

| 36,9 kB | .cdr |

| 1,7 kB | .png | 74.083 x 52.211 mm - 210 x 148 px - 72 dpi

| 29,8 kB | .jpg | 352.778 x 248.003 mm - 1000 x 703 px - 72 dpi

## Diagrama das comutações



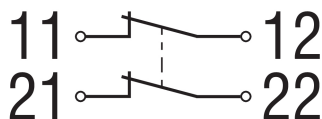
ID: kr235s11

| 26,7 kB | .cdr |

| 2,2 kB | .png | 74.083 x 41.628 mm - 210 x 118 px - 72 dpi

| 71,1 kB | .jpg | 352.778 x 197.908 mm - 1000 x 561 px - 72 dpi

## Diagrama



ID: k2o--k01

| 48,8 kB | .jpg | 352.778 x 125.236 mm - 1000 x 355 px - 72 dpi

| 2,3 kB | .png | 74.083 x 26.458 mm - 210 x 75 px - 72 dpi

ACE Schmersal Eletroeletrônica Ind. Ltda, Av. Brasil, nº 815, Jardim Esplanada – CEP 18557-646 Boituva/SP  
Os dados e informações anteriores foram verificados cuidadosamente. As imagens podem ser diferentes do original. Mais informações técnicas podem ser encontradas nos manuais de instruções. Sujeito a modificações técnicas e erros.

Gerado em 11/11/2025 19:46



# Safety Rope Switches from IDEM

## Data Sheet

## Guardian Line Series



Heavy Duty Types: GLHD (Dual Head)  
GLHD-SS (Dual Head)



GLHR/L (Single Head)  
GLHR/L-SS (Single Head)



Standard Duty Types: GLS  
GLS-SS



Mini Duty Type: GLM  
GLM-SS

## Using Safety Rope Emergency Stop Switches

### Application:

Safety Rope Emergency Stop Switches are mounted on machines and sections of plant conveyors which cannot be protected by guards. In contrast to traditional mushroom head type Emergency Stop buttons, Safety Rope Switches can initiate the emergency command from any point along the installed rope length. In combination with any dual channel safety monitoring controllers IDEM Safety Rope Systems can be used as emergency stop devices and monitored for up to Category PLe/Cat.4 to ISO13849-1. It is the responsibility of the user to ensure the correct overall functionality of its systems and machines. IDEM, its subsidiaries and affiliates, are not in a position to guarantee all of the characteristics of a given system or product not designed by IDEM.

### Operation:

All IDEM Safety Rope Emergency Stop Switches conform to Standards ISO13850 and IEC60947-5-5. They have a positive mechanical linkage between the switch contacts and the wire rope as per IEC60947-5-1. The emergency stop switches are brought into the operational condition by pre-tensioning the rope by use of a tensioner/gripper device which clamps the rope and then hooks to the switch eyebolts. Correct tension can be observed by viewing the tension indicator on the switch housing. Once tensioned the switch contact blocks can be set to the operational condition (safety contacts closed, auxiliary contacts open) by pressing a blue reset button on the switch cover.

All of the Safety Rope Switches have wire-breakage monitoring. On pulling or breakage (tension loss) of the rope, the safety contacts are positively opened and the auxiliary contacts are closed. The switches are mechanically latched and can then only be returned to the operating condition by pressing the reset button as required by ISO13850.

### Installation Guide:

1. Installation of all IDEM Safety Rope Switch systems must be in accordance with a risk assessment for the individual application. Installation must only be carried out by competent personnel and in accordance with these instructions.
2. According to ISO13850 pulleys may only be mounted such that a complete length of the rope can be observed.
3. Rope support eyebolts must be fitted at 2.5 m. min. to 3m. max. intervals along all rope lengths between switches. The rope must be supported no more than 500mm from the Switch eyebolt or Safety Spring (if used). It is important that this first 500mm is not used as part of the active protection coverage.
4. M5 mounting bolts must be used to fix the switches. Tightening torque for mounting bolts to ensure reliable fixing is 4 Nm. Tightening torque for the lid screws, conduit entry plugs and cable glands must be 1.5 Nm to ensure IP seal. Only use the correct size gland for the conduit entry and cable outside diameter.
5. Tensioning of rope is achieved by use of IDEM tensioner/gripper assemblies.

On installation set the tension to the mid position as indicated by the markers in the viewing window of each switch. Check operation of all switches and the control circuits by pulling the rope at various locations along the active protection area and resetting each switch by depressing the Blue Reset button. Ensure each time that the switches latch off and require manual resetting by depressing the blue reset button. Increase the system tension further, if required, depending upon the checks along the active length of coverage.

If fitted with a Mushroom type E-Stop button (Red) then test and reset each switch to ensure correct function of the safety control circuits.

Typical operational condition for successful operation of the system is less than 75N. pulling force and less than 150mm deflection of rope between eyebolt supports.

### 6. Maintenance:

**Every Month:** Check correct operation of system at locations along all coverage length. Check for nominal tension setting, re-tension rope if necessary.

**Every 6 Months:** Isolate power and remove cover. Check screw terminal tightness and check for signs of moisture ingress. Never attempt to repair any switch.

### Original Instructions.

To request this data sheet in other languages please contact [info@idemsafety.com](mailto:info@idemsafety.com)  
Um dieses Datenblatt in Deutscher Sprache wenden Sie sich bitte anfordern [info@idemsafety.com](mailto:info@idemsafety.com)  
Pour obtenir cette fiche en Français, veuillez contacter [info@idemsafety.com](mailto:info@idemsafety.com)  
Para solicitar esta hoja de datos en Español, por favor contacto con [info@idemsafety.com](mailto:info@idemsafety.com)



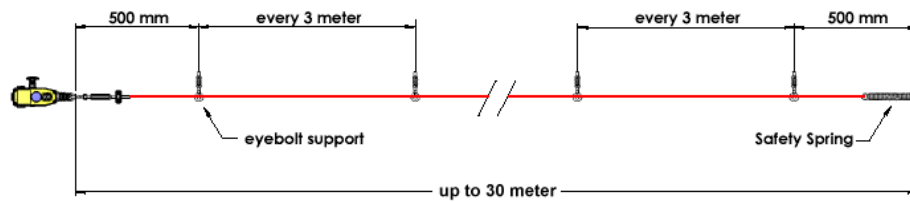
**WARNING: DO NOT DEFEAT, TAMPER, OR BYPASS THE SAFETY FUNCTION. FAILURE TO DO SO CAN RESULT IN DEATH OR SERIOUS INJURY.**

**AVERTISSEMENT: NE PAS DESACTIVER, MODIFIER, RETIRER, OU CONTOURNER CETI INTERVERROUILLAGE IL PEUT EN RESULTER DES BLESSURES GRAVES DU PERSONNEL UTILISATEUR.**

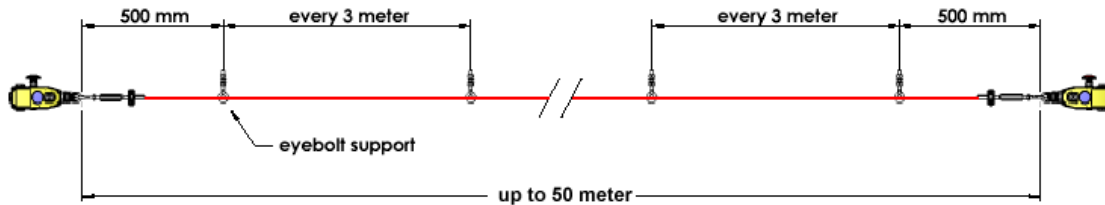


# Safety Rope Switches from IDEM

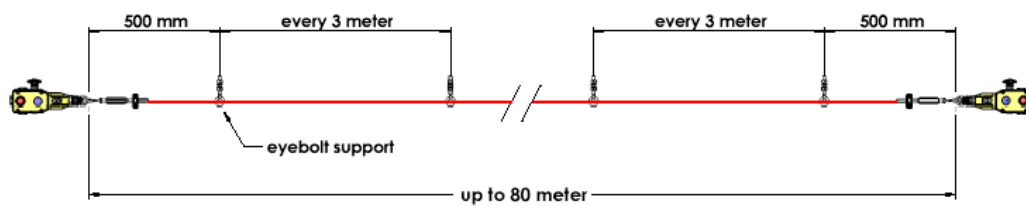
7. Recommended rope span options and fittings - (subject to an individual risk assessment for the installation):



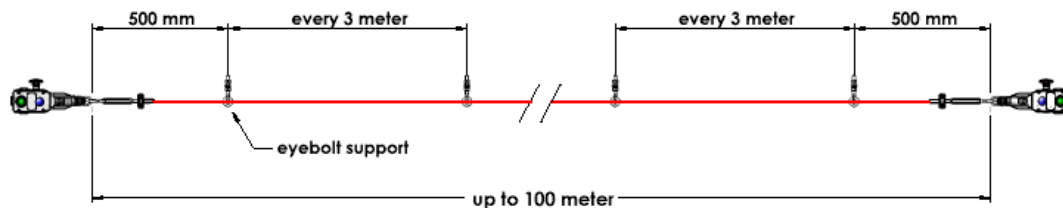
GLM 30m.  
with Safety Spring



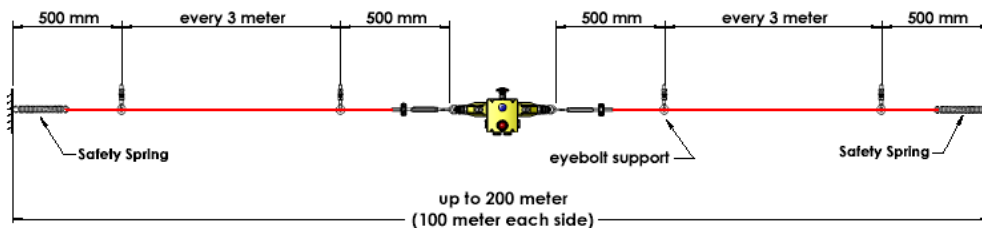
GLM 50m.



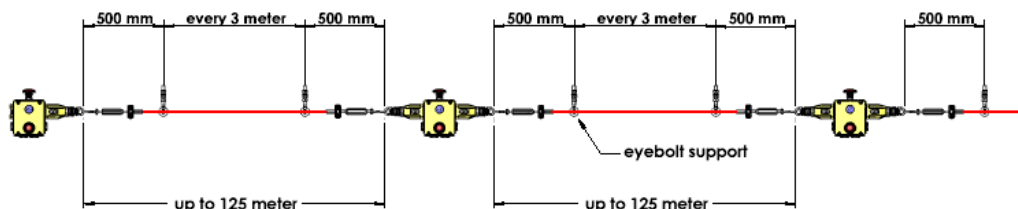
GLS 80m.



GLS-SS 100m.



GLHD 200m.  
with Safety Springs



GLHD/L/R 250m.

|                |
|----------------|
| Contact open   |
| Contact closed |

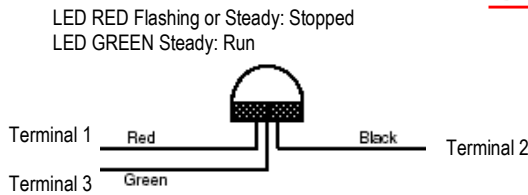
0mm                      3.5mm                      14.5mm                      17.0mm

Typical operating conditions:

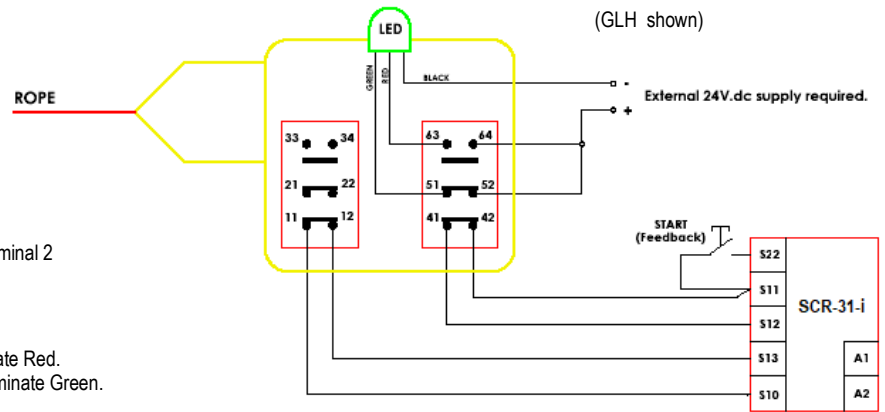
| EX | 2NC 1NO | 3NC 1NO | 2NC 2NO | 4NC   | 4NC 2NO | Latched off – Rope Slack | Tension Range (Switch Reset) | Rope Pulled |
|----|---------|---------|---------|-------|---------|--------------------------|------------------------------|-------------|
| NC | 11/12   | 11/12   | 11/12   | 11/12 | 11/12   |                          |                              |             |
|    | 21/22   | 21/22   | 21/22   | 21/22 | 21/22   |                          |                              |             |
|    |         | 31/32   |         | 31/32 | 41/42   |                          |                              |             |
|    |         |         |         | 41/42 | 51/52   |                          |                              |             |
| NO | 33/34   | 43/44   | 33/34   |       | 33/34   |                          |                              |             |
|    |         |         | 43/44   |       | 63/64   |                          |                              |             |

# Safety Rope Switches from IDEM

## 8. Wiring examples:

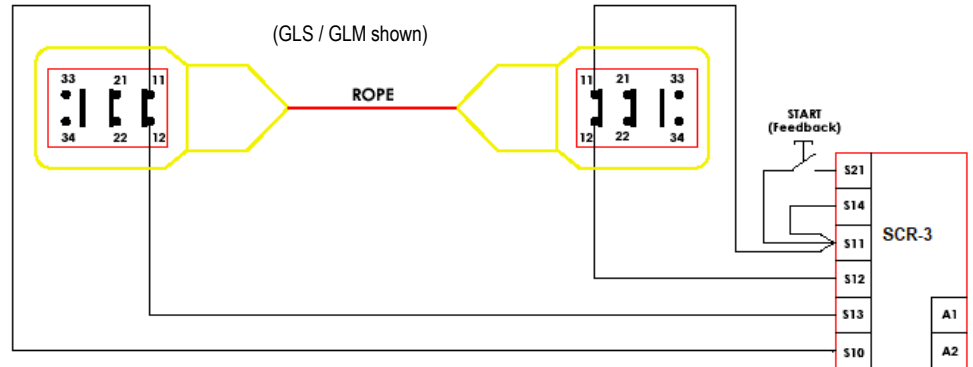
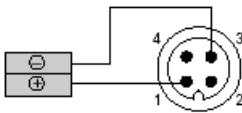


When power is applied to the Red wire, the lamp will illuminate Red.  
When power is applied to the Green Wire, the Lamp will illuminate Green.  
Black is 0V.dc or Neutral for 110Vac and 230Vac versions.



## Optional ASi Safe versions:

AS-I profile : S-7.B.E  
ID configuration / ID code : 7(Hex) / B.E(Hex)



## 9. To fit Mushroom type Emergency stop Buttons:

- Remove M12 threaded plug from the mounting port.
- Apply thread locking solution to the threads of the E Stop mechanism.
- Insert the Emergency Stop Mechanism into the mounting port and tighten to 1.5Nm.
- After installation test and reset to ensure all safety circuits are functioning correctly.



## 10. Technical Specifications

|                                       |                                                                                                          |
|---------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>Standards:</b>                     | IEC 60947-5- IEC60947-5-5 UL508                                                                          |
|                                       | ISO13850 IEC 13849-1                                                                                     |
| <b>Approvals:</b>                     | cULus TUV                                                                                                |
| <b>Mechanical Features:</b>           |                                                                                                          |
| Enclosure / Cover                     | Die-Cast – Painted Yellow                                                                                |
| External Parts                        | Stainless Steel                                                                                          |
| IP Rating                             | IP67 (IP69K S/Steel versions).                                                                           |
| Rope Spans                            | Dual Head 250m.                                                                                          |
| Rope Tension device                   | IDEM Tensioner / Gripper – Quick Fixing                                                                  |
| Rope Type:                            | 4.0mm Outside Dia. Steel inner-PVC sheath                                                                |
| Mounting                              | 4 x M5                                                                                                   |
| Mounting position                     |                                                                                                          |
| Conduit entries                       | 4 x M20 or 4 x ½" NPT by part number                                                                     |
| Torque settings                       | Mounting M5 4.0 Nm<br>Lid T20 Torx M4 1.5 Nm<br>Terminals 1.0 Nm                                         |
| Ambient Temperature                   | -25C. 80 C. (-40C. for -FZ versions).                                                                    |
| Vibration resistance                  | 10-500Hz 0.35mm                                                                                          |
| Shock resistance                      | 15g 11ms                                                                                                 |
| Tension Force (typical mid setting)   | 130N.                                                                                                    |
| Typical Operating Force (Rope pulled) | < 125N. < 300mm Deflection                                                                               |
| Approx. Weight                        | GLHD-SS 2200g. GLHL / R-SS 2000g.<br>GLHD 1320g. GLHL / R 1100g.<br>GLS 880g. GLS-SS 1635g.<br>GLM 675g. |

## Electrical:

|                                   |                                                          |
|-----------------------------------|----------------------------------------------------------|
| Safety Contact type               | IEC 60947-5-1 Double break Type Zb                       |
| Contact Material                  | Silver                                                   |
| Termination                       | Clamp up to 2.5 sq. mm conductors                        |
| Rating                            | Utilisation Category : AC15                              |
| Operational Rating                | AC15 A300 240V. 3A/120V 6A. ac<br>24V. 2.5A dc inductive |
| Thermal Current (Ith)             | 10A                                                      |
| Rated Insulation Voltage (Ui)     | 500V.                                                    |
| Withstand Voltage (Uimp)          | 2500V.                                                   |
| Short Circuit Overload Protection | Fuse Externally 10A. (FF)                                |

## Optional Explosion Proof Contacts

|                            |                                                                  |
|----------------------------|------------------------------------------------------------------|
| Type                       | IDEM LS-EX internal switch                                       |
| EC Type Certificate Number | Baseefa11ATEX0267X                                               |
| IEC Certificate Number     | IECEx BAS11.0133X                                                |
| Classification             | Ex d IIC T6 (-20C Ta 60C) Gb<br>Ex tb IIIC T85C (-20C Ta 60C) Db |
| Zones                      | 1, 21, 2, 22                                                     |
| Rated Voltage              | 250V ac/dc                                                       |
| Rated Current              | 2 pole 4A. 4 pole 2.5A.                                          |

## Safety Classification and Reliability Data:

|                             |                                                                    |
|-----------------------------|--------------------------------------------------------------------|
| Mechanical Reliability B10d | 1.5 x 10 <sup>6</sup> operations at 100mA load                     |
| ISO13849-1                  | up to Category 4 with Safety Relay                                 |
| ISO 13849-1                 | up to PLe depending upon system architecture                       |
| EN 62061                    | up to SIL3 depending upon system architecture                      |
| Safety Data - Annual Usage  | 8 cycles per hour / 24 hours per day / 365 days<br>MTTfd 214 years |

## Information with regard to UL 508:

Type 1 Enclosures. Temperature rating 80C.  
Use 16 - 12AWG copper conductors, rated 75°C only.  
Intended for same polarity use and one polymeric conduit connection.  
Electrical Rating: A300 240V.ac 3A. (6,000 cycles)  
120V. 60A. Making 6A. Breaking PF >0.38 (100,000 cycles)  
240V. 10A. carry only.  
Wire range: 16AWG – 12AWG Copper Torque 7lb/in (0.8Nm)  
LED powered by LVLC or Class 2 only.  
Earth bonding terminal inside enclosure if required.

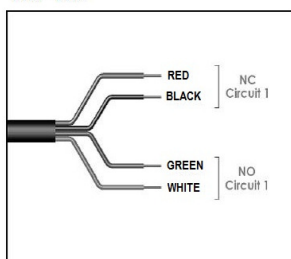
## Information with regard to AS/NZS 4024.3610:

1. Perpendicular Force to operate the switches midway between  
Eyebolt supports: Check <70N. Rope Deflection <300mm

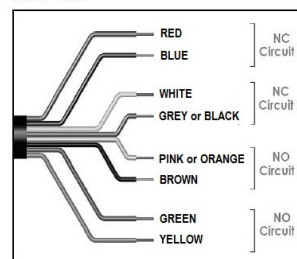
2. Axial Force - Direct along rope axis: <230N. (Typical 125N).

## PRE-WIRED EX VERSIONS:

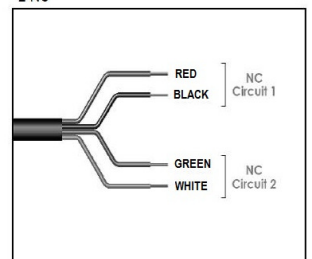
1 NC 1 NO



2 NC 2 NO



2 NC

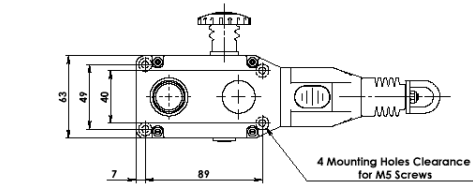


## IMPORTANT- SPECIFIC CONDITIONS OF USE FOR EX VERSIONS:

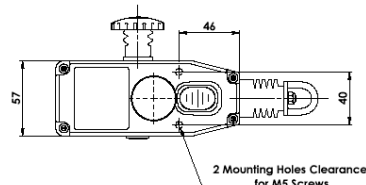
THE INTEGRAL CABLE SHALL BE SUITABLY PROTECTED FROM PHYSICAL DAMAGE AND ABRASION.  
THE INTEGRAL CABLE IS TO BE TERMINATED IN A SUITABLE TERMINAL FACILITY.

# Safety Rope Switches from IDEM

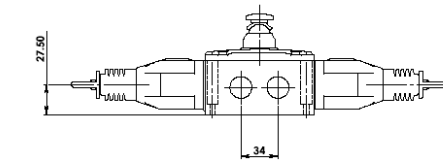
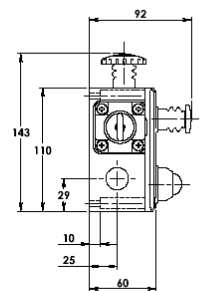
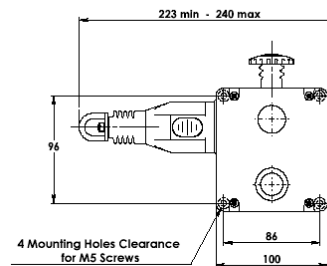
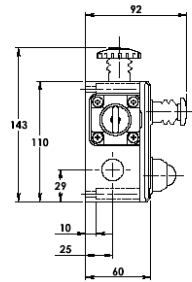
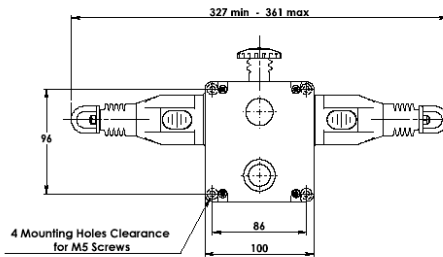
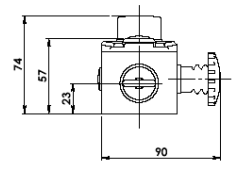
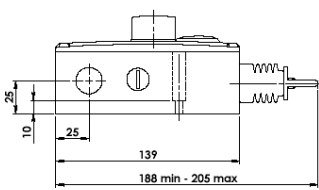
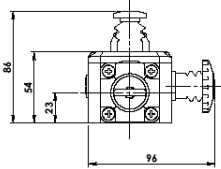
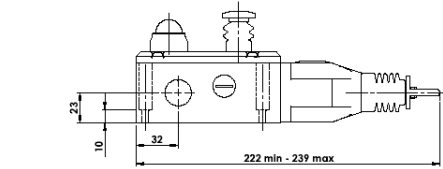
## 11. Dimensions



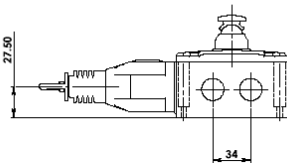
**Guardian Line  
Standard Duty (GLS)**



**Guardian Line  
Mini Duty (GLM)**

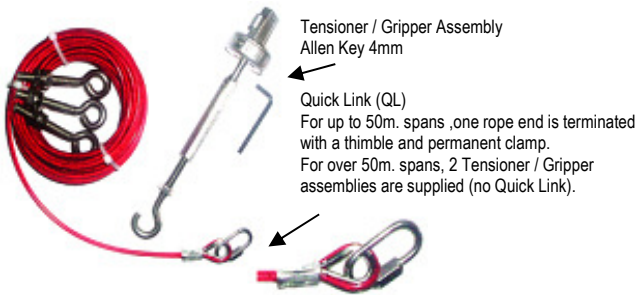


**Gurdian Line Dual  
HEAVY DUTY (GLH)**



**Gurdian Line Single  
HEAVY DUTY (GLH)**

## 12. Accessories



Tensioner / Gripper Assembly  
Allen Key 4mm

Quick Link (QL)  
For up to 50m. spans, one rope end is terminated with a thimble and permanent clamp.  
For over 50m. spans, 2 Tensioner / Gripper assemblies are supplied (no Quick Link).

| Sales Number |                 | Description    | Rope    | EyeBolts | Tensioner Gripper S/S | Allen Key |
|--------------|-----------------|----------------|---------|----------|-----------------------|-----------|
| Galvanised   | Stainless Steel |                |         |          |                       |           |
| 140001       | 140010          | 5M Rope Kit    | 5M QL   | 3        | 1                     | 1         |
| 140002       | 140011          | 10M Rope Kit   | 10M. QL | 5        | 1                     | 1         |
| 140003       | 140012          | 15M Rope Kit   | 15M. QL | 7        | 1                     | 1         |
| 140004       | 140013          | 20M Rope Kit   | 20M. QL | 9        | 1                     | 1         |
| 140005       | 140014          | 30M Rope Kit   | 30M. QL | 12       | 1                     | 1         |
| 140006       | 140015          | 50M Rope Kit   | 50M. QL | 20       | 1                     | 1         |
| 140007       | 140016          | 80M Rope Kit   | 80M.    | 30       | 2                     | 2         |
| 140008       | 140017          | 100M Rope Kit  | 100M.   | 37       | 2                     | 2         |
| 140009       | 140018          | 125M Rope Kit  | 126M.   | 45       | 2                     | 2         |
| 140033       |                 | Rope only 5M   |         |          |                       |           |
| 140034       |                 | Rope only 10M  |         |          |                       |           |
| 140036       |                 | Rope only 20M  |         |          |                       |           |
| 140037       |                 | Rope only 30M  |         |          |                       |           |
| 140038       |                 | Rope only 50M  |         |          |                       |           |
| 140039       |                 | Rope only 80M  |         |          |                       |           |
| 140040       |                 | Rope only 100M |         |          |                       |           |
| 140041       |                 | Rope only 126M |         |          |                       |           |

| Sales Number                                                                              |                                                                                                            | Description                                     |                                  |
|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-------------------------------------------------|----------------------------------|
| 140019<br>140020                                                                          |                                                                                                            | Rope Tensioner / Gripper                        | Stainless Steel                  |
|                                                                                           |                                                                                                            | Rope Tensioner / Gripper                        | Galvanised Steel                 |
| 140021<br>140064                                                                          |                                                                                                            | 77mm Long 40mm High<br>Fixing Hole centres 20mm | Universal Pulley Stainless Steel |
|                                                                                           |                                                                                                            | Universal Pulley                                | Galvanised                       |
| 140045<br>140046                                                                          |                                                                                                            | 84mm Long<br>Thread length 51mm M8 x 1.25       | Eyebolt Stainless Steel          |
|                                                                                           |                                                                                                            | Eyebolt                                         | Galvanised                       |
| Standard Bezel<br>140042-A<br>140042-B<br>140042-C<br>140132-AS<br>140132-BS<br>140132-CS | S/Steel Bezel<br>140042-A-SS<br>140042-B-SS<br>140042-C-SS<br>140132-AS-SS<br>140132-BS-SS<br>140132-CS-SS | LED Green / Flashing Red                        | 24V.d.c.                         |
|                                                                                           |                                                                                                            | LED Green / Flashing Red                        | 110-120V.ac.                     |
| 140044<br>140144                                                                          |                                                                                                            | E-Stop Mechanism – Standard                     |                                  |
|                                                                                           |                                                                                                            | E-Stop Mechanism – Stainless Steel              |                                  |
| 140043                                                                                    |                                                                                                            | Safety Spring                                   | 220mm long                       |





Comutador acionado por cabo com parada de emergência caixa metálica IP67, 3 xM20 x1,5; elemento de chaveamento de ação lenta 1NA+3NF; engate segundo EN ISO 13850, com dispositivo que desencrava por rotação, para comprimentos de cabo até 75 m

|                                                            |                               |
|------------------------------------------------------------|-------------------------------|
| nome da marca do produto                                   | SIRIUS                        |
| designação do produto                                      | interruptor da tensão do cabo |
| designação do tipo de produto                              | 3SE7                          |
| <b>Dados técnicos gerais</b>                               |                               |
| função do produto função de PARADA DE EMERGÊNCIA           | Si                            |
| componente do produto fonte de luz                         | No                            |
| tensão de isolamento valor nominal                         | 250 V                         |
| grau de poluição                                           | classe 3                      |
| tensão de impulso suportável valor nominal                 | 2,5 kV                        |
| grau de proteção IP                                        | IP67                          |
| durabilidade mecânica (ciclos de operação) típica          | 100 000                       |
| corrente térmica                                           | 2 A                           |
| identificação de referência de acordo com IEC 81346-2:2009 | S                             |
| corrente permanente da unidade para fusível DIAZED gG      | 2 A                           |
| Diretiva RSP (Data)                                        | 07/01/2006                    |
| SVHC substance name                                        | Lead - 7439-92-1              |
| Peso                                                       | 0,829 kg                      |
| <b>Condições ambientais</b>                                |                               |
| temperatura ambiente durante operação                      | -25 ... +70 °C                |
| número de NF para contatos auxiliares                      | 3                             |
| número de NA para contatos auxiliares                      | 1                             |
| corrente de serviço em AC-15                               | 6 A                           |
| • em 240 V valor nominal                                   |                               |
| corrente de serviço em DC-13                               |                               |
| • em 24 V valor nominal                                    | 2 A                           |
| • em 250 V valor nominal                                   | 0,25 A                        |
| <b>Caixa</b>                                               |                               |
| material do invólucro                                      | metal                         |
| material da tampa do invólucro                             | plástico                      |
| componente do produto aparelho de PARADA DE EMERGÊNCIA     | Si                            |
| cor                                                        | preto                         |
| • do invólucro                                             |                               |
| • da parte superior do invólucro                           | cinza                         |
| revestimento do invólucro                                  | pintado                       |
| <b>Visor</b>                                               |                               |
| função do produto display do status                        | Si                            |
| princípio de comutação                                     | função de marcha lenta        |
| material do contato                                        | prateado                      |
| número de contatos de comutação orientado para a segurança | 3                             |

|                                                                                 |                                                                                      |
|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| versão da entrada de condutores                                                 | 3x M20 x 1,5                                                                         |
| Montagem/ Fixação/ Dimensões                                                    |                                                                                      |
| tipo de fixação                                                                 | fixação de parafusos                                                                 |
| altura                                                                          | 201 mm                                                                               |
| largura                                                                         | 67 mm                                                                                |
| profundidade                                                                    | 83 mm                                                                                |
| Conexões/ terminais                                                             |                                                                                      |
| versão da conexão elétrica                                                      | ligação roscada                                                                      |
| tipo de secções transversais dos condutores a serem conectados                  | 2x (0,5 ... 2,5 mm²)<br>2x (0,5 ... 2,5 mm²)<br><br>2x (20 ... 14)<br>2x (20 ... 14) |
| • sólido                                                                        |                                                                                      |
| • de fio fino com tratamento de terminal de condutor isolado                    |                                                                                      |
| • em cabos AWG sólido                                                           |                                                                                      |
| • em cabos AWG encordado                                                        |                                                                                      |
| Segurança                                                                       |                                                                                      |
| proporção de falhas perigosas em taxa de demanda elevada de acordo com SN 31920 | 50 %                                                                                 |
| valor B10 em taxa de demanda elevada de acordo com SN 31920                     | 100 000                                                                              |
| Homologações certificados                                                       |                                                                                      |
| General Product Approval                                                        | other                                                                                |



[Confirmation](#)

#### Environment

[Environmental Confirmations](#)

#### Outras informações

Informações sobre a embalagem

[Informações sobre a embalagem](#)

Information for data generation and storage

<https://support.industry.siemens.com/cs/ww/en/view/109995012>

Information- and Downloadcenter (catálogo, brochuras,...)

<https://www.siemens.com/ic10>

Industry Mall (encomendar online)

<https://mall.industry.siemens.com/mall/pt/pt/Catalog/product?mlfb=3SE7141-1EG10>

CAX Online Generator

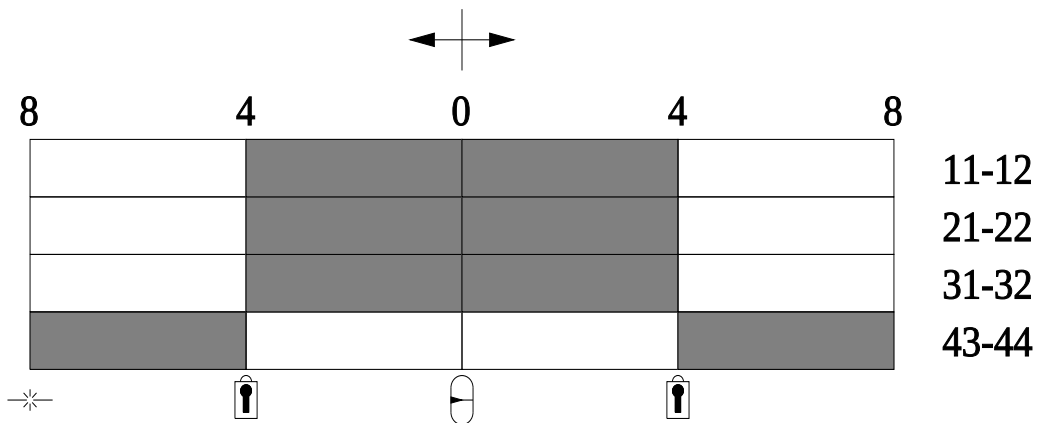
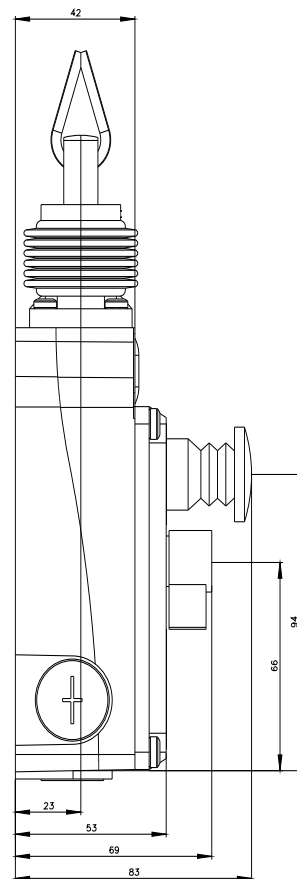
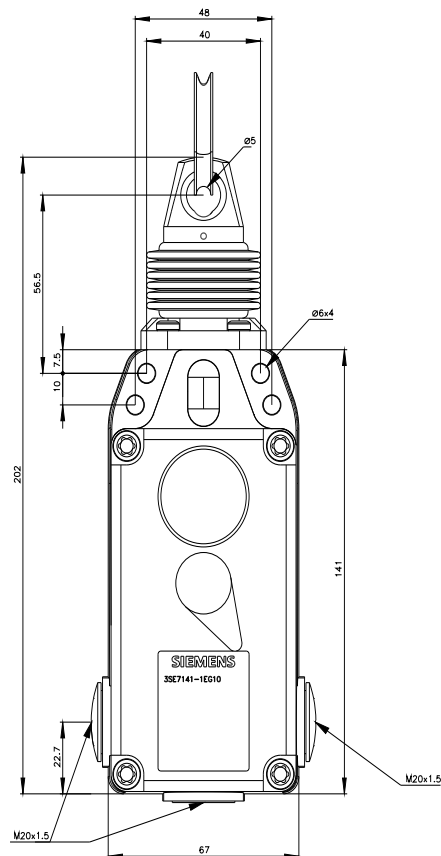
<https://support.automation.siemens.com/WW/CAXorder/default.aspx?lang=en&mlfb=3SE7141-1EG10>

Service&Support (manuais, manuais de instruções, certificados, curva característica, FAQs,...)

<https://support.industry.siemens.com/cs/ww/en/ps/3SE7141-1EG10>

Base de dados das imagens (fotografias do produto,desenhos de medida em 2D, modelos em 3D, esquemas eléctricos, macros EPLAN... )

[https://www.automation.siemens.com/bilddb/cax\\_de.aspx?mlfb=3SE7141-1EG10&lang=en](https://www.automation.siemens.com/bilddb/cax_de.aspx?mlfb=3SE7141-1EG10&lang=en)



🔒 Verriegelung / Locking

➡ Betätigungsrichtung / Travel

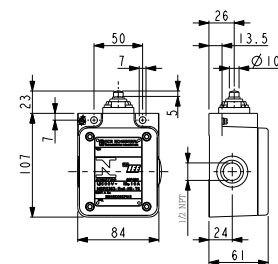
○ Mittelstellung / Middle position

✱ Seilriss / Rope rip

■ Schaltglied geschlossen / Contact element closed

□ Schaltglied geöffnet / Contact element open





## Características técnicas

|                                                               |                                                                         |
|---------------------------------------------------------------|-------------------------------------------------------------------------|
| Área de aplicação                                             | Zonas 1, 2, 21 e 22                                                     |
| Marcação                                                      | Ex d IIB T6 Gb / Ex tb IIIC T<br>85°C Db                                |
| INMETRO                                                       | DNV 13.0059                                                             |
| Propriedades globais                                          |                                                                         |
| Normas                                                        | ABNT NBR IEC 60079-0, ABNT<br>NBR IEC 60079-1, ABNT NBR<br>IEC 60079-31 |
| Materiais<br>Material dos invólucros<br>Material dos contatos | Ferro Fundido<br>Prata reforçada com níquel                             |
| Acabamento                                                    | Pintura Azul RAL 5011                                                   |
| Dados mecânicos                                               |                                                                         |
| Design da conexão elétrica                                    | Conexão por parafuso                                                    |
| Resistência mecânica                                          | 10.000.000 comutações (T) e<br>5.000.000 comutações (M)                 |
| Frequência de comutação                                       | Máx. 3.000/h                                                            |
| Ambiente                                                      |                                                                         |
| Temperatura ambiente mínima                                   | -20°C                                                                   |
| Temperatura ambiente máxima                                   | +60°C                                                                   |
| Tipo de proteção                                              | IP65                                                                    |
| Dados elétricos                                               |                                                                         |
| Tipos dos contatos                                            | 2 contatos com pontes<br>independentes                                  |
| Corrente térmica Ith <sub>2</sub>                             | 10A                                                                     |
| Tensão nominal U <sub>i</sub>                                 | 500 V, 25-60Hz                                                          |
| Capacidade de ruptura (Corrente/<br>Tensão de Operação)       | 4A / 380V (T) e 2,5A / 380V (M)                                         |
| Velocidade de acionamento                                     | Min. 1 mm/s e máx. 1 m/s                                                |

## Dados Técnicos

## Detalhes de Encomenda

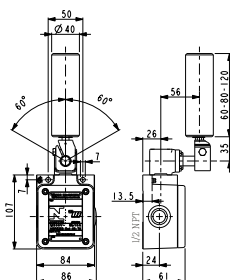
## (1)(2) 441 (3)(4)(5)(6) Ex

| Nº  | Opção     | Descrição                            |
|-----|-----------|--------------------------------------|
| (1) | M         | Comutação por ação rápida            |
|     | T         | Comutação por impulso                |
| (2) | S         | Pistão                               |
|     | R         | Pistão com roldana                   |
|     | K         | Alavanca com roldana                 |
|     | 2C        | Alavanca angular com duas posições   |
|     | 3C        | Alavanca angular com duas posições   |
|     | L         | Alavanca angular com roldana         |
|     | D         | Alavanca angular com roldana         |
|     | 2F        | Pedaleira                            |
|     | V7H       | Alavanca regulável com roldana       |
|     | V12H      | Alavanca detectora de desalinhamento |
|     | C         | Alavanca angular com retenção        |
|     | V         | Alavanca cremalheira                 |
| (3) | 11H       | Alavanca cremalheira                 |
|     | 11        | 1 NA / 1NF                           |
|     | 20        | 2NA                                  |
| (4) | 02        | 2NF                                  |
|     | y         | IP65                                 |
| (5) | h         | Com contatos consecutivos            |
|     | em branco | Sem contatos consecutivos            |
| (6) | u         | Com contatos de sobreposição         |
|     | em branco | Sem contatos de sobreposição         |



# EX 441

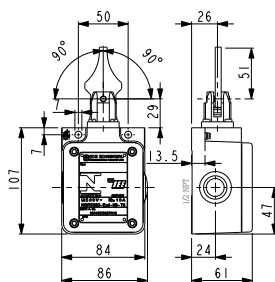
## Alavanca Detectora de Desalinhamento



## Tipos de Contatos

| Chaves de deslocamento / Contatos | Comutação por ação rápida (M) | Comutação por impulso (T)    |
|-----------------------------------|-------------------------------|------------------------------|
| 1NA + 1NF                         | <b>MV12H 441-11y Ex</b><br>   | <b>TV12H 441-11y Ex</b><br>  |
| 2NF                               |                               | <b>TV12H 441-02y Ex</b><br>  |
| 2NA                               |                               | <b>TV12H 441-20y Ex</b><br>  |
| 1NA + 1NF                         |                               | <b>TV12H 441-11yu Ex</b><br> |
| 2NF                               |                               | <b>TV12H 441-02yh Ex</b><br> |
| 2NA                               |                               | <b>TV12H 441-20yh Ex</b><br> |

## Alavanca Angular com Retenção



## Tipos de Contatos

| Chaves de deslocamento / Contatos | Comutação por ação rápida (M) | Comutação por impulso (T) |
|-----------------------------------|-------------------------------|---------------------------|
| 1NA + 1NF                         | <b>MC 441-11y Ex</b><br>      | <b>TC 441-11y Ex</b><br>  |
| 2NF                               |                               | <b>TC 441-02y Ex</b><br>  |
| 2NA                               |                               | <b>TC 441-20y Ex</b><br>  |
| 1NA + 1NF                         |                               | <b>TC 441-11yu Ex</b><br> |
| 2NF                               |                               | <b>TC 441-02yh Ex</b><br> |
| 2NA                               |                               | <b>TC 441-20yh Ex</b><br> |



## Dados

### Dados para encomenda

|                   |                  |
|-------------------|------------------|
| PM_TYPE_NAME      | EX-ZS 235-02Z-3D |
| PM_ORDER_NUMBER   | 101214399        |
| SAP_EAN           | 4030661398570    |
| CODE_ECLASS_V12P0 | 27-27-26-01      |
| CODE_ECLASS_V11P0 | 27-27-26-01      |
| CODE_ECLASS_V09P0 | 27-27-26-01      |
| CODE_ETIM_V07P0   | EC000030         |
| CODE_ETIM_V06P0   | EC000030         |

### Homologações - Instruções

|                        |                              |
|------------------------|------------------------------|
| PNV_NORM_CERTIFICATION | ATEX (Konformitätserklärung) |
|------------------------|------------------------------|

### Proteção contra explosão

|                       |                                                  |
|-----------------------|--------------------------------------------------|
| EXPL_PROTECT_STANDARD | EN IEC 60079-0<br>EN IEC 60079-15<br>EN 60079-31 |
| EXPL_PROTECT_ZONE     | 2<br>22                                          |

|                            |                                                                                                                                                                                                                            |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EXPL_PROTECT_CAT           | 3G<br>3D                                                                                                                                                                                                                   |
| EXPL_PROTECT_MARK          |  II 3G Ex nC IIC T5 Gc X<br> II 3D Ex tc IIIC T90°C Dc X |
| EXPL_MANUFACTURER_DECLARAT | Zona ATEX 2 e 22                                                                                                                                                                                                           |

### Propriedades globais

|                              |                                           |
|------------------------------|-------------------------------------------|
| NORM_STANDARD                | BG-GS-ET-15<br>EN IEC 60947-5-1           |
| DESIGN_HOUSING               | Design construtivo padrão                 |
| DESIGN_ACT_TYPE_DIN_EN_50047 | B                                         |
| MAT_HOUSING                  | Filme metálico, zinco fundido sob pressão |
| MAT_HOUSING_COATING          | pintura de fábrica                        |
| SAP_WEIGHT_GROSS             | 195                                       |

### Propriedades globais - Características

|                      |     |
|----------------------|-----|
| YN_FIT_FOR_SAFE_FUNC | Sim |
| NUM_OF_CONT_SUB      | 0   |
| NUM_OF_SAFE_CONT     | 2   |

### Classificação

|                    |                |
|--------------------|----------------|
| SAFE_NORM_STANDARD | EN ISO 13849-1 |
| SAFE_MISSION_TIME  | 20             |

### Classificação - saídas de segurança

|                   |            |
|-------------------|------------|
| SAFE_B10D_NC_SOUT | 20.000.000 |
|-------------------|------------|

### Dados mecânicos

|                                 |                  |
|---------------------------------|------------------|
| DESIGN_ACT_ELEMENT              | Pinos de pressão |
| DESIGN_MECH_LIFETIME_SWITCH_MIN | 20.000.000       |
| FORCE_ACT_MIN                   | 9                |

|                          |    |
|--------------------------|----|
| FORCE_POSITIVE_BREAK_MIN | 19 |
| MOTION_ACT_SPEED_MIN     | 10 |
| MOTION_ACT_SPEED_MAX     | 1  |

### Dados mecânicos - Tecnologia conectiva

|                                  |                                                      |
|----------------------------------|------------------------------------------------------|
| REVIEW_ELEC_WIRING_GENERAL       | Ligação por parafuso M20 x 1.5                       |
| DIM_DIAM_CABLE_GLAND_HOLDING_MIN | 7                                                    |
| DIM_DIAM_CABLE_GLAND_HOLDING_MAX | 12                                                   |
| ELEC_CABLE_SECTION_MIN           | 0,75 mm <sup>2</sup>                                 |
| ELEC_CABLE_SECTION_MAX           | 2,5 mm <sup>2</sup>                                  |
| NOTE_ELEC_CABLE_SECTION          | Todas as especificações incluindo ponteiros de cabo. |
| DIM_DIAM_AWG_WIRE                | 13                                                   |

### Dados mecânicos - dimensões

|                   |      |
|-------------------|------|
| DIM_LENGTH_SENSOR | 30   |
| DIM_WIDTH_SENSOR  | 30   |
| DIM_HEIGHT_SENSOR | 75,5 |

### Ambiente

|                         |                |
|-------------------------|----------------|
| DESIGN_IP_CLASS_GENERAL | IP67           |
| TEMP_AMB_GPV            | -20 ... +60 °C |

### Ambiente - Parâmetros de isolamento

|                              |       |
|------------------------------|-------|
| VOLT_RATED_INSULAT           | 500 V |
| VOLT_RATED_IMPULSE_WITHSTAND | 6     |

### Dados elétricos

|                         |     |
|-------------------------|-----|
| CURR_THERMAL_CONTINUOUS | 10  |
| VOLT_UTILISAT_CAT_AC15  | 230 |
| CURR_UTILISAT_CAT_AC15  | 4   |

|                              |                                       |
|------------------------------|---------------------------------------|
| VOLT_UTILISAT_CAT_DC13       | 24                                    |
| CURR_UTILISAT_CAT_DC13       | 1                                     |
| REVIEW_DESIGN_SWITCH_ELEMENT | 2 contactos normalmente fechados (NF) |
| DESIGN_SWITCH                | Comutação de ação rápida              |
| TIME_BOUNCE_DURAT_MAX        | 3                                     |
| TIME_FREQ_OF_OPERAT_MAX      | 5.000                                 |
| TIME_SWITCHOVER_MIN          | 5,5                                   |
| MAT_CONT_ELEC                | Prata                                 |

### Escopo do fornecimento

|                        |                                  |
|------------------------|----------------------------------|
| SCOPE_OF_DELIV_GENERAL | Bucin roscado com certificado EX |
|------------------------|----------------------------------|

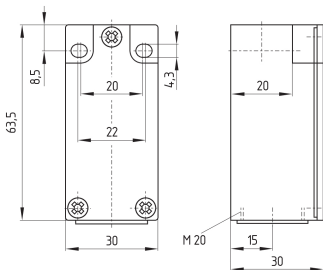
### Imagens

#### Foto do produto (foto individual do catálogo )



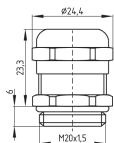
ID: k235sf01  
| 620,3 kB | .jpg | 352.778 x 668.867 mm - 1000 x 1896 px - 72 dpi  
| 79,6 kB | .png | 74.083 x 140.406 mm - 210 x 398 px - 72 dpi  
| 71,8 kB | .png | 65.264 x 123.472 mm - 185 x 350 px - 72 dpi  
| 31,1 kB | .png | 74.083 x 74.083 mm - 210 x 210 px - 72 dpi

#### Desenho dimensional componente básico



ID: k-235g01  
| 24,5 kB | .cdr |  
| 3,6 kB | .png | 74.083 x 61.736 mm - 210 x 175 px - 72 dpi  
| 111,2 kB | .jpg | 352.778 x 293.511 mm - 1000 x 832 px - 72 dpi

#### Desenho dimensional componente básico

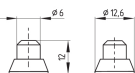


ID: 1xzm1g07

| 2,5 kB | .png | 74.083 x 51.153 mm - 210 x 145 px - 72 dpi

| 46,3 kB | .jpg | 352.778 x 243.769 mm - 1000 x 691 px - 72 dpi

## Desenho dimensional Atuador



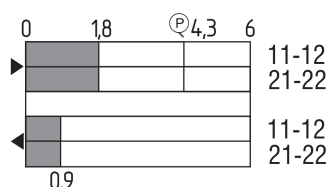
ID: 1s236g01

| 36,9 kB | .cdr |

| 1,7 kB | .png | 74.083 x 52.211 mm - 210 x 148 px - 72 dpi

| 29,8 kB | .jpg | 352.778 x 248.003 mm - 1000 x 703 px - 72 dpi

## Diagrama das comutações



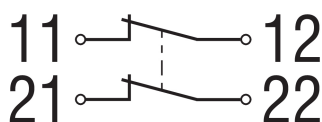
ID: kr235s11

| 26,7 kB | .cdr |

| 2,2 kB | .png | 74.083 x 41.628 mm - 210 x 118 px - 72 dpi

| 71,1 kB | .jpg | 352.778 x 197.908 mm - 1000 x 561 px - 72 dpi

## Diagrama



ID: k2o--k01

| 48,8 kB | .jpg | 352.778 x 125.236 mm - 1000 x 355 px - 72 dpi

| 2,3 kB | .png | 74.083 x 26.458 mm - 210 x 75 px - 72 dpi

ACE Schmersal Eletroeletrônica Ind. Ltda, Av. Brasil, nº 815, Jardim Esplanada – CEP 18557-646 Boituva/SP  
Os dados e informações anteriores foram verificados cuidadosamente. As imagens podem ser diferentes do original. Mais informações técnicas podem ser encontradas nos manuais de instruções. Sujeito a modificações técnicas e erros.

Gerado em 10/11/2025 19:40

**Câmera IP**

- » Resolução 4 MP
- » Cartão micro SD
- » Entrada e saída de áudio
- » Entrada e saída de alarme
- » 2 Microfones
- » Alto falante embutido
- » Alerta Visual
- » Alerta Sonoro

**H.265+**  
COMPRESSÃO  
DE VÍDEO**4MP**  
RESOLUÇÃO**IP67**  
ÍNDICE DE  
PROTEÇÃO

As VIPs Intelbras são câmeras de segurança para sistemas de monitoramento e vigilância por vídeo IP. Podem ser utilizadas com os sistemas de CFTV Intelbras, para um sistema de monitoramento seguro, estável e integrado. Sua instalação e gerenciamento podem ser feitos através de interface web de forma rápida e fácil. Além disso, possui Inteligência Artificial embarcada para realizar detecção de face e inteligência perimetral.

**Especificações técnicas**

## VIP 5430 TL IA

## VIP 5430 D TL IA

**Câmera**

|                           |                                            |
|---------------------------|--------------------------------------------|
| Sensor de imagem          | 1/2.7"4MP progressivo CMOS                 |
| Resolução máxima          | 2688 (H) × 1520 (V)                        |
| Rom                       | 128MB                                      |
| Ram                       | 512MB                                      |
| Obturador eletrônico      | Automático / Manual<br>(1/3s ~ 1/100,000s) |
| Sistema de varredura      | Progressiva                                |
| Iluminação mínima         | 0.003 Lux @ F1.0                           |
| Relação sinal-ruído (SNR) | >56 dB                                     |
| Dia / Noite               | Colorido / Preto e Branco                  |

|                      |                    |                    |
|----------------------|--------------------|--------------------|
| Ângulo de instalação | Pan: 0° a 360°     | Pan: 0° a 360°     |
|                      | Tilt: 0° a 78°     | Tilt: 0° a 90°     |
|                      | Rotação: 0° a 360° | Rotação: 0° a 360° |

## Lente

|                           |                |                 |                 |          |            |             |
|---------------------------|----------------|-----------------|-----------------|----------|------------|-------------|
| Tipo de lente             |                |                 | Fixa            |          |            |             |
| Montagem de lente         |                |                 | M12             |          |            |             |
| Distância focal           |                | 3.6 mm          | 2.8 mm          |          |            |             |
| Abertura máxima           |                |                 | F1.0            |          |            |             |
| Ângulo de visão           | Horizontal 81° |                 | Horizontal 103° |          |            |             |
|                           | Vertical 43°   |                 | Vertical 53°    |          |            |             |
|                           | Diagonal 95°   |                 | Diagonal 122°   |          |            |             |
| Zoom                      |                |                 | N/A             |          |            |             |
| Controle de íris          |                |                 | Fixo            |          |            |             |
| Distância de foco próximo |                | 1.2m            | 2.1m            |          |            |             |
| Dori <sup>1</sup>         |                | Distância Focal | Detectar        | Observar | Reconhecer | Identificar |
| Bullet                    |                | 3.6 mm          | 80.0 m          | 32.0 m   | 16.0 m     | 8.0 m       |
| Dome                      |                | 2.8 mm          | 67.4 m          | 27 m     | 13.5 m     | 6.7 m       |

## Tipos de Iluminação

|                        |                                  |  |                                  |  |  |
|------------------------|----------------------------------|--|----------------------------------|--|--|
| Tipo de iluminação     | Luz Branca, IR                   |  |                                  |  |  |
| Alcance Infravermelho  | 30m                              |  |                                  |  |  |
| Alcance luz branca     | 30m                              |  |                                  |  |  |
| IR inteligente         | Sim                              |  |                                  |  |  |
| Luz Branca inteligente | Sim                              |  |                                  |  |  |
| Comprimento de onda IR | 850nm                            |  |                                  |  |  |
| Quantidade de Leds     | 2 Luz Branca, 1 azul, 1 vermelho |  | 1 Luz Branca, 1 azul, 1 vermelho |  |  |

## Vídeo

|                                 |                                                                                                                                                                                                  |  |  |  |  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| Quantidade de streamings        | 3 streams simultâneos                                                                                                                                                                            |  |  |  |  |
| Compressão de vídeo             | H.265 / H.264 / H.264H / H.264B / MJPEG (apenas stream extra)                                                                                                                                    |  |  |  |  |
| Compressão de vídeo inteligente | N/A possui                                                                                                                                                                                       |  |  |  |  |
| Compressão de vídeo com IA      | H.265 / H.264 / H.264H / H.264B / MJPEG (apenas stream extra)                                                                                                                                    |  |  |  |  |
| Resolução de imagem             | 4M (2688 × 1520); 1440P (2560 × 1440); 3M (2048 × 1536); 3M (2304 × 1296); 1080P (1920 × 1080); 1.3M (1280 × 960); 720p (1280 × 720); D1 (704 × 480); VGA (640 × 480); CIF (354 × 288/354 × 240) |  |  |  |  |
| Formato do vídeo                | PAL/NTSC                                                                                                                                                                                         |  |  |  |  |
| Taxa de frames                  | Stream principal: 2688 x 1520 @ 1-30 fps                                                                                                                                                         |  |  |  |  |
|                                 | Stream extra: 704 x 576 @ 1-30 fps/704 x 480 @ 1-30 fps                                                                                                                                          |  |  |  |  |
|                                 | Stream extra 2: 1920 x 1080 @ 1-30 fps                                                                                                                                                           |  |  |  |  |
| Controle de taxa de bits        | Constante / Variável / Média                                                                                                                                                                     |  |  |  |  |



|              |                                                                  |
|--------------|------------------------------------------------------------------|
| Taxa de bits | H.264: 3072 kbps até 8192 kbps<br>H.265: 1280 kbps até 8192 kbps |
|--------------|------------------------------------------------------------------|

## Imagem

|                             |                                                                                          |
|-----------------------------|------------------------------------------------------------------------------------------|
| Configurações               | Brilho, Contraste, Saturação, Nitidez, Gama                                              |
| Modos de vídeo              | Automático (ICR) / Colorido / Preto e Branco                                             |
| Perfil                      | Dia/Noite / Geral / Luz dianteira / Luz de fundo / Luz de fundo forte / Baixa iluminação |
| Compensação de luz de fundo | BLC / WDR / HLC / Adaptação automática                                                   |
| Balanço de branco           | Auto / Natural / Lâmpada de rua / Exterior / Manual / Personalizar Área                  |
| Controle de ganho           | Automático / Manual                                                                      |
| Rotação de imagem           | 0°/90°/180°/270°                                                                         |
| Espelhamento                | Sim                                                                                      |
| Redução de ruído            | 3D NR / 2D NR                                                                            |
| Estabilização de imagem     | N/A                                                                                      |
| Máscara de Privacidade      | Até 4 áreas                                                                              |

## Áudio

|                            |                                                                       |
|----------------------------|-----------------------------------------------------------------------|
| Microfone embutido         | 2 microfones                                                          |
| Sensibilidade de microfone | -24±3dB                                                               |
| Compressão                 | G.711a / G.711Mu / PCM / G.726 / G.723 / AAC                          |
| Taxa de amostragem         | 8000 (G.711A/G.711Mu/G.726/G.723), 8000/16000/32000/48000/64000 (AAC) |
| Filtro de ruído            | Sim                                                                   |
| Alto-falante embutido      | Sim                                                                   |

## Inteligência Artificial<sup>2</sup>

|                                               |                                                                          |
|-----------------------------------------------|--------------------------------------------------------------------------|
| Detecção de face <sup>6</sup>                 | Sim                                                                      |
| Metadados de face/corpo                       | N/A                                                                      |
| Metadados de objeto alvo (humano/veículo)     | N/A                                                                      |
| Contagem de pessoas                           | N/A                                                                      |
| Inteligência perimetral                       | Funções IVS (linha e cerca virtual) com detecção de humanos/veículos     |
| Classificação do objeto alvo (humano/veículo) | Detecção e classificação de humanos e veículos (SMD).                    |
| Mapa de calor                                 | N/A                                                                      |
| Busca inteligente                             | Integração com NVR para extração de eventos e fusão de vídeos, Insearch. |

## Evento

|                       |                                                                                                                                             |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Detecção de movimento | Sim                                                                                                                                         |
| Detecção de áudio     | Sim                                                                                                                                         |
| Anormalidade          | Sem cartão SD, cartão SD cheio/erro, sem de rede, conflito de IP, acesso ilegal, exceção de tensão, mascaramento de vídeo, mudança de cena. |

|                   |                                                                                                                                                                                                                         |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Máscara de vídeo  | Sim                                                                                                                                                                                                                     |
| Mudança de cena   | Sim                                                                                                                                                                                                                     |
| Eventos de alarme | Rede desconectada, Conflito de IP, acesso ilegal, detecção de movimento, máscara de vídeo, detecção de áudio, detecção inteligente (pessoas veículos), linha e cerca virtual (pessoas e veículos), alerta de segurança. |

## Rede

|                                  |                                                                                                                                                                                                         |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interface                        | RJ-45 (10/100Base-T)                                                                                                                                                                                    |
| Protocolos e serviços suportados | IPv4 / IPv6 / DHCP / DNS / DDNS / NTP / QoS / RTSP /<br>RTMP / RTP / RTCP / ONVIF / HTTPS / TLS / SSL / HTTP / TCP / UDP /<br>ICMP / IGMP / SMTP / FTP / SFTP / SNMP / ARP / UPnP / NFS / SAMBA / PPPoE |
| Interoperabilidade               | ONVIF (Perfil S, G, T), Intelbras -1 <sup>3</sup> , Intelbras Cloud                                                                                                                                     |
| Serviço DDNS                     | Intelbras DDNS, DDNS No-IP®, DynDNS®                                                                                                                                                                    |
| Método de transmissão            | Unicast / Multicast                                                                                                                                                                                     |
| Configuração de nível de acesso  | Acesso a múltiplos usuários (máximo de 20) com proteção por senha, níveis de permissão (Admin, Operador, Visualizador), Filtro por IP/MAC                                                               |
| Throughput máximo                | 80 Mbps                                                                                                                                                                                                 |
| Armazenamento                    | FTP, SFTP, NAS, cartão MicroSD (máx. 256GB)                                                                                                                                                             |
| Navegadores <sup>4</sup>         | Chrome, IE, Firefox, Safari (versão 12 ou superior)                                                                                                                                                     |
| Aplicações e monitoramento       | Interface Web5, Intelbras S.I.M. Next, IP Utility, ISIC Lite, Guardian e Defense IA.                                                                                                                    |

## Cibersegurança

|                                     |                                                                                                                                                                                                                                         |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criptografia e proteção de dados    | Criptografia de configuração, criptografia de vídeo, criptografia de firmware, armazenamento criptografado, transmissão criptografada                                                                                                   |
| Autenticação e acesso               | Filtro de IP/MAC, bloqueio de conta, autenticação e autorização de segurança, controle de acesso.                                                                                                                                       |
| Segurança em comunicação            | HTTPS; 802.1x                                                                                                                                                                                                                           |
| Monitoramento e auditoria           | Registros de segurança (log de segurança), registros de Sistema (log de sistema).                                                                                                                                                       |
| Proteção contra-ataques             | Detecção de adulteração de vídeo, bloqueio de acesso não autorizado (filtro IP/MAC, bloqueio de conta após tentativas inválidas), criptografia de dados (HTTPS/AES) e proteção de firmware (atualização assinada/inicialização segura). |
| Atualização e inicialização seguras | Protege contra adulteração, acessos não autorizados e inclui criptografia de dados/firmware.                                                                                                                                            |

## Conexões

|                   |                           |
|-------------------|---------------------------|
| Entrada de áudio  | 1 (conexão RCA)           |
| Saída de áudio    | 1 (conexão RCA)           |
| Entrada de alarme | 1 (entrada: 3-5V DC, 5mA) |
| Saída de alarme   | 1 (saída: 12V DC, 300mA)  |

## Características Elétricas

|             |                                      |                                  |
|-------------|--------------------------------------|----------------------------------|
| Alimentação | 12V DC (±30%) ou PoE (802.3af)       |                                  |
| Consumo     | Mínimo: 2W (12V DC) / 2.6 W (PoE)    | Mínimo: 2.5W (DC) / 3.0 W (PoE)  |
|             | Máximo: 7.5 W (12V DC) / 8.8 W (PoE) | Máximo: 7.3 W (DC) / 8.0 W (PoE) |

## Características Mecânicas

| Material do case      | Plástico, metal              | Metal              |
|-----------------------|------------------------------|--------------------|
| Dimensões (L x A x P) | 288.4 mm x 94.4 mm x 84.7 mm | 122.0 mm x 110.9mm |
| Peso líquido          | 1.0 kg                       | 754 g              |
| Peso bruto            | 1.23 kg                      | 915 g              |
| Local de instalação   | Interno e externo            |                    |

## Características Ambientais

| Temperatura de operação      | -40° até +60°C |
|------------------------------|----------------|
| Umidade relativa de operação | ≤ 95% (RH)     |
| Proteção anti surto          | 15 kV          |
| Grau de proteção             | IP67           |

1 Os valores informados na tabela DORI atribuem-se a capacidade de uma pessoa visualizar o vídeo da câmera e N/A estão vinculadas as funções de inteligência da câmera. As informações contidas na tabela, estão diretamente associadas as condições de iluminação do local de instalação.

2 As funções de inteligência da câmera, estão diretamente associadas as condições de iluminação do local de instalação. Exemplo: Em ambiente noturno, sem que haja uma iluminação apropriada, o desempenho das funções de inteligência será afetado.

3 Para garantir o correto funcionamento da detecção de movimento e inteligências de vídeo utilizar o protocolo Intelbras-1.

4 A compatibilidade pode variar conforme a versão do navegador.

5 Para conectar a câmera em DVRs e NVRs que N/A possuem a função de inicialização, será necessário primeiro conectar a câmera em um computador para fazer a inicialização através da interface web da câmera.

6 Essa função N/A funciona simultaneamente com IVS.

7 Permite visualização simultânea.

\*Este produto possui a opção de criptografia dos dados em trânsito, N/A sendo possível realizar a criptografia em repouso. A Intelbras N/A acessa, transfere, capta, nem realiza qualquer outro tipo de tratamento de dados pessoais a partir deste produto, com exceção aos dados necessários para funcionamento dos serviços.

\*\*O uso deste produto permite que você colete dados pessoais de terceiros, tais como imagem facial, e-mail e telefone. Portanto, para tratar tais dados você deve estar em conformidade com a legislação local garantindo a proteção dos direitos dos titulares dos dados pessoais, implementando medidas que incluem, mas N/A se limitam a: informar, de forma clara e visível, o titular dos dados pessoais sobre a existência da área de vigilância e fornecer informações de contato para eventuais dúvidas e garantias de direito.

\*\*\* Esse produto é compatível com os modelos NVD 1204, NVD 1208 e NVD 1216, somente utilizando o protocolo ONVIF e com o modo de gravação em Regular. N/A garantimos o funcionamento da detecção de movimento entre esses dispositivos. Devido implementações de segurança na comunicação da câmera com os gravadores Intelbras, todos os firmwares da câmera a partir de 2020 N/A serão compatíveis com gravadores que possuem versão de firmware de 2017 ou anterior. Para maiores informações, favor consultar o suporte técnico.

**Câmera IP**

- » Resolução 4 MP
- » Lente varifocal de 2.7 a 13.5 mm motorizado
- » Cartão micro SD
- » Entrada e saída de áudio
- » Entrada e saída de alarme

**H.265+**COMPRESSÃO  
DE VÍDEOINTELIGÊNCIA  
ARTIFICIALMICROFONE  
EMBTUDO**IP67**ÍNDICE DE  
PROTEÇÃO**4MP**

RESOLUÇÃO

As VIPs Intelbras são câmeras de segurança para sistemas de monitoramento e vigilância por vídeo IP. Podem ser utilizadas com os sistemas de CFTV Intelbras, para um sistema de monitoramento seguro, estável e integrado. Sua instalação e gerenciamento podem ser feitos através de interface web de forma rápida e fácil. Além disso, possui Inteligência Artificial embarcada para realizar detecção de face e inteligência perimetral.

**Especificações técnicas****VIP 5460 Z IA****VIP 5440 D Z IA****Câmera**

|                                          |                                                                                                |                                                        |
|------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| <b>Sensor de imagem</b>                  | 4 Megapixels 1/3" CMOS Starlight                                                               |                                                        |
| <b>Obturador eletrônico</b>              | Automático / Manual<br>(1/3s ~ 1/100000s)                                                      |                                                        |
| <b>Pixels efetivos</b>                   | 2688 (H) x 1520 (V)                                                                            |                                                        |
| <b>Sensibilidade</b>                     | 0.005 Lux /F1.5 (Colorido, 30 IRE)<br>0.0005 Lux /F1.5 (P&B, 30 IRE)<br>0 Lux (P&B, IR ligado) |                                                        |
| <b>Relação sinal-ruído</b>               | >56 dB                                                                                         |                                                        |
| <b>Infravermelho <sup>1</sup></b>        | Filtro de infravermelho com atuador eletromecânico                                             |                                                        |
| <b>Distância máxima do infravermelho</b> | 60 metros                                                                                      | 40 metros                                              |
| <b>Alcance de Pan/Tilt/Rotação</b>       | Pan: 0° a 360°<br>Tilt: 0° a 90°<br>Rotação: 0° a 360°                                         | Pan: 0° a 355°<br>Tilt: 0° a 80°<br>Rotação: 0° a 355° |
| <b>Controle do foco</b>                  | Automático / Manual                                                                            |                                                        |

## Lente

|                       |                                                                      |          |          |            |             |
|-----------------------|----------------------------------------------------------------------|----------|----------|------------|-------------|
| Tipo de lente         | Varifocal motorizada                                                 |          |          |            |             |
| Distância focal       | 2.7 mm a 13.5 mm                                                     |          |          |            |             |
| Abertura máxima       | F1.5                                                                 |          |          |            |             |
| Ângulo de visão       | Horizontal: 104° a 29°<br>Vertical: 54° a 16°<br>Diagonal: 125° a 33 |          |          |            |             |
| DORI <sup>2</sup>     | Distância focal                                                      | Detectar | Observar | Reconhecer | Identificar |
|                       | 2.7mm                                                                | 64 m     | 25.6 m   | 12.8 m     | 6.4 m       |
|                       | 13.5mm                                                               | 210 m    | 84 m     | 42 m       | 21 m        |
| Zoom óptico           | 5x                                                                   |          |          |            |             |
| Zoom digital          | 16x                                                                  |          |          |            |             |
| Varredura Progressiva | Sim                                                                  |          |          |            |             |

## Inteligência Artificial <sup>3</sup>

|                         |                                                                    |  |  |  |  |
|-------------------------|--------------------------------------------------------------------|--|--|--|--|
| Detecção de face        | Captura de face sem metadados                                      |  |  |  |  |
| Inteligência perimetral | Linha virtual, cerca virtual (classificação de humanos e veículos) |  |  |  |  |

## Análise de vídeo

|                           |                          |  |  |  |  |
|---------------------------|--------------------------|--|--|--|--|
| Detecção de movimento     | Até 4 áreas <sup>4</sup> |  |  |  |  |
| Máscara de vídeo          | Até 4 áreas              |  |  |  |  |
| Mudança de cena           | Sim                      |  |  |  |  |
| Região de Interesse (ROI) | Sim (Até 4 áreas)        |  |  |  |  |

## Vídeo

|                                 |                                                                                                                                                                                                               |  |  |  |  |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| Quantidade de streams           | 4                                                                                                                                                                                                             |  |  |  |  |
| Compressão de vídeo             | H.265 / H.264 / H.264H / H.264B / MJPEG <sup>5</sup>                                                                                                                                                          |  |  |  |  |
| Compressão de vídeo inteligente | Smart H.264+ / Smart H.265+                                                                                                                                                                                   |  |  |  |  |
| Compressão de vídeo com IA      | Sim                                                                                                                                                                                                           |  |  |  |  |
| Resolução de imagem             | 4M (2688 × 1520); 1440p (2560 × 1440); 3M (2048×1536); 3M (2304×1296);<br>1080p (1920 × 1080); 1.3M(1280 × 960); 720p (1280 × 720); D1 (704 × 576/704×480);<br>CIF (352 × 288/352 × 240); VGA (640 × 480)     |  |  |  |  |
| Foto                            | Até 1 foto por segundo                                                                                                                                                                                        |  |  |  |  |
| Formato do vídeo                | NTSC / PAL                                                                                                                                                                                                    |  |  |  |  |
| Taxa de frames                  | Stream principal: 2688 × 1520 (1 - 25/30 fps)<br>Stream extra 1: 704 × 576 (1 - 25 fps) / 704 x 480 (1 - 30 fps)<br>Stream extra 2: 1920 × 1080 (1 - 25/30 fps)<br>Stream extra 3: 1280 × 720 (1 - 25/30 fps) |  |  |  |  |
| Controle de taxa de bits        | CBR / VBR                                                                                                                                                                                                     |  |  |  |  |

|                             |                                                                                                 |
|-----------------------------|-------------------------------------------------------------------------------------------------|
| Taxa de bits                | H.264: 3 kbps a 8192 kbps<br>H.265: 3 kbps a 8192 kbps                                          |
| Modos de vídeo              | Automático / Colorido / Preto e Branco                                                          |
| Perfil Dia e Noite          | Agendamento, Dia e Noite                                                                        |
| Controle de ganho           | Automático/ Manual                                                                              |
| Compensação de luz de fundo | Backlight Compensation (BLC) / Wide Dynamic Range (WDR) (120 dB) / Highlight Compensation (HLC) |
| Balanço do branco           | Automático/Manual/ Luz Natural/ Iluminação Pública/ Ambiente externo/ Personalizado             |
| Redução de ruído            | 2D / 3D                                                                                         |
| Rotação de imagem           | 0°/90°/180°/270°                                                                                |

## Áudio

|                    |                                              |
|--------------------|----------------------------------------------|
| Microfone embutido | Sim                                          |
| Interface de áudio | 1 entrada e 1 saída (RCA)                    |
| Compressão         | AAC / G.711a / G.711Mu / PCM / G.726 / G.723 |

## Rede

|                                  |                                                                                                                                                                                                                                                                                            |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interface                        | RJ-45 (10/100Base-T)                                                                                                                                                                                                                                                                       |
| Protocolos e serviços suportados | IPv4, IPv6, HTTP, HTTPS, TCP, UDP, ARP, RTP, RTSP, RTCP, RTMP, SMTP, FTP, SFTP, DHCP, DNS, DDNS, QoS, UPnP, NTP, Multicast, ICMP, IGMP, NFS, PPPoE, SNMP, 802.1x, Bonjour, Intelbras-1 e Intelbras Cloud                                                                                   |
| Onvif                            | Perfil S, T e G                                                                                                                                                                                                                                                                            |
| Serviço DDNS                     | Intelbras DDNS , DDNS No-IP®, DynDNS®                                                                                                                                                                                                                                                      |
| Configuração de nível de acesso  | Acesso a múltiplos usuários (máximo de 20) com proteção por senha <sup>6</sup>                                                                                                                                                                                                             |
| Throughput Máximo (Cabo)         | 70 Mbps                                                                                                                                                                                                                                                                                    |
| Armazenamento                    | Cartão micro-SD de até 256 GB (vendido separadamente), FTP, SFTP, NAS                                                                                                                                                                                                                      |
| Navegadores                      | Microsoft Edge®, Chrome® e Firefox® <sup>7</sup>                                                                                                                                                                                                                                           |
| Aplicações e monitoramento       | Interface Web, Intelbras S.I.M. Play, Intelbras IP Utility, ISIC Lite, Guardian e Defense IA                                                                                                                                                                                               |
| Interoperabilidade               | CGI, P2P                                                                                                                                                                                                                                                                                   |
| Segurança                        | Criptografia de vídeo, Criptografia de firmware, Criptografia de configuração, Digest, WSSE, Bloqueio de conta, Logs de segurança, Filtro de IP/MAC, Geração e importação de certificação X.509, syslog, HTTPS, 802.1x, Inicialização confiável, Execução confiável, Atualização confiável |

## Interfaces

|        |                                                      |
|--------|------------------------------------------------------|
| Alarme | 1 entrada (5 mA 3 – 5 VDC) / 1 saída (300 mA 12 VDC) |
|--------|------------------------------------------------------|

## Características Gerais

|                                |                                                     |                       |
|--------------------------------|-----------------------------------------------------|-----------------------|
| <b>Alimentação</b>             | 12 VDC (tolerância de $\pm 25\%$ ) ou PoE (802.3af) |                       |
| <b>Proteção anti-surto</b>     | 15 kV (vídeo e alimentação)                         |                       |
| <b>Consumo</b>                 | Mínimo: 2.8 W / 3.6 W (via PoE)                     |                       |
|                                | Máximo: 7.9 W / 9.2 W (via PoE)                     |                       |
| <b>Temperatura de operação</b> | -30 °C ~ +60 °C / umidade < 95%                     |                       |
| <b>Local de instalação</b>     | Interno e Externo                                   |                       |
| <b>Nível de proteção</b>       | IP67                                                | IP67 e IK10           |
| <b>Material do case</b>        | Metal                                               |                       |
| <b>Dimensões (L x A x P)</b>   | 244.1 mm x 79.0 mm x 75.9 mm                        | 94 mm x $\Phi 122$ mm |
| <b>Peso líquido</b>            | 820g                                                | 713g                  |
| <b>Certificados</b>            | UL, FCC e CE                                        |                       |

<sup>1</sup> O uso do infravermelho é para a captação da imagem em ambiente noturno. Não está associado as funções de inteligência e informações da tabela DORI.

<sup>2</sup> Os valores informados na tabela DORI atribuem-se a capacidade de uma pessoa visualizar o vídeo da câmera e não estão vinculados as funções de inteligência da câmera. As informações contidas na tabela, estão diretamente associadas as condições de iluminação do local de instalação.

<sup>3</sup> As funções de inteligência da câmera, estão diretamente associadas as condições de iluminação do local de instalação. Exemplo: Em ambiente noturno, sem que haja uma iluminação apropriada, o desempenho das funções de inteligência será afetado.

<sup>4</sup> Para garantir o correto funcionamento da detecção de movimento utilizar o protocolo Intelbras-1.

<sup>5</sup> MJPEG disponível apenas no sub stream extra 1.

<sup>6</sup> Para conectar a câmera em DVRs e NVRs que não possuem a função de inicialização, será necessário primeiro conectar a câmera em um computador para fazer a inicialização através da interface web da câmera.

<sup>7</sup> A compatibilidade pode variar conforme a versão do navegador.

\*Este produto possui a opção de criptografia dos dados em trânsito, não sendo possível realizar a criptografia em repouso. A Intelbras não acessa, transfere, capta, nem realiza qualquer outro tipo de tratamento de dados pessoais a partir deste produto, com exceção aos dados necessários para funcionamento dos serviços.

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\*\*\* Esse produto é compatível com os modelos NVD 1204, NVD 1208 e NVD 1216, somente utilizando o protocolo ONVIF e com o modo de gravação em Regular. Não garantimos o funcionamento da detecção de movimento entre esses dispositivos. Devido implementações de segurança na comunicação da câmera com os gravadores Intelbras, todos os firmwares da câmera a partir de 2020 não serão compatíveis com gravadores que possuem versão de firmware de 2017 ou anterior. Para maiores informações, favor consultar o suporte técnico. Não compatível com os NVRs modelos NVD 3000 e NVD 3000-P.

## Conheça também:



Caixa metálica VBOX 5000 E  
(vendido separadamente)



Suporte metálico VBOX 3000 P  
(vendido separadamente)

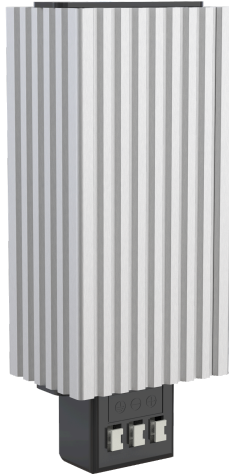


Fonte 12,8V 1A EF 1201  
(vendido separadamente)



PoE 200 AT  
(vendido separadamente)





## FLH PTC Radiant | up to 150W FLH 100 110-250V Radiant Heater

AC 110 / 250 V

Product number: 17010005007



### DESCRIPTION

Pfannenberg Radiant heaters have a very compact design and cover a number of heating applications. Mainly they are used in combination with a thermostat or hygrostat to prevent low temperatures or high humidity in the electrical cabinet, thereby preventing corrosion from forming.

The advantages of the series at a glance:

- Standard radiant heater for all applications
- Ideal for small housings
- Durable and robust design without fan
- Electrical connection via spring-type terminal or cable
- Available from 30W to 150W heating performance (standard)
- Available from 10W to 30W heating performance (mini)
- Integrated snap fastening for 35mm DIN bars
- Approvals: cURus, EAC

TECHNICAL DATA

Technical Data

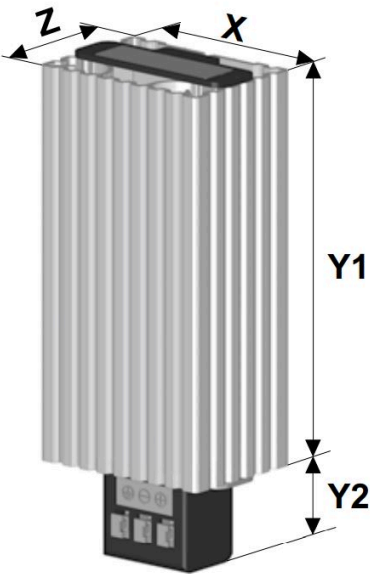
Unit of Measure

metric

▼

|                                                  |                                                             |
|--------------------------------------------------|-------------------------------------------------------------|
| Rated voltage V ±10 %                            | AC 110 / 250 V                                              |
| Rated frequency Hz ±1 %                          | 50 Hz   60 Hz                                               |
| Heating performance W                            | 100 W                                                       |
| Functional range                                 | 110-250V AC @ 50   60 Hz                                    |
| Max. surface temperature °C                      | 130 °C                                                      |
| With fan                                         | no                                                          |
| With thermostat                                  | no                                                          |
| Operating temperature °C                         | -40 °C ... +70 °C                                           |
| System of protection for intended purpose of use | IP IP20                                                     |
| Housing material                                 | aluminium profile, black anodised                           |
| Type of mounting                                 | snap fastening for 35 mm profile bars according to EN 60715 |
| Type of connection                               | plug terminal connector, connecting cable (500 mm)          |
| Weight (without packaging) kg                    | 0,51 kg                                                     |
| Dimensions (H   W   D) mm                        | 70 mm   60 mm   177 mm                                      |
| Width mm                                         | 60 mm                                                       |
| Height mm                                        | 70 mm                                                       |
| Depth mm                                         | 177 mm                                                      |
| ETIM-Class                                       | EC000737                                                    |

TECHNICAL DRAWINGS



## DOWNLOADS

| Description                                               | Type                                                                                    | Size      | Link                                                                                         |
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### Pfannenberg Headquarters

Werner-Witt-Straße 1  
21035 Hamburg

+ 49 40 734120

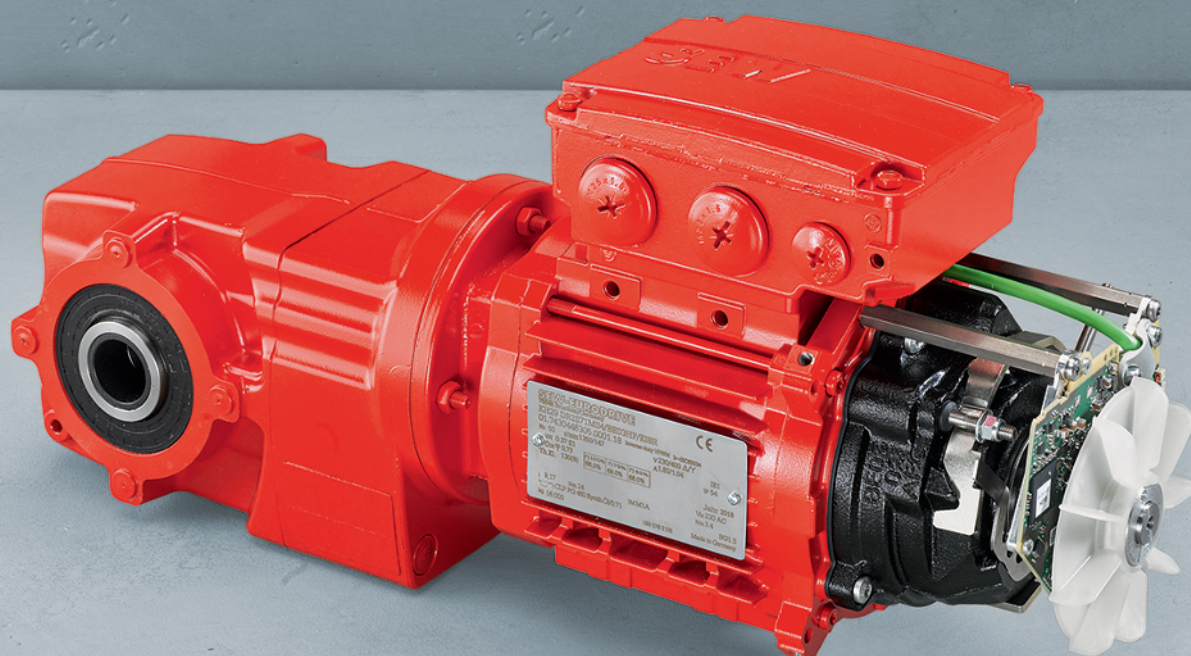
+ 49 40 73412101

info@pfannenberg.com





# Product Manual



**Built-In Encoders, Add-On Encoders, and Safety Encoders**

DR., DRN., DRU., DR2., EDR., EDRN.. AC Motors





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## 1 General information

### 1.1 About this documentation

**The documentation at hand is the original.**

This documentation is an integral part of the product. The documentation is intended for all employees who perform work on the product.

Make sure this documentation is accessible and legible. Ensure that persons responsible for the systems and their operation as well as persons who work on the product independently have read through the documentation carefully and understood it. If you are unclear about any of the information in this documentation or if you require further information, contact SEW-EURODRIVE.

### 1.2 Structure of the safety notes

#### 1.2.1 Meaning of signal words

The following table shows the graduation and meaning of the signal words in the safety notes.

| Signal word        | Meaning                                                        | Consequences if not observed             |
|--------------------|----------------------------------------------------------------|------------------------------------------|
| <b>▲ DANGER</b>    | Imminent danger                                                | Death or severe injuries                 |
| <b>▲ WARNING</b>   | Possibly dangerous situation                                   | Death or severe injuries                 |
| <b>▲ CAUTION</b>   | Possibly dangerous situation                                   | Minor injuries                           |
| <b>NOTICE</b>      | Possible damage to property                                    | Damage to the product or its environment |
| <b>INFORMATION</b> | Useful information or tip: Simplifies handling of the product. |                                          |

### 1.2.2 Structure of section-related safety notes

Section-related safety notes do not apply to a specific action but to several actions pertaining to one subject. The hazard symbols used either indicate a general hazard or a specific hazard.

This is the formal structure of a safety note for a specific section:



#### **SIGNAL WORD**

Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

### 1.2.3 Meaning of the hazard symbols

The hazard symbols in the safety notes have the following meaning:

| Hazard symbol | Meaning                      |
|---------------|------------------------------|
|               | General hazard               |
|               | Warning of hot surfaces      |
|               | Warning of automatic restart |

### 1.2.4 Structure of embedded safety notes

Embedded safety notes are directly integrated into the instructions just before the description of the dangerous step.

This is the formal structure of an embedded safety note:

**▲ SIGNAL WORD!** Type and source of danger. Possible consequence(s) if disregarded. Measure(s) to prevent danger.

### 1.3 Rights to claim under limited warranty

Read the information in this documentation. This is essential for fault-free operation and fulfillment of any rights to claim under limited warranty. Read the documentation before you start working with the product.

### 1.4 Product names and trademarks

The product names mentioned in this documentation are trademarks or registered trademarks of the respective titleholders.

### 1.5 Copyright notice

© 2025 SEW-EURODRIVE. All rights reserved. Copyright law prohibits the unauthorized reproduction, modification, distribution and use of this document – in whole or in part.

### 1.6 Other applicable documentation

The corresponding documentation applies for all other components.

### 1.7 Recycling, reprocessing, reuse

When manufacturing products, SEW-EURODRIVE makes sure to keep the use of new natural resources in the interests of the circular economy to a minimum. Key aspects here are the recycling of materials as well as the inspection and/or processing of returned components and their reuse in new products. These processes are only used at SEW-EURODRIVE if the resulting materials and components correspond to the quality of new products.

### 1.8 General Terms and Conditions (T&Cs)

You can find an overview of SEW-EURODRIVE's General Terms and Conditions (GTC) under the following links.

- [General Terms and Conditions \(GTC\) in German](#)
- [General Terms and Conditions \(GTC\) in English](#)

For business with customers and suppliers of subsidiaries and representatives of SEW-EURODRIVE outside Germany, the respective local General Terms and Conditions and (shipping) conditions apply.

- [SEW-EURODRIVE worldwide in German](#)
- [SEW-EURODRIVE worldwide in English](#)

## 2 Safety notes

### 2.1 Preliminary information

The following general safety notes serve the purpose of preventing injury to persons and damage to property. They primarily apply to the use of products described in this documentation. If you use additional components, also observe the relevant warning and safety notes.

### 2.2 Safety encoders

#### 2.2.1 Designated use

- The safety encoders are designed for use with the described motors. It is not permitted to mount them on other motors.
- When installed in machines, starting the designated operation is prohibited until you have determined that the machine complies with the local laws and directives. Machinery Directive 2006/42/EC in particular must be followed in the respective validity.
- Before starting the designated use and during the entire operation, make sure that the system complies with the specifications of this documentation, and in particular the technical data.
- Safety encoders can also be operated outside functional safety (FS) without safety-relevant monitoring/evaluation by evaluation electronics. Also in this case, the specifications of the documentation, especially the technical data, must be adhered to. If the safety encoder is operated outside the permitted operating limits, future use as part of a safety function is no longer permitted.
- In order to determine the achieved safety integrity level (SIL) or performance level (PL) of a system's safety functions, the system manufacturer must perform an overall evaluation. This document contains the product-related specifications necessary for the evaluation.
- When using a safety encoder in combination with a motor brake, the brake may only be used as a holding brake. Braking during operation is not permitted. The designated use of the brake is to activate the brake in an idle state (brake application speed < 20 min<sup>-1</sup>). Emergency stop braking operations from higher motor speeds are permitted. SEW-EURODRIVE recommends stopping the drive with stop category 1 in accordance with EN 60204-1.
- Operation of the safety encoders is permitted at ambient temperatures of -40 to +60 °C.
- The safety encoders are rated for the following installation altitudes:
  - ES7S, AS7W, AS7Y: 4000 m above sea level
  - EG7S, AG7W, AG7Y: 4000 m above sea level
  - EK8S, EK8W, AK8W, AK8Y: 4000 m above sea level
  - AK8H: 2000 m above sea level
  - EK8Z, EK9Z, AK8Z: 3800 m above sea level
  - EI7C FS: 3800 m above sea level

Installation altitudes that deviate from these and derating of the drives or frequency inverters must be noted.

- For AS7W, AG7W, AS7Y, AG7Y, AK8Y, EK8W, AK8W, AK8H, EK9Z, and AK8Z safety encoders, only the incremental interface is certified in accordance with PL d/ SIL 2 approval. The absolute interface must not be used to implement safety functions without further measures in place.
- SEW-EURODRIVE recommends activating the monitoring functions lag error, speed, and encoder monitoring when configuring the inverter.
- The safety encoders described in this documentation are not capable of independently bringing about a safe state in the machine.
- In the event of a failure or malfunction of the safety encoder, injury and damage to the system or operating equipment must be prevented by means of suitable measures taken in the overall system.
- Protection against unintentional or automatic restarting of the machine must be ensured in the overall system, if necessary.
- The safety encoders described in this documentation are intended to be used in functional safety and are mounted on the motor. Fault exclusion in compliance with EN 61800-5-2 can be assumed on the mounting of the safety encoder.
- Motors with a safety encoder are not suitable for operation in areas with increased vibration stress of level 1 (vibration level 1).

Note that in case of emergency stop braking from speeds  $> 20 \text{ min}^{-1}$ , the encoders can output warnings or errors if the negative acceleration exceeds certain limit values. Before switching the device on again, warnings or errors must be checked and acknowledged if necessary.

## **2.2.2 Inspection/maintenance**

The users can perform work themselves on a drive with functionally safe motor options (can be identified by the FS logo on the motor nameplate).

Any work on the safety encoder and/or the safety brake is carried out at your own risk. The user is responsible and liable for the proper performance of the work described in the corresponding documentation.

The user has to ensure the traceability of the work performed with regard to the functional safety. In the event of proven compliance with the work described in the documentation, the characteristics regarding functional safety described by the manufacturer are maintained.

Use only genuine spare parts in accordance with the valid spare parts list.

### 3 Encoder technology in practice

#### 3.1 What are encoder systems?

##### 3.1.1 What are the tasks of encoder systems?

The basic function of encoders is to provide one of the following pieces of information:

- Absolute encoder: Motor shaft position of a rotary drive or linear motor
- Incremental encoder: Change in motor shaft position of a rotary drive or linear motor
- Absolute or incremental encoder: Rotational speed/speed of the motor shaft of a rotary drive or linear motor

The aforementioned information is used, for example, to enable one of the following functions:

- Position control in a closed loop system
- Speed control in a closed loop system
- Torque control in a closed loop system
- Realization of safety-related applications
- Monitoring of the position or speed

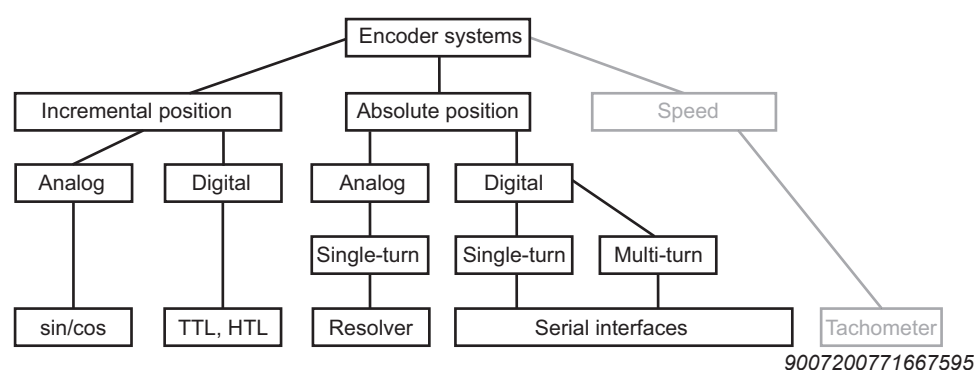
If the encoder system is operated in a closed loop system, the speed quality and control behavior can be significantly improved, even with major changes in load.

For dynamic control of synchronous motors under a wide range of load conditions, feedback of the rotor position is required to set the rotating field. By selecting the correct encoder and the optimum combination of signals for control processes and positioning, you can create an optimum drive system.

Due to control technology requirements, tacho-generators that determine direct information about a speed are rarely used today, as they do not enable positioning.

##### 3.1.2 Which types of encoder systems are there?

#### Overview of conventional encoder systems with respect to electrical interfaces



The different encoders deliver the following data:

| Encoder system               | Delivered data |          |       |
|------------------------------|----------------|----------|-------|
|                              | Rotor angle    | Position | Speed |
| Single-turn absolute encoder | x              | x        | (x)   |
| Multi-turn absolute encoder  | x              | x        | (x)   |
| Incremental encoder          | (x)            | (x)      | (x)   |

| Encoder system         | Delivered data |          |       |
|------------------------|----------------|----------|-------|
|                        | Rotor angle    | Position | Speed |
| <b>Resolver</b>        | x              | (x)      | (x)   |
| <b>Tacho-generator</b> | –              | –        | x     |

x: Encoder system determines the data

(x): Encoder evaluation calculates the data from the encoder information

### Advantages and disadvantages of the most important encoder systems

| Encoder system             | Advantages                                                                                                                                                                                                                                                                                                                                                                                                                        | Disadvantages                                                                                                 |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>Incremental encoder</b> | <ul style="list-style-type: none"> <li>Robust designs</li> <li>Long cable lengths of up to 300 m are possible with TTL and HTL interfaces</li> <li>Wide range of resolutions, mounting positions, and interfaces</li> <li>Very high resolution possible</li> <li>Built-in encoders: motor-integrated, compact design possible</li> </ul>                                                                                          | <ul style="list-style-type: none"> <li>If a voltage drop occurs, the position information is lost.</li> </ul> |
| <b>Absolute encoder</b>    | <ul style="list-style-type: none"> <li>Position information is still available even after a voltage drop and restart</li> <li>Very high resolution possible with sin/cos interfaces</li> <li>Single-turn encoder design: A unique position within one motor revolution is determined.</li> <li>Multi-turn encoder design: In the case of rotary encoders, a position must also be determined over several revolutions.</li> </ul> | <ul style="list-style-type: none"> <li>Higher costs</li> </ul>                                                |
| <b>Resolver</b>            | <ul style="list-style-type: none"> <li>Robust design</li> <li>Insensitive to vibration and temperature</li> <li>Resolvers by SEW-EURODRIVE are single-turn encoders</li> </ul>                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>High evaluation effort</li> </ul>                                      |

An important criterion when selecting an encoder is the robustness of an encoder system. As some encoders are installed directly on the motor, they must be insensitive to temperature and vibration, otherwise the encoder could be damaged.

An encoder system's susceptibility to interference also plays a major role. In the event of a supply voltage failure, the absolute encoder retains its current path information, while the incremental encoder loses it. As a result, the absolute encoder is also resistant to external interference pulses. Once the interference fades away, the device continues to work flawlessly since the saved path information has not been changed.

In the incremental encoder, a lost or excess counting pulse is not registered and leads to a permanent measurement fault.



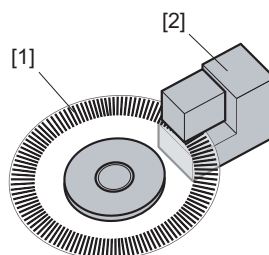
### 3.1.3 How do encoder systems work?

#### Rotary encoder systems

##### *Incremental encoder*

##### *Optical system*

Incremental rotary encoders convert the speed into a discrete number of electrical pulses. This is performed via a code disk with radial, transparent slots, which is optoelectronically scanned. During the process, the resolution is defined by the number of slots.



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[1] Optical code disk

[2] Light source and scanning unit

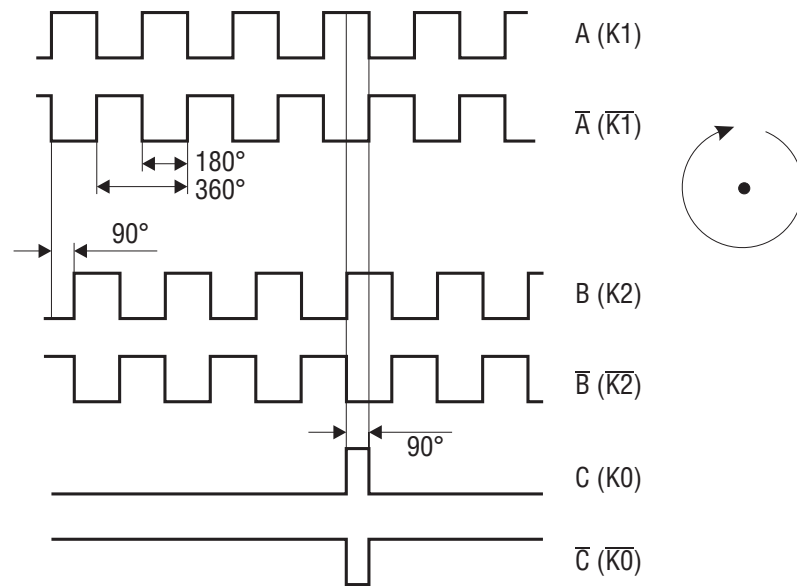
##### *Magnetic system*

Sensors scan rotating magnets or ferromagnetic material measures and use them to generate a signal. These systems tend to be more mechanically robust than optical systems. It is also possible to deviate from the classic design. For example, in the case of built-in encoders from the E7. and EI8. family, magnetic pole rings are integrated in the fan. Magnetic field sensors on an encoder module detect these pole rings. This encoder module is integrated between the motor and fan in a space-saving manner and measures changes in position in a contactless and wear-free manner. The corresponding incremental signals are produced by interpreting the measured values.

##### *Design and operating principle*

Incremental encoders normally have 2 tracks and a zero pulse track. Inverting the signals results in a total of 6 tracks. Two scanning elements in the incremental encoder, which are offset by 90°, deliver two signal tracks, A (K1) and B (K2). Track A (K1) is 90° ahead of track B (K2) when looking at the motor shaft. This phase shift is used to determine the motor's direction of rotation. The zero pulse (one pulse per revolution) is registered by a third scanning unit and made available on track C (K0) as a reference signal.

The signals A (K1), B (K2), and C (K0) are inverted in the encoder and provided as signals  $\bar{A}$  (K1),  $\bar{B}$  (K2), and  $\bar{C}$  (K0).



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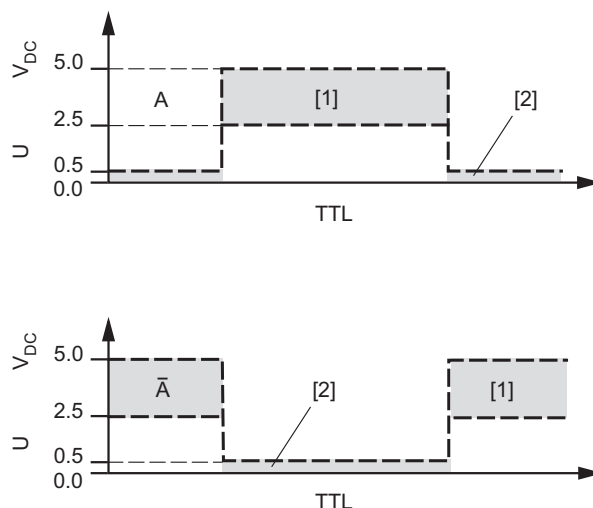
### Signal level

A distinction is made between 2 signal levels for incremental digital encoders:

- TTL (Transistor-Transistor Logic)
- HTL (High-voltage-Transistor Logic)

### TTL (Transistor-Transistor Logic)

The signal levels are typically  $V_{\text{low}} \leq 0.5 \text{ V}$  and  $V_{\text{high}} \geq 2.5 \text{ V}$ . A positive and negative signal (e.g. A,  $\bar{A}$ ) are each sent from the sender to the receiver and evaluated differentially. This symmetrical signal transmission and differential evaluation can minimize common mode interference and achieve higher data rates.



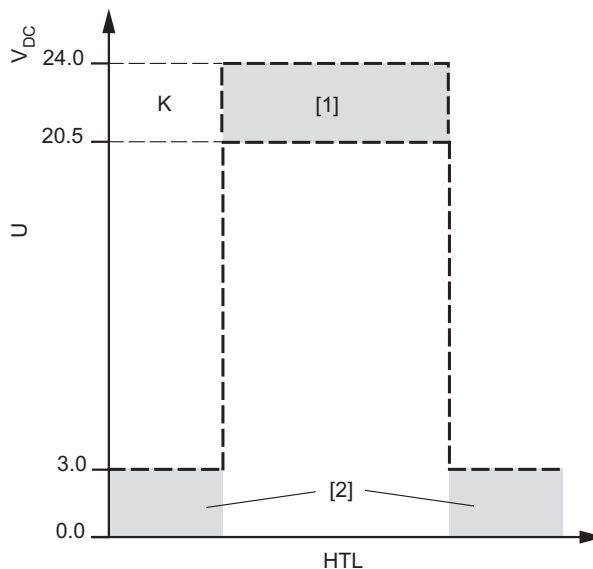
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[1] "1" area

[2] "0" area

**HTL (High-voltage-Transistor Logic)**

The signal levels are typically  $V_{low} \leq 3 \text{ V}$  and  $V_{high} \geq V_B - 3.5 \text{ V}$ . The signals are transferred symmetrically and evaluated differentially. Because of this and due to the high voltage level, HTL encoders have excellent EMC performance.



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[1] "1" area

[2] "0" area

Inverted HTL signals must not usually be connected directly to the inverter's encoder input, as the input stages may be overloaded and thereby destroyed in certain circumstances.

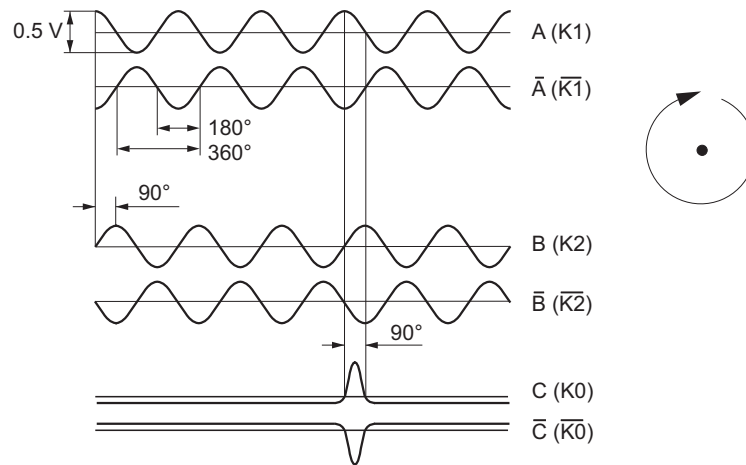
*Incremental rotary encoders with sin/cos tracks**Structure and functional principle*

Sin/cos encoders, also known as sine encoders, deliver two sinus signals offset by  $90^\circ$ . During the process, the number and the course of the sinus curves (interpolation and arcus tangent formation) are evaluated. With the help of these values, the rotational speed can be determined with a very high resolution and accuracy. This is particularly advantageous if large setting ranges and low speeds need to be precisely maintained. Furthermore, there is a very high level of control stability.

Sin/cos encoders normally have 2 tracks and a zero pulse track. Inverting the signals results in a total of 6 tracks. The 2 signals, which are offset by  $90^\circ$ , are on track A (K1) and B (K2). One sine half wave per revolution is provided at track C (K0) as the zero pulse. The tracks A (K1), B (K2), and C (K0) are inverted in the encoder and provided as inverted signals on tracks  $\bar{A}$  ( $\bar{K1}$ ),  $\bar{B}$  ( $\bar{K2}$ ) and  $\bar{C}$  ( $\bar{K0}$ ).

Track A = cos

Track B = sin



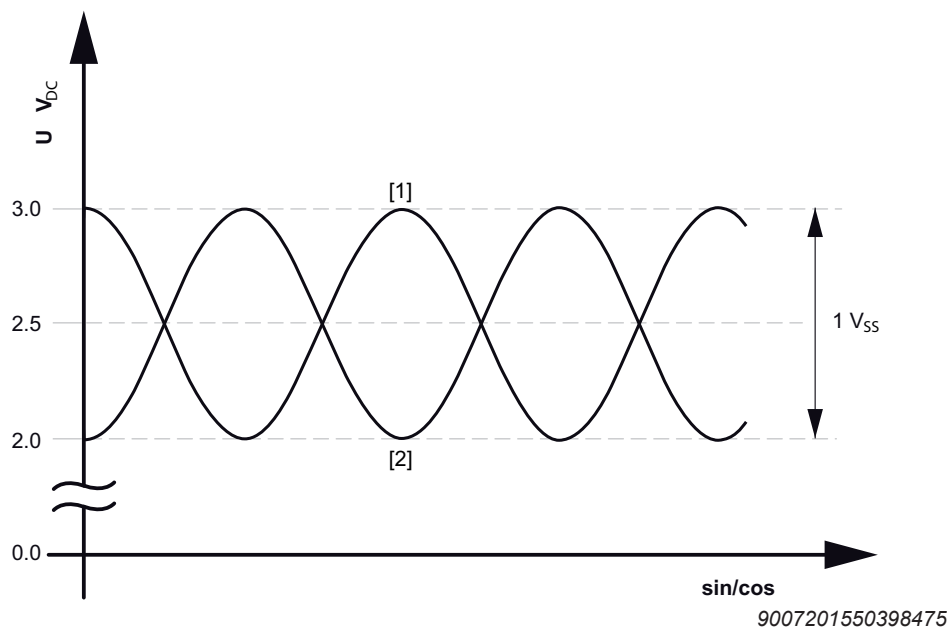
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### 3 Encoder technology in practice

What are encoder systems?

#### Signal level

Sin/cos signals are generally superimposed over a DC voltage of 2.5 V. As the sin/cos signals are transferred symmetrically and evaluated differentially ( $V_{SS} = 1\text{ V}$ ), they are impervious to asymmetrical interference and have excellent EMC performance.



[1] A

[2]  $\bar{A}$

### Absolute encoder

#### Absolute encoder with asynchronous-serial interface

Over the past few years, so-called combi encoders have also established themselves on the market. These encoders are sin/cos encoders with absolute value information. In addition to the current motor speed, they also provide absolute value information and so offer technical and financial advantages whenever an absolute encoder is required.

### Structure

The absolute encoder with an asynchronous interface is a typical combi encoder. In addition to a sin/cos signal for recording the speed and for information on the absolute value, this encoder also has a typical electronic nameplate in which the drive data can be saved, among other things. This makes startup easier and reduces possible input faults by the user, as they do not have to enter any drive data.

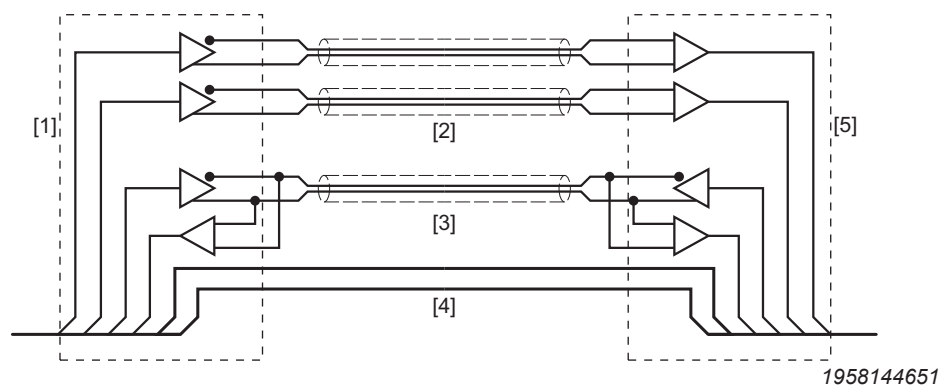
Absolute encoders with an asynchronous interface are available as:

1. Add-on encoders for asynchronous motors and synchronous servomotors
2. Built-in encoders for synchronous servomotors

Both are available in a single-turn design and in a multi-turn design.

### Operating principle

At the start of the power-on process, the absolute encoder assembly determines the absolute position. The inverter for synchronous motors can use this to calculate the commutation information. The inverter reads this position information via an RS485 connection (parameter channel) and sets a counter reading. Based on this absolute value, the position changes are recorded via the tracks of the sin/cos encoder and analogously transferred to the inverter via the process data channel. Additional queries of the absolute position are then only performed cyclically for plausibility monitoring.



- [1] Encoder systems
- [2] sin/cos signal
- [3] RS485 parameter channel
- [4] Supply voltage
- [5] Inverter

An inverter with an asynchronous-serial interface receives both the position information and the time period for which this position is valid via the parameter channel. In parallel, the incoming analog signals (sin/cos signals) are constantly received and counted on the process data channel.

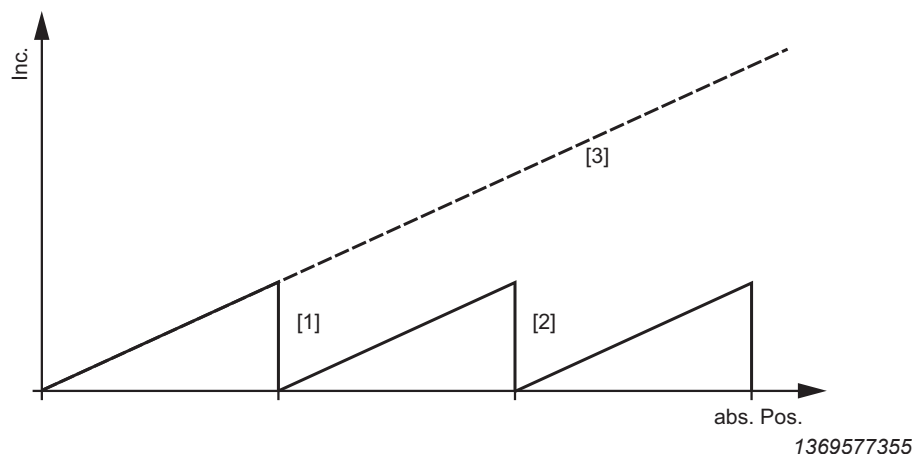
The encoder can be optionally designed as a single or multi-turn variant. Single-turn means that the absolute position information always refers to only one revolution. The multi-turn variant of the encoder can also provide information about the number of revolutions (typically e.g. 4096) via downstream code disks rotating at a reduced ratio or by using an electronic revolution counter. Thus, depending on the inverter, an encoder overflow occurs, e.g. after the maximum number of encoder revolutions, which is counted in the inverter's non-volatile memory (NVM). Up to 256 encoder overflows are saved (with 4096 revolutions). If the voltage at the supply pins falls below a limit value (e.g. in the event of a power failure), the NVM detects this and the data is saved in non-volatile memory.

Overflow example:

When powered on again, the EEPROM in the inverter provides the following values:

- The absolute value within an overflow (typically  $4096 \times 4096$ )
- The number of overflows (0 – 255)

If the drive that is close to an overflow is moved beyond the encoder overflow point after removing the supply voltage, then there will be a discrepancy between the recorded and the saved absolute values when powered on again. The encoder electronics then corrects the saved values automatically with the recorded values.



[1] 1st encoder overflow

[2] 2nd encoder overflow

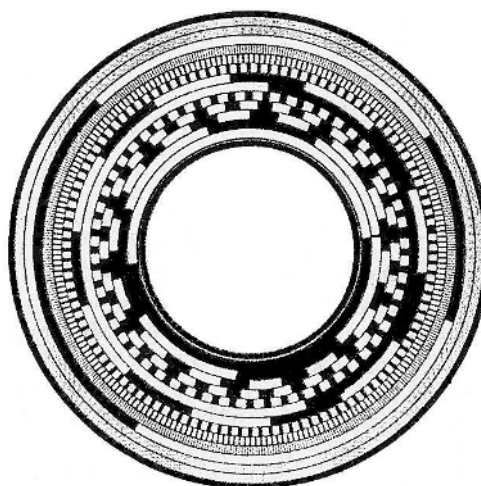
[3] Absolute position viewed by the user

The encoder overflows are also counted in the inverter, which can be used to determine the absolute position.

The user does not see the actual encoder overflows; they are saved in the inverter. As a result, the encoder with an asynchronous-serial interface is a true absolute encoder.

*Absolute encoder with SSI (synchronous serial interface)**Single-turn encoder*

The absolute value information is generated using a code disk, e.g. with Gray code, which is generally scanned optically. Each angle position is assigned a unique code pattern in the process. In this way, it is possible to identify the motor shaft's absolute position. In contrast to binary code, the special feature of a single-step Gray code is that only 1 bit changes at a time, meaning that a faulty scanning process is detected immediately.



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| Decimal | Gray code | Binary code |
|---------|-----------|-------------|
| 0       | 0000      | 0000        |
| 1       | 0001      | 0001        |
| 2       | 0011      | 0010        |
| 3       | 0010      | 0011        |
| 4       | 0110      | 0100        |
| 5       | 0111      | 0101        |
| 6       | 0101      | 0110        |
| 7       | 0100      | 0111        |
| 8       | 1100      | 1000        |
| 9       | 1101      | 1001        |
| 10      | 1111      | 1010        |
| 11      | 1110      | 1011        |
| 12      | 1010      | 1100        |
| 13      | 1011      | 1101        |
| 14      | 1001      | 1110        |
| 15      | 1000      | 1111        |

This encoder design is a so-called single-turn encoder, since the absolute position of the motor shaft can be determined only via a single revolution.



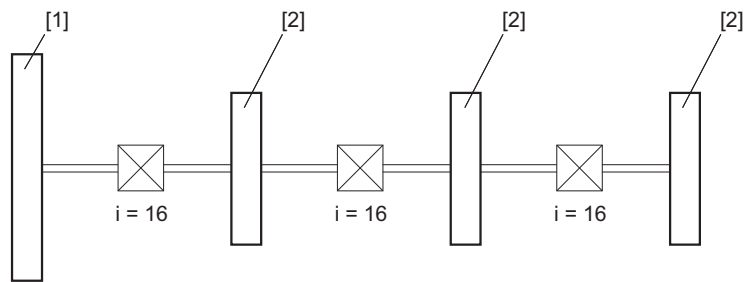
*Multi-turn encoder*

In addition to the single-turn design, there are also multi-turn encoders that determine the absolute position over multiple revolutions.

Different technical solutions are available to detect the revolutions. There are micro-gear unit stages that are magnetically or optically scanned using code disks.

The multi-turn unit is also available as an electronic counter that saves to memory.

In the case of an optical rotary encoder, the code disks are decoupled from each other via a gear unit stage with a reduction ratio of  $i = 16$ . In other words, with 3 additional code disks (common value),  $16 \times 16 \times 16 = 4096$  revolutions can be resolved absolutely.



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[1] Code disk to detect the angle position

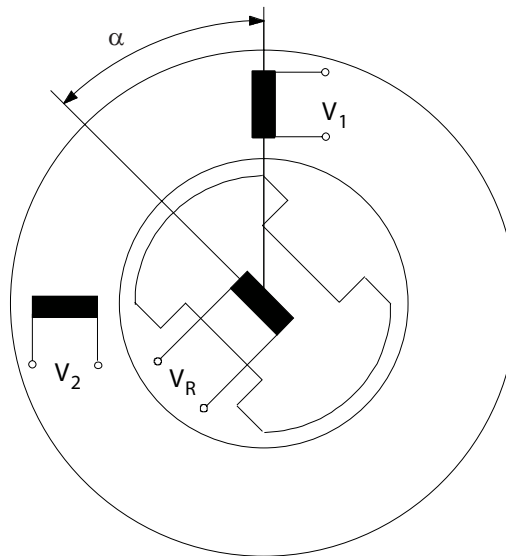
[2] Code disk to detect the number of revolutions

## Resolver

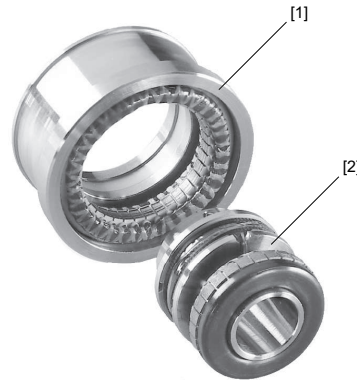
If designed as a two-pole version, a resolver can determine the absolute position of the motor shaft within one motor revolution. The speed and the absolute position per revolution are derived from the resolver signal.

## Structure

The resolver consists of 2 function units, the stator, and the rotor.



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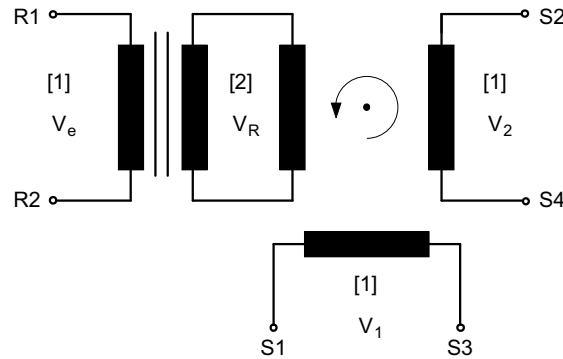
[1] Stator of the resolver

[2] Rotor of the resolver

*Functional principle*

The inverter delivers a high-frequency excitation signal with a constant amplitude and constant frequency. This high-frequency signal is transferred to the resolver's rotor via the stator.

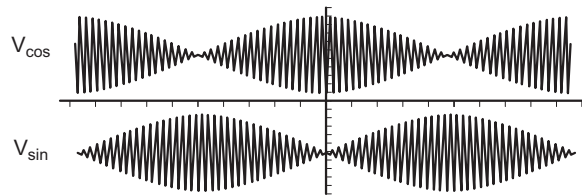
The rotation of the resolver's rotor induces voltages in the rotary transformer's stator winding; these voltages are based on the position of the rotor.



1369630347

[1] Stator

[2] Rotor



1369632779

*Signal characteristics*

The course of the signals is calculated as follows:

$$V_{\text{ref}} = A \times \sin(\omega_{\text{exciter}} \times t)$$

$$V_{\text{cos}}(t) = A \times \ddot{u} \times \sin(\omega_{\text{exciter}} \times t) \times \cos(p \times \alpha)$$

$$V_{\text{sin}}(t) = A \times \ddot{u} \times \sin(\omega_{\text{exciter}} \times t) \times \sin(p \times \alpha)$$

$$p \times \alpha = \arctan(V_{\text{sin}} / V_{\text{cos}})$$

|                           |                                      |
|---------------------------|--------------------------------------|
| $V_{\text{ref}}$          | Reference voltage                    |
| $V_{\text{cos}}$          | Output voltage 1 of the stator       |
| $V_{\text{sin}}$          | Output voltage 2 of the stator       |
| $A$                       | Amplitude of the input voltage       |
| $\omega_{\text{exciter}}$ | Angle frequency of $V_e$             |
| $\alpha$                  | Rotor angle                          |
| $\ddot{u}$                | Gear ratio                           |
| $p$                       | Number of pole pairs of the resolver |

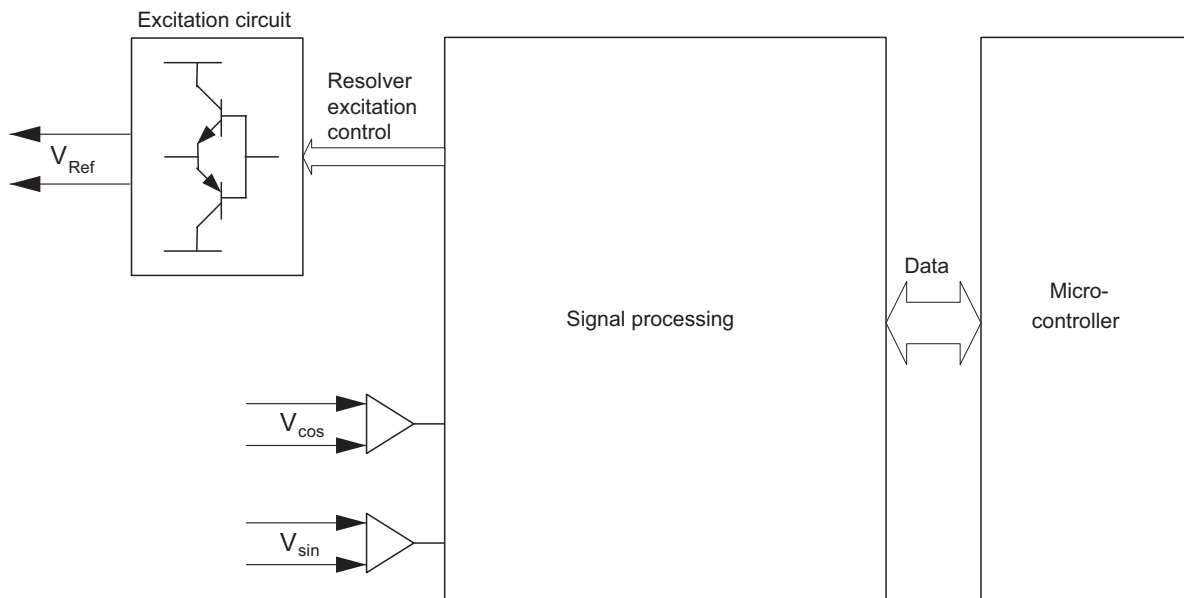
The amplitudes of voltages  $V_{\text{sin}}$  and  $V_{\text{cos}}$  change based on the position of the rotor and are each fed to the evaluation unit via a differential amplifier. The differential amplifiers filter out interference signals (common mode interference) on the isolated track signals  $V_{\text{sin}}$  and  $V_{\text{cos}}$ .

The current mechanical position can be determined from the scanned track signals:

$$p \times \alpha = \arctan(V_{\sin} / V_{\cos})$$

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The following graphic provides an overview of the main hardware structure of a resolver evaluation, which operates according to the scanning process.



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### 3.1.4 Which encoder with which motor?

#### Encoder systems for asynchronous DRN., DRU., and DR2.. AC motors or servomotors

In the case of asynchronous motors, encoder systems are generally used for the following reasons:

- Speed control – to achieve high speed quality and to respond optimally to load changes.
- Positioning
- Torque control
- Speed and rotation monitoring

The following encoders are generally used here:

- Low-resolution incremental encoders
  - Can only be used for positioning and speed monitoring and not for speed control
  - Only simple positioning (rapid/creep speed) is possible
  - As a result, the system has lower dynamics
  - Reference travel required
- Incremental rotary encoders
  - For speed control
  - For positioning
  - Reference travel required
- Absolute encoder
  - For positioning
  - No reference travel required
  - If no real-time channel (combi encoder with either sin/cos, TTL, or HTL signal) is present, then an additional encoder system is required for speed control.

#### Encoder systems for CM.. synchronous servomotors and DR2C.. synchronous standard motors

For dynamic control of synchronous motors, the rotor position is still required for the control system. Generally, two systems for rotor position detection are used in synchronous servomotors:

- Resolver
  - For rotor position detection
  - For speed control
  - For positioning
  - Reference travel required
  - Torque control
  - Speed and rotation monitoring
- Absolute encoder
  - For rotor position detection
  - Absolute encoders for servomotors are generally combi encoders with a real-time channel (sin/cos) for speed control.
  - For positioning
  - Torque control

- Speed and rotation monitoring
- Reference travel is usually necessary for single-turn encoders.
- Reference travel is not necessary for multi-turn encoders.

#### Encoder systems for linear motors

- Linear encoders and material measures
  - For positioning
  - No reference travel is required with absolute value information on the measuring tape
  - Reference travel is required in the event of purely incremental information on the measuring tape

#### Encoder systems for linear position detection

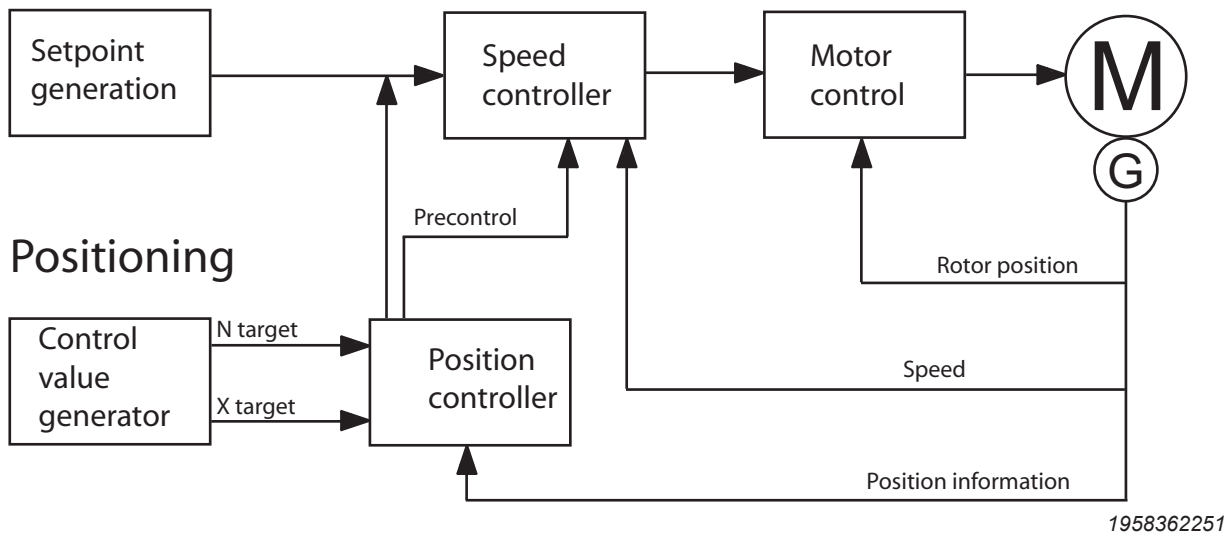
For precise positioning in systems that are prone to slip, it is necessary to install a measuring system on the track in addition to the encoders installed on the motor.

- Laser encoders
  - For measuring distances up to approx. 250 m
  - No curve mobility
- Barcode positioning system
  - Can be used for measuring very long distances
  - Curve mobility and switches are possible
- Code rail
  - Can be used for measuring distances up to approx. 320 m
  - Very robust system
  - Curve mobility and switches are possible
- Wire-actuated encoders
  - Robust system
  - Ideal for vertical applications

### 3.2 How are encoder systems used at SEW-EURODRIVE?

The typical closed loop system of a drive system, consisting of a motor (M) with encoder (G), is shown in simplified form below. As part of the simplification, note that the encoder generally outputs position values (rotor position or change in rotor position). All other sizes are derived from this.

#### Speed control



#### 3.2.1 Which encoder systems does SEW-EURODRIVE use?

##### Basic class incremental encoders of type EI71, EI72, EI76, EI7C

Low-resolution incremental encoders can be used to realize simple, non-dynamic positioning tasks. Furthermore, these encoders allow you to inexpensively check whether the motor is turning. If a two-track encoder is used, the direction of rotation of the motor can also be detected.

##### Incremental encoder type EI8., E..T, E..C, E..S, E..R

Incremental encoders are suitable for speed control and positioning. They have 2 signal tracks and a zero pulse track. The incremental encoders are designed as a hollow-shaft encoder, cone shaft, spread-shaft encoder, plug-in shaft with end thread, or solid-shaft encoder with coupling. Pulse output: TTL, HTL, or sin/cos.

##### Single-turn encoder type E..W

The E..W absolute encoders are combi encoders. They contain a single-turn absolute encoder and a high-resolution sine encoder. An asynchronous-serial interface is available for transferring the data of the absolute values. They are suitable for operating synchronous motors. They can be used for speed control or for positioning via a revolution. The E..W absolute encoders also have an electronic nameplate.

### Multi-turn absolute encoders type A..Y, A..H, A..W

The A..Y, A..H, and A..W absolute encoders are combi encoders. They contain a multi-turn absolute encoder and a high-resolution sine encoder. You can choose between an SSI interface or an asynchronous-serial interface for transmission of absolute values. The A..H and A..W absolute encoders also have an electronic nameplate.

### Encoders with MOVILINK® DDI interface

The MOVILINK® DDI digital drive interface offers you the option of using encoders from all categories. Incremental encoders of type EI8Z and EK8Z, single-turn encoders of type EK9Z, and multi-turn absolute encoders of type AK8Z are available. The use of these encoders is particularly advantageous due to their combination capability with all other options for digital motor integration, without the need for an additional interface.

For detailed information, refer to the "Digital Motor Integration with MOVILINK® DDI" manual in SEW-EURODRIVE Online Support: <https://download.sew-eurodrive.com/>

### X...-type special encoder

Due to its modular system, SEW-EURODRIVE can provide customer-specific special encoders. If you require a special encoder, contact SEW-EURODRIVE. Special encoders are integrated into the design of the motor upon customer request.

## 3.2.2 How do you perform the project planning for encoder systems?

The use of a specific encoder is based on the requirements of the application. Each encoder in the offered capability classes can be used in relation to the application. If the application is not very dynamic, it may be sufficient under certain circumstances to implement rapid/creep speed positioning via a low-resolution incremental encoder.

However, speed control is essential for dynamic positioning. A high encoder resolution is necessary for the speed control quality. This is why SEW-EURODRIVE recommends sin/cos encoders. The signals are scanned with an A/D converter that achieves a higher resolution than the typical 1024 (4096 due to quadruple evaluation) increments of a TTL or HTL incremental encoder.

Linear systems are often used on the track for travel distance positioning. They have the advantage of measuring directly on the track and so are independent of the slip of the drive system.

For functional safety, certified safety encoders are used to implement safety functions. They have the advantage that they are already certified as a safety-related component and can be used for the application-related and safety-relevant tasks at the same time.

The following table lists the most important characteristics of the encoder systems. For further information, refer to chapter "Encoder capability class".

| Encoder system   | EK8S/EV8S/EK8Z<br>Incremental encoder                 | EI8Z/EI8C/EK8C/EV8C/<br>EK8R/EV8R<br>Incremental encoder      | EI71/EI72/EI76/EI7C<br>Low-resolution incremental encoder |
|------------------|-------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------|
| Capability class | High                                                  | Medium                                                        | Basic                                                     |
| Output signal    | 1024 sin/cos periods/revolution or with MOVILINK® DDI | 1024 periods/revolution (HTL/TTL level) or with MOVILINK® DDI | 1 to 24 periods/revolution                                |
| Accuracy         | < 2 angular minutes                                   | < 7 angular minutes                                           | < 300 angular minutes                                     |



| Encoder system                 | EK8S/EV8S/EK8Z<br>Incremental encoder                                                                                       | EI8Z/EI8C/EK8C/EV8C/<br>EK8R/EV8R<br>Incremental encoder                                                    | EI71/EI72/EI76/EI7C<br>Low-resolution incre-<br>mental encoder                                  |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Capability class               | High                                                                                                                        | Medium                                                                                                      | Basic                                                                                           |
| Maximum usable reso-<br>lution | < 22 bits                                                                                                                   | < 14 bits                                                                                                   | < 5 bits                                                                                        |
| Use                            | For speed control and "in-<br>cremental" positioning                                                                        | For speed control and "in-<br>cremental" positioning                                                        | For simple "incremental"<br>positioning and speed<br>monitoring                                 |
| Suitable for                   | Asynchronous DR.. AC<br>motors, asynchronous<br>DR2L servomotors                                                            | Asynchronous DR.. AC<br>motors, asynchronous<br>DR2L servomotors                                            | Synchronous DR2C.. mo-<br>tors, asynchronous DR..<br>AC motors                                  |
| Speed control                  | Suitable for dynamic appli-<br>cations                                                                                      | Suitable for dynamic appli-<br>cations with limitations in<br>the lower speed range                         | –                                                                                               |
| Safety encoder                 | Optionally as a certified<br>safety encoder for imple-<br>menting safety functions<br>(sin/cos signals or<br>MOVILINK® DDI) | –                                                                                                           | Optionally as a certified<br>safety encoder for imple-<br>menting safety functions<br>(EI7C FS) |
| Other characteristics          | Simple startup due to<br>electronic nameplate                                                                               | Simple encoder system for<br>standard applications<br><br>For EI8R/EI8C: Motor<br>without additional length | Motor without additional<br>length                                                              |

| Encoder system                 | RK8M<br>Resolver                               | EK8W/AK8W/AV8W<br>Single-turn absolute en-<br>coder (EK8W), multi-turn<br>absolute encoder (A.8W)<br><br>EK9Z/AK8Z<br>Single-turn absolute en-<br>coder (EK9Z), multi-turn<br>absolute encoder (AK8Z)                               | AK8Y/AV8Y<br>Multi-turn absolute en-<br>coder with synchronous<br>serial interface                                                                                                              |
|--------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Capability class               | Medium                                         | High                                                                                                                                                                                                                                | High                                                                                                                                                                                            |
| Output signal                  | Amplitude-modulated sin/<br>cos signal; 2-pole | <ul style="list-style-type: none"> <li>• up to 2048 sin/cos<br/>periods</li> <li>• up to 32768 incre-<br/>ments/revolution (ab-<br/>solute)</li> <li>• up to 65536 revolu-<br/>tions (absolute)</li> <li>• MOVILINK® DDI</li> </ul> | <ul style="list-style-type: none"> <li>• up to 2048 sin/cos<br/>periods</li> <li>• up to 4096 increments/<br/>revolution (absolute)</li> <li>• up to 4096 revolutions<br/>(absolute)</li> </ul> |
| Accuracy                       | < 40 angular minutes                           | < 2 angular minutes                                                                                                                                                                                                                 | < 2 angular minutes                                                                                                                                                                             |
| Maximum usable reso-<br>lution | < 16 bits                                      | < 22 bits                                                                                                                                                                                                                           | < 22 bits                                                                                                                                                                                       |

| Encoder system        | <b>RK8M<br/>Resolver</b>                                                                                                                                                    | <b>EK8W/AK8W/AV8W</b><br>Single-turn absolute en-<br>coder (EK8W), multi-turn<br>absolute encoder (A.8W)<br><b>EK9Z/AK8Z</b><br>Single-turn absolute en-<br>coder (EK9Z), multi-turn<br>absolute encoder (AK8Z) | <b>AK8Y/AV8Y</b><br>Multi-turn absolute en-<br>coder with synchronous<br>serial interface                                          |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Capability class      | Medium                                                                                                                                                                      | High                                                                                                                                                                                                            | High                                                                                                                               |
| Use                   | For speed control and de-<br>termining the rotor position<br>within one motor revolu-<br>tion as well as "incre-<br>mental" positioning                                     | For speed control and de-<br>termining both the rotor<br>position and absolute posi-<br>tion                                                                                                                    | For speed control and de-<br>termining both the rotor<br>position and absolute posi-<br>tion                                       |
| Suitable for          | <ul style="list-style-type: none"> <li>• Synchronous DR2C..<br/>motors</li> <li>• Asynchronous DR.. AC<br/>motors</li> <li>• Asynchronous DR2L..<br/>servomotors</li> </ul> | <ul style="list-style-type: none"> <li>• Synchronous DR2C..<br/>motors</li> <li>• Asynchronous DR.. AC<br/>motors</li> <li>• Asynchronous DR2L..<br/>servomotors</li> </ul>                                     | <ul style="list-style-type: none"> <li>• Asynchronous DR.. AC<br/>motors</li> <li>• Asynchronous DR2L..<br/>servomotors</li> </ul> |
| Speed control         | Suitable for dynamic appli-<br>cations                                                                                                                                      | Suitable for highly dy-<br>namic and dynamic appli-<br>cations                                                                                                                                                  | Suitable for highly dy-<br>namic and dynamic appli-<br>cations                                                                     |
| Safety encoder        | –                                                                                                                                                                           | Optionally as a certified<br>safety encoder for imple-<br>menting safety functions<br>(sin/cos signals or<br>MOVILINK® DDI)                                                                                     | Optionally as a certified<br>safety encoder for imple-<br>menting safety functions<br>(sin/cos signals)                            |
| Other characteristics | Mechanically and<br>thermally very robust                                                                                                                                   | Simple startup due to elec-<br>tronic nameplate                                                                                                                                                                 | –                                                                                                                                  |

## 4 Further information on the encoders

### 4.1 General information

#### Encoder technology

The task of an encoder is to detect the angular position of the motor shaft or the change of the angular position, and to pass on this information to a unit that evaluates this data, such as a PLC or frequency inverter.

This information is used to determine the rotational speed and angular acceleration. The evaluating unit (inverter, encoder card) can then monitor or control the speed and position the drive system accordingly.

#### Encoder in closed loop system

Encoders are connected to the inverter and allow for further improved motor control.

- The motor can be operated in positioning control or for a simple positioning task.
- The quality of torque control can be improved significantly.
- The quality of speed control can be improved significantly.

#### Encoder design

Encoders are available in various designs:

- Incremental encoders, single-turn absolute encoders, multi-turn absolute encoders
- Built-in encoders integrated in the motor and add-on encoders mounted to the motor
- Different mechanical connections of the motor shaft with the encoder.
- Different electrical connection options, such as terminal strip or connector.
- Different output signals: sin/cos, HTL, TTL, SSI, RS485 + sin/cos, HIPERFACE®, MOVILINK® DDI, resolvers
- With or without electronic nameplate for startup on SEW-EURODRIVE inverters.
- Different resolutions and number of counted revolutions.
- Available for order ex works or mechanically prepared through mounting adapters for retrofitting
- Various mechanical preparations for mounting encoders subsequently
- Design as a safety encoder for implementing safety functions.
- Design as an encoder for use in potentially explosive areas according to ATEX/IECEx and HazLoc-NA®

SEW-EURODRIVE offers a wide range of encoders for different applications and different inverters. Before selecting the encoder, check the application environment as well as the encoder interface of the inverter.

#### Electronic nameplate

With EI8Z, E.8S, EK8W, EK8Z, EK9Z, AK8H, A.8W, and AK8Z encoders, important startup data are stored in an electronic nameplate. This facilitates starting up the drive and ensures that motor parameters are set correctly in the inverter.

During startup, the engineering software checks whether an electronic nameplate is present in the encoder and gives a suggestion to the user about how to use this data.

Advantages of auto identification of the drive:

- Complete and correct identification of encoder, motor, and gear unit

- No manual entry of data is necessary, which saves time during startup.
- Easy startup of drives that are installed in locations that are difficult to access.

### Modular encoder system

The modular encoder concept has been standardized and improved. The encoders of the spread shaft (.S7.), plug-in shaft (.G7.), and hollow shaft (.H7.) variants have been converted into encoder variants with a cone shaft (.K8./K9.). You will find significant advantages of the improved encoders in the following chapters.

### Built-in encoders (EI..)

- EI7. and EI8. built-in encoders.
  - This encoder is integrated in the motor in a particular compact manner without adding extra length to the motor.
  - Brake wear can be measured without removing the encoder.
  - The encoder can be retrofitted.
  - The encoder does not have its own bearing. This is why the encoder is wear-free during operation and is suited for rough operating conditions, also with frequent working brake operations.

The EI7. encoder family is currently built in its second generation by SEW-EURODRIVE. The version ID EI7. B and EI7C FS is not listed in the type designation, however, and is therefore not listed in this document.

The add-on encoder is mounted to the motor on the B-side of the motor by means of various tool flanges. The standard for this is a conical shaft connection.

### Cone shaft

- Encoders with cone shaft .K8./K9.
  - The encoder type is available for sizes 63 to 355.
  - The encoders are available as safety encoders for implementing safety functions.
  - The encoders are suited for use in explosion-protected motors.
  - It is possible to measure the brake wear without removing the encoder.
  - The cone shaft connection is particularly robust and accurate.

Further product information and installation instructions for cone shaft encoders from SEW-EURODRIVE can be found via the following links:



DE: <https://youtu.be/0vamJrbOUAk>



EN: <https://youtu.be/8-D5meLW7cg>

### Spread shaft (.S7.), plug-in shaft (.G7.), hollow shaft (.H7.)

The encoders with spread, plug-in, and hollow shafts are replaced by encoders with a cone shaft (.K8./K9.) and by built-in encoders (EI..). We recommend switching to the new encoder types in order to benefit from the numerous advantages mentioned above. You can find more information on our website:

[https://www.sew-eurodrive.de/products/motors/ac\\_motors/accessories\\_and\\_options/encoders/encoders.html](https://www.sew-eurodrive.de/products/motors/ac_motors/accessories_and_options/encoders/encoders.html)

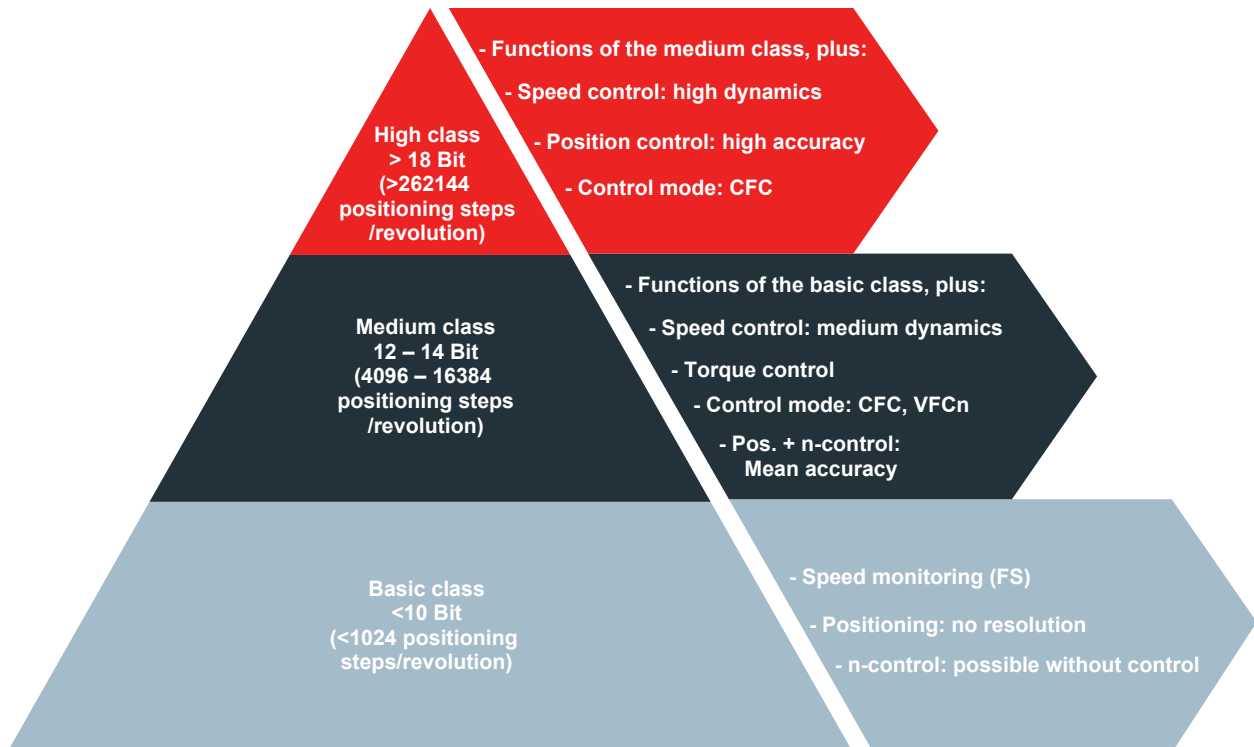
**4.1.1 Manufacturer information about conical encoders**

The conical encoders from SEW-EURODRIVE of the type EK8R/EV8R, EK8C/EV8C, EK8S/EV8S, EK8Z, AK8W/AV8W, AK8Y/AV8Y and AK8Z are offered by the manufacturers Baumer Hübner GmbH and Fritz Kübler GmbH. SEW-EURODRIVE uses two suppliers to ensure availability and short delivery times. Each type is compatible and interchangeable, even if the encoder is designed as a safety-related encoder or used in a potentially explosive area. All of the information about these encoder types shown in this document is valid for both manufacturers.

#### 4.1.2 Encoder capability class

Encoder systems by SEW-EURODRIVE are categorized into ability classes. The categorization into different ability classes provides an overview regarding which encoder can be used for what application. This allows for an optimal preselection.

In case of special applications, SEW-EURODRIVE will gladly assist you with the selection.



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#### Assignment of encoders to capability classes

| Capability class | Encoder type | Electrical interface | Encoder function             |
|------------------|--------------|----------------------|------------------------------|
| Basic class      | EI71         | HTL                  | Incremental encoder          |
| Basic class      | EI72         | HTL                  | Incremental encoder          |
| Basic class      | EI76         | HTL                  | Incremental encoder          |
| Basic class      | EI7C         | HTL                  | Incremental encoder          |
| Medium class     | EI8R         | TTL                  | Incremental encoder          |
| Medium class     | EI8C         | HTL                  | Incremental encoder          |
| Medium class     | EK8X         | HTL                  | Incremental encoder          |
| Medium class     | EK8R/EV8R    | TTL                  | Incremental encoder          |
| Medium class     | EK8C/EV8C    | HTL                  | Incremental encoder          |
| Medium class     | EI8Z         | MOVILINK® DDI        | Incremental encoder          |
| Medium class     | RK8M         | Resolver             | Single-turn absolute encoder |
| High class       | EK8S/EV8S    | Sin/cos              | Incremental encoder          |
| High class       | EK8W         | Sin/cos + RS485      | Single-turn absolute encoder |

# 4 Further information on the encoders

## General information

| Capability class | Encoder type | Electrical interface | Encoder function             |
|------------------|--------------|----------------------|------------------------------|
| High class       | EK8Z         | MOVILINK® DDI        | Incremental encoder          |
| High class       | EK9Z         | MOVILINK® DDI        | Single-turn absolute encoder |
| High class       | AK8Z         | MOVILINK® DDI        | Multi-turn absolute encoder  |
| High class       | AK8W/AV8W    | Sin/cos + RS485      | Multi-turn absolute encoder  |
| High class       | AK8Y/AV8Y    | Sin/cos + SSI        | Multi-turn absolute encoder  |
| High class       | AK8H/AV8H    | HIPERFACE®           | Multi-turn absolute encoder  |

## 4.2 EI7., EI8. built-in encoder

The built-in encoders from SEW-EURODRIVE are completely integrated into the motor. This means the overall length of the drive remains unchanged. The components of the built-in encoder do not protrude beyond the contour of the drive, which means they are particularly well protected from environmental effects and damage. Built-in encoders enable a particularly compact motor design.

### Areas of application

EI7. built-in encoders are suitable for the following applications:

- Simple positioning with up to 96 increments per revolution
- Speed monitoring
- Direction of rotation monitoring
- The EI7C encoder is also available as an EI7C FS safety encoder (not on size DR.63..).

EI8. built-in encoders are suitable for the following applications:

- The EI8Z built-in encoder allows for a motor without additional length due to the encoder in combination with single-cable technology and the fully digital MOVILINK® DDI interface.
- Speed monitoring
- Direction of rotation monitoring
- Positioning/position control up to a resolution of 12 bits (4096 increments/revolution)
- Speed control
- Torque control

### Evaluation

EI7. built-in encoders can be evaluated with the following products from SEW-EURODRIVE:

- MOVI-C®: Can be evaluated in many devices from the modular inverter system. For further information, refer to the respective inverter documentation.
- MOVITRAC® B in the technology version: Evaluation via "Simple positioning" application software.
- MOVIFIT® FC with "technology" function level.
- MOVIPRO® with encoder option.
- MOVIDRIVE® B
- MOVIAxis®

The EI7C FS safety encoder can be evaluated with the following products from SEW-EURODRIVE:

- MOVI-C®: Functional safety with MOVISAFE® CS..A safety option.
- MOVIFIT® FC: Functional safety with S12 safety option.

EI8. built-in encoders can be evaluated with the following products from SEW-EURODRIVE:

- MOVI-C®: Can be evaluated in many devices from the modular inverter system. For further information, refer to the respective inverter documentation.
- MOVIPRO® with encoder option. For further information, refer to the respective inverter documentation.
- MOVIDRIVE® B with encoder option. For further information, refer to the respective inverter documentation.
- MOVIAxis®. For further information, refer to the respective inverter documentation.



### **4.3 Information regarding operation with an inverter from the MOVI-C® modular automation system**

The EI7C, EI8C, EK8C, EV8C and EK8X HTL encoders can be operated without an additional encoder card on the binary terminals of the MOVITRAC® advanced inverter.

For this purpose, the encoder is supplied externally with 24 V and the signal tracks A, B, and C, as well as an optional temperature sensor, are connected to the terminals of the basic device and evaluated.

The C track is omitted for the EI7C encoder.

The C track is omitted for the EK8X encoder for all adjustable increments/revolutions, except for 1024 increments/revolutions.

The EI7C HTL encoder can only be used for positioning, not for speed and torque control.

For more information, refer to chapter "Technical data" (→ 86) and the operating instructions for the inverter used.

## 4.4 Functional safety (FS)

### 4.4.1 Functionally safe motor options

Motors from SEW-EURODRIVE are optionally available with the following functionally safe motor options:

- Safety brake
- Safety encoder
- Integrated STO (decentralized inverters)

Functionally safe motor options are designed for implementing safety functions.

In the delivered motor, SEW-EURODRIVE assumes responsibility for ensuring that functionally safe motor options, including their safety-relevant mechanical connections, meet the requirements of functional safety. Safety-relevant mechanical connections are designed with a tampering indicator and marked as follows:

- Safety brake: locking compound
- Safety encoder: retaining ring or adhesive label

If these markings are damaged, there is a deviation from the delivery state.

### 4.4.2 Safety encoders

Safety encoders from SEW-EURODRIVE are characterized by their exceptional reliability as well as electronic and mechanical load capacity.

Safety encoders allow you to improve the safety of your machines by implementing safety functions in relation to their speed, direction of rotation, idle state, relative position, or absolute position. The safety encoder provides the safety-relevant signals in the intelligent interaction of sensor, control, and actuator.

The safety function requires a reliable mechanical connection between encoder and motor. At SEW-EURODRIVE, this connection is dimensioned in such a way that fault exclusion is achieved.

The safety encoders cannot trigger a safe state at the machine autonomously. Therefore, they have to be monitored in the overall system. In case the encoder or the evaluation electronics detects a fault, a fault response, such as safe state, is initiated in the overall system.

### 4.4.3 Safety brake

Safety brakes from SEW-EURODRIVE are characterized by their exceptional reliability as well as electronic and mechanical load capacity.

Safety brakes allow you to increase the safety in your machines by implementing safety functions for deceleration and stopping. The safety brake represents the safety-relevant actuator in the intelligent interaction of sensor, control, and actuator.

The safety brakes cannot trigger a safe state at the machine autonomously. The brakes must be augmented in the overall system with suitable brake control and monitored by means of a brake test, if necessary. The overall system triggers a suitable fault response, e.g. the safe state, on request.

#### 4.4.4 General information

When implementing safety functions in machines, it is necessary to evaluate in particular whether the components to be used are suitable in terms of functional safety. When using functionally safe motor options from SEW-EURODRIVE, the following safety-related requirements, e.g. in accordance with EN ISO 13849 – parts 1 and 2, are already taken into account:

- Application of basic safety principles
- Application of proven safety principles
- Use of proven components
- Specifications on failure probability ( $B_{10D}$ ,  $MTTF_D$ , or  $PFH_D$ )
- Common cause failure (CCF)
- Determination of the system structure (HFT) and/or the category (Cat.)
- Determination of the safety integrity level (SIL) and/or the performance level (PL)
- Determination of the service life
- Production monitoring with 100% final inspection
- Retraceability by the unique motor assignment
- Notice of influences and ambient conditions
- Compliance with normative requirements regarding documentation

As an advantage for the machine designer, SEW-EURODRIVE has already fulfilled these safety-relevant requirements for functionally safe motor options. In the overall analysis of safety technology, the machine designer can rely on the manufacturer's confirmation, e.g. based on the product documentation or the German Technical Inspection Association (TÜV) certificate. The internal effort required for evaluation and documentation is reduced considerably.

If other components (standard components) are used for implementing safety functions, the machine designer has to evaluate the safety-related requirements.

#### 4.4.5 FS marking

SEW-EURODRIVE labels a functionally safe motor option on the drive with an FS logo and a 2-digit number on the motor nameplate. The number is a code that indicates which components in the drive are safety-related. This makes it possible to uniquely identify an available functional safety motor option via the motor nameplate.

Make sure you observe any present FS logo on the nameplate and its meaning according to the following table:

| FS logo                                                                             | Available functionally safe motor option |              |                 |
|-------------------------------------------------------------------------------------|------------------------------------------|--------------|-----------------|
|                                                                                     | Decentralized inverters                  | Safety brake | Safety encoders |
|    | ✓                                        | –            | –               |
|    | –                                        | ✓            | –               |
|    | –                                        | –            | ✓               |
|   | ✓                                        | –            | ✓               |
|  | –                                        | ✓            | ✓               |

- ✓ The motor option is functionally safe.
- The motor option is not available.

If the FS logo is present on the motor nameplate, e.g. with the code "FS 11", the motor includes a combination of safety encoder and safety brake. Drives can also be equipped with 2 encoders, e.g. a built-in encoder and an add-on encoder. In such cases, the FS logo for the safety encoder always relates to the add-on encoder. If an FS logo is available, adhere to the information specified in the corresponding documentation.

If the FS logo with the code "FS 0X" is present on the motor nameplate, a special design related to functional safety is installed at the motor.

Observe the information concerning the special design in the documentation.

#### 4.4.6 Retraceability

Functionally safe motor options can be retraced by SEW-EURODRIVE with the motor serial number and thus have a unique assignment to the motor.

If the SEW-EURODRIVE service replaces a safety encoder or a safety brake, the retraceability is ensured.

If you replace a functionally safe motor option on your own, you revoke this assignment. To continue the assignment, document the replacement yourself.

#### 4.4.7 Underlying standards

The safety assessment is based on the following standards:

##### Safety encoder

|                                      | EN 62061<br>EN 61508 | EN 61800-5-2 | EN ISO 13849 -1 |
|--------------------------------------|----------------------|--------------|-----------------|
| ES7S<br>EG7S                         | ✓                    | –            | ✓               |
| AS7W<br>AG7W                         | ✓                    | –            | ✓               |
| AS7Y<br>AG7Y                         | ✓                    | –            | ✓               |
| EK8S<br>EK8W<br>AK8W<br>AK8Y<br>AK8H | ✓                    | –            | ✓               |
| EK8Z<br>EK9Z<br>AK8Z                 | –                    | ✓            | ✓               |
| EI7C FS                              | –                    | ✓            | ✓               |

✓ Applicable

– Not applicable

Safety integrity level 3 (SIL 3) or performance level e (PL e) can be achieved if a functionally safe motor option is suitably integrated into a safety system. The requirements (e.g. on the system architecture, required diagnostics and failure probabilities) are to be implemented according to the normative specifications and to the document in hand.

## 4.4.8 Safety sub-functions of the safety encoders

## INFORMATION



For AK8W, AK8Y, AK8H, AK8Z, EK8W and EK9Z encoders, the single-turn/multi-turn absolute value data is not part of PL d/SIL 2 approval. The single-turn/multi-turn absolute value data may only be used with a simultaneous evaluation of a 2nd encoder for implementing safety functions.

## INFORMATION



The safety sub-functions are dependent on the evaluation electronics.

## Safety functions – Rotational speed, direction of rotation, idle state, and relative position

Safety encoders can be used to implement the following safety sub-functions in compliance with EN 61800-5-2 with respect to speed, direction of rotation, idle state, and relative position:

| En-coder | SS1 | SS2 | SOS | SLA | SLS | SDI | SLI | SSR | SAR | SSM |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ES7S     | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   |
| EG7S     | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   |
| AS7W     | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   |
| AG7W     | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   |
| AS7Y     | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   |
| AG7Y     | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   |
| EK8S     | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   |
| EK8W     | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   |
| AK8W     | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   |
| AK8Y     | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   |
| AK8H     | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   |
| EK8Z     | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   |
| EK9Z     | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   |
| AK8Z     | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   | ✓   |
| EI7C FS  | ✓   | –   | –   | –   | ✓   | ✓   | –   | ✓   | –   | ✓   |



Applicable



Not applicable

# 4 Further information on the encoders

## Functional safety (FS)

### Safety sub-functions – absolute position

Safety encoders can be used to implement the following safety sub-functions in compliance with EN 61800-5-2 with respect to the absolute position. Observe the requirements of the evaluation electronics.

| Encoder | SCA | SLP |
|---------|-----|-----|
| ES7S    | ✓   | ✓   |
| EG7S    | ✓   | ✓   |
| AS7W    | ✓   | ✓   |
| AG7W    | ✓   | ✓   |
| AS7Y    | ✓   | ✓   |
| AG7Y    | ✓   | ✓   |
| EK8S    | ✓   | ✓   |
| EK8W    | ✓   | ✓   |
| AK8W    | ✓   | ✓   |
| AK8Y    | ✓   | ✓   |
| AK8H    | ✓   | ✓   |
| EK8Z    | ✓   | ✓   |
| EK9Z    | ✓   | ✓   |
| AK8Z    | ✓   | ✓   |
| EI7C FS | –   | –   |

- ✓ Applicable  
– Not applicable

#### 4.4.9 Initializing the safety encoder

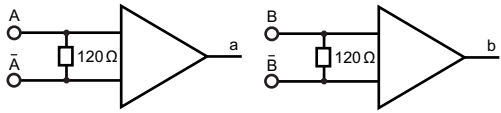
Switch the safety encoder off and on again at least once a year in accordance with EN 61800-5-2.

#### 4.4.10 Requirements for the evaluation electronics

Where safety encoders are used for safety-related reasons, evaluation electronics are needed to monitor the signals of the rotary encoder and check their validity. When a malfunction is detected, a fault response (e.g. the safe state) must be triggered in the overall system.

The evaluation electronics in the overall system have to meet the following requirements.

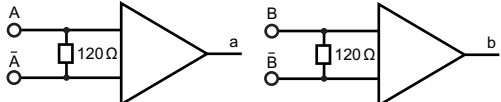
**Safety encoder: ES7S, EG7S, AS7W, AG7W, AS7Y, AG7Y**

| Designation                                                                                         | Requirement                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety requirements                                                                                 | ≥ SIL 2                                                                                                                                            |
| Diagnostic coverage ("DC")                                                                          | ≥ 90%                                                                                                                                              |
| Fault presumptions                                                                                  | According to EN 61800-5-2:2017, table D.8                                                                                                          |
| Monitoring of the phasor length "r"                                                                 | $r = \sqrt{a^2 + b^2}$ <p>with</p> <p><math>a = A - \bar{A}</math> for cosine signals and</p> <p><math>b = B - \bar{B}</math> for sine signals</p> |
| Safe state                                                                                          | Phasor length "r" outside of the range<br>$350 \text{ mV} \leq r \leq 700 \text{ mV}$                                                              |
| Terminating resistor between A and $\bar{A}$ or B and $\bar{B}$                                     | $120 \Omega \pm 10\%$                                          |
| Terminating resistor between A, $\bar{A}$ , B, $\bar{B}$ to the supply voltage and reference ground | > 1 kΩ                                                                                                                                             |
| Sampling frequency                                                                                  | At least twice as high as the frequency maximally occurring in the application at the encoder signal outputs (Nyquist criterion)                   |

If the safety encoders are operated with prefabricated encoder cables from SEW-EURODRIVE on evaluation electronics from SEW-EURODRIVE, these previously mentioned requirements have been met.



## Safety encoder: EK8S, AK8W, AK8Y, EK8W, AK8H

| Designation                                                                                         | Requirement                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety requirements                                                                                 | ≥ SIL 2                                                                                                                                                                                                                                                                                          |
| Diagnostic coverage ("DC")                                                                          | ≥ 90%                                                                                                                                                                                                                                                                                            |
| Fault presumptions                                                                                  | According to EN 61800-5-2:2017, table D.8                                                                                                                                                                                                                                                        |
| Monitoring of the phasor length "r"                                                                 | $r = \sqrt{a^2 + b^2}$ <p>with</p> <p>a = A – <math>\bar{A}</math> for cosine signals and</p> <p>b = B – <math>\bar{B}</math> for sine signals</p>                                                                                                                                               |
| Safe state                                                                                          | Phasor length "r" outside of the range<br>$350 \text{ mV} \leq r \leq 700 \text{ mV}$                                                                                                                                                                                                            |
| Terminating resistor between A and $\bar{A}$ or B and $\bar{B}$                                     | $120 \Omega \pm 10\%$                                                                                                                                                                                          |
| Terminating resistor between A, $\bar{A}$ , B, $\bar{B}$ to the supply voltage and reference ground | > 1 k $\Omega$                                                                                                                                                                                                                                                                                   |
| Sampling frequency                                                                                  | <p>For the frequency maximally occurring in the application at the encoder signal outputs, the following sampling frequency must be met:</p> <ul style="list-style-type: none"> <li>• minimum 8 times with synchronous sampling</li> <li>• minimum 5 times with asynchronous sampling</li> </ul> |

The risk of an undetected fault at the safety encoder is increased if the sampling frequency is not adhered to. If you cannot adhere to the required sampling frequency when using the evaluation electronics, contact the manufacturer of the evaluation electronics to clarify any additional diagnostics.

If the safety encoders are operated with prefabricated encoder cables from SEW-EURODRIVE on evaluation electronics from SEW-EURODRIVE, these previously mentioned requirements have been met.

**Safety encoder: EK8Z, EK9Z, AK8Z**

The safety encoders are designed for operation with a MOVISAFE® CS..A safety option from SEW-EURODRIVE. The safety encoders are connected to the MOVI-C® inverter via the MOVILINK® DDI communication unit. The encoder data is available to the former and the safety option for further processing.

Requirement for using the safety encoders:

- MOVISAFE® CSS..A or CSA31A safety option

Check the compatibility of the devices with the safety encoders with MOVILINK® DDI in the corresponding product manuals.

When operating the safety encoders on a compatible MOVISAFE® CSS..A or CSA31A safety option, the requirements for the evaluation electronics are met. Operating the encoder with encoder evaluation units from other manufacturers is not permitted.

**Safety encoder: EI7C FS**

The EI7C FS built-in encoder is designed for operation with safety options from SEW-EURODRIVE, e.g. safety option S12 or a MOVISAFE® CS..A safety card. Operating the encoder with encoder evaluation units from other manufacturers is not permitted.

**4.4.11 Acceptance**

The system manufacturer has to perform an overall evaluation for determining the safety of a machine.

The effectiveness of each risk minimization must be checked. It must also be checked if the required safety integrity is reached for each implemented safety function.

To validate the safety integrity level you can use the "SISTEMA" calculation tool from the Institut für Arbeitsschutz (Institute for Occupational Safety and Health of the German Social Accident Insurance).

## 4.5 Encoder designs

### INFORMATION



A built-in encoder can generally be combined with an add-on encoder on the motor, e.g. EI7C built-in encoder and AK8W add-on encoder. This combination can also be made with an add-on encoder as a safety encoder, e.g. EI7C built-in encoder and EK8S safety encoder. Currently, only the add-on encoder can be selected as the safety encoder in such combinations. For more information on FS motor options and their combinations, refer to chapter "FS marking".

|     |   |                                                 |
|-----|---|-------------------------------------------------|
| Typ | = | Type designation of the encoder                 |
| e   |   |                                                 |
| FS  | = | Available as safety encoder                     |
| EX  | = | Available for use in areas at risk of explosion |
| ✓   | = | Applicable                                      |
| –   | = | Not applicable                                  |

#### 4.5.1 Incremental encoder

| Type | Motors                                     | Mech. interface       | Shaft design   | Supply DC V | Electrical interface                     | FS | EX |
|------|--------------------------------------------|-----------------------|----------------|-------------|------------------------------------------|----|----|
| EG7C | (E)DR.160 – 280<br>(E)DRN132M – 280        | Shaft-centered        | Plug-in shaft  | 4.5 – 30    | HTL/TTL<br>(RS422)                       | –  | ✓  |
| EG7R | (E)DR.160 – 280<br>(E)DRN132M – 280        | Shaft-centered        | Plug-in shaft  | 7 – 30      | TTL<br>(RS422)                           | –  | ✓  |
| EG7S | (E)DR.160 – 280<br>(E)DRN132M – 280        | Shaft-centered        | Plug-in shaft  | 7 – 30      | 1 V sin/cos<br>+ RS485<br>(peak-to-peak) | ✓  | ✓  |
| EH7C | (E)DR315                                   | Shaft-centered        | Hollow shaft   | 10 – 30     | HTL                                      | –  | ✓  |
| EH7R | (E)DR../DRN315                             | Shaft-centered        | Hollow shaft   | 10 – 30     | TTL<br>(RS422)                           | –  | ✓  |
| EH7S | (E)DR315                                   | Shaft-centered        | Hollow shaft   | 10 – 30     | 1 V sin/cos<br>(peak-to-peak)            | –  | ✓  |
| EH7T | (E)DR315                                   | Shaft-centered        | Hollow shaft   | 5           | TTL<br>(RS422)                           | –  | ✓  |
| EI71 | DR.71 – 132<br>DRN../DRU../DR2.71 – 132S   | Integrated into motor | Standard shaft | 9 – 30      | HTL                                      | –  | –  |
| EI72 | DR../71 – 132<br>DRN../DRU../DR2.71 – 132S | Integrated into motor | Standard shaft | 9 – 30      | HTL                                      | –  | –  |
| EI76 | DR../71 – 132<br>DRN../DRU../DR2.71 – 132S | Integrated into motor | Standard shaft | 9 – 30      | HTL                                      | –  | –  |

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| Type    | Motors                                    | Mech. interface       | Shaft design   | Supply DC V               | Electrical interface               | FS                | EX |
|---------|-------------------------------------------|-----------------------|----------------|---------------------------|------------------------------------|-------------------|----|
| EI7C    | DR..71 – 132<br>DRN../DRU../DR2.63 – 132S | Integrated into motor | Standard shaft | 9 – 30                    | HTL                                | –                 | –  |
| EI7C FS | DR..71 – 132<br>DRN../DRU../DR2.71 – 132S | Integrated into motor | Standard shaft | 19.2 – 30                 | HTL                                | ✓                 | –  |
| EI8A    | DRN../DRU../DR2.71 – 132S                 | Integrated into motor | Standard shaft | No information for supply | Various                            | –                 | –  |
| EI8C    | DRN../DRU../DR2.71 – 132S                 | Integrated into motor | Standard shaft | 7 – 30                    | HTL                                | –                 | –  |
| EI8R    | DRN../DRU../DR2.71 – 132S                 | Integrated into motor | Standard shaft | 7 – 30                    | TTL                                | –                 | –  |
| EI8Z    | DRN../DRU../DR2.71 – 132S                 | Integrated into motor | Standard shaft | 24                        | MOVILINK® DDI                      | –                 | –  |
| EK8X    | (E)DRN../DRU../DR2.71 – 225               | Shaft-centered        | Cone shaft     | 4.5 – 30                  | HTL/TTL (RS422)                    | –                 | ✓  |
| EK8C    | (E)DRN../DRU../DR2.63 – 355               | Shaft-centered        | Cone shaft     | 4.5 – 30                  | HTL/TTL (RS422)                    | –                 | ✓  |
| EK8R    | (E)DRN../DRU../DR2.63 – 355               | Shaft-centered        | Cone shaft     | 7 – 30                    | TTL (RS422)                        | –                 | ✓  |
| EK8S    | (E)DRN../DRU../DR2.63 – 355               | Shaft-centered        | Cone shaft     | 7 – 30                    | 1 V sin/cos + RS485 (peak-to-peak) | ✓ <sup>1)2)</sup> | ✓  |
| EK8Z    | DRN../DRU../DR2.71 – 225                  | Shaft-centered        | Cone shaft     | 24                        | MOVILINK® DDI                      | ✓ <sup>1)</sup>   | –  |
| ES7C    | (E)DR.71 – 132<br>(E)DRN80 – 132S         | Shaft-centered        | Spread shaft   | 4.5 – 30                  | HTL/TTL (RS422)                    | –                 | 77 |
| ES7R    | (E)DR.71 – 132<br>(E)DRN80 – 132S         | Shaft-centered        | Spread shaft   | 7 – 30                    | TTL (RS422)                        | –                 | ✓  |
| ES7S    | (E)DR.71 – 132<br>(E)DRN80 – 132S         | Shaft-centered        | Spread shaft   | 7 – 30                    | 1 V sin/cos + RS485 (peak-to-peak) | ✓                 | ✓  |
| EV2C    | DR.71 – 225<br>DRN71 – 225                | Flange-centered       |                | 9 – 26                    | HTL                                | –                 | –  |
| EV2R    | DR.71 – 225<br>DRN71 – 225                | Flange-centered       |                | 9 – 26                    | TTL                                | –                 | –  |
| EV2S    | DR.71 – 225<br>DRN71 – 225                | Flange-centered       |                | 24                        | 1 V sin/cos (peak-to-peak)         | –                 | –  |
| EV2T    | DR.71 – 225<br>DRN71 – 225                | Flange-centered       |                | 5                         | TTL                                | –                 | –  |

# 4 Further information on the encoders

## Encoder designs

| Type | Motors                           | Mech. interface | Shaft design | Supply DC V | Electrical interface               | FS | EX |
|------|----------------------------------|-----------------|--------------|-------------|------------------------------------|----|----|
| EV7C | (E)DR.71 – 280<br>(E)DRN80 – 280 | Flange-centered |              | 4.5 – 30    | HTL/TTL (RS422)                    | –  | ✓  |
| EV7R | (E)DR.71 – 280<br>(E)DRN80 – 280 | Flange-centered |              | 7 – 30      | TTL (RS422)                        | –  | ✓  |
| EV7S | (E)DR.71 – 280<br>(E)DRN80 – 280 | Flange-centered |              | 7 – 30      | 1 V sin/cos + RS485 (peak-to-peak) | –  | ✓  |
| EV8C | (E)DRN/DRU../<br>(E)DR2..71-355  | Flange-centered |              | 4.5 – 30    | HTL/TTL (RS422)                    | –  | ✓  |
| EV8R | (E)DRN/DRU../<br>DR2..71-355     | Flange-centered |              | 7 – 30      | TTL (RS422)                        | –  | ✓  |
| EV8S | (E)DRN/DRU../<br>DR2..71-355     | Flange-centered |              | 7 – 30      | 1 V sin/cos + RS485 (peak-to-peak) | –  | ✓  |

1) Size DRN../DRU..255 or DR2.180 or larger only permitted with insulation coupling /IK.

2) Available as a safety encoder up to motor size 315.

## 4.5.2 Absolute encoder

| Type | Motors                              | Mech. inter-<br>face | Shaft<br>design | Supply<br>DC V | Electrical<br>interface                          | FS                | EX |
|------|-------------------------------------|----------------------|-----------------|----------------|--------------------------------------------------|-------------------|----|
| AG7W | (E)DR.160 – 280<br>(E)DRN132M – 280 | Shaft-centered       | Plug-in shaft   | 7 – 30         | 1 V sin/<br>cos +<br>RS485<br>(peak-to-<br>peak) | ✓ <sup>1)</sup>   | ✓  |
| AG7Y | (E)DR.160 – 280<br>(E)DRN132M – 280 | Shaft-centered       | Plug-in shaft   | 7 – 30         | 1 V sin/<br>cos + SSI<br>(peak-to-<br>peak)      | ✓ <sup>1)</sup>   | ✓  |
| AH7Y | (E)DR315                            | Shaft-centered       | Hollow shaft    | 9 – 30         | TTL<br>(RS422) +<br>SSI                          | –                 | ✓  |
| AK8H | DRN../DRU../DR2.63 –<br>355         | Shaft-centered       | Cone shaft      | 7 – 12         | HIPERFA<br>CE®                                   | ✓ <sup>2)</sup>   | –  |
| AK8W | (E)DRN../DRU../DR2.63<br>– 355      | Shaft-centered       | Cone shaft      | 7 – 30         | 1 V sin/<br>cos +<br>RS485<br>(peak-to-<br>peak) | ✓ <sup>2)3)</sup> | ✓  |
| AK8Y | (E)DRN../DRU../DR2.63<br>– 355      | Shaft-centered       | Cone shaft      | 7 – 30         | 1 V sin/<br>cos + SSI<br>(peak-to-<br>peak)      | ✓ <sup>2)3)</sup> | ✓  |
| AK8Z | DRN../DRU../DR2.71 –<br>225         | Shaft-centered       | Cone shaft      | 24             | MOVILINK®<br>DDI                                 | ✓ <sup>3)</sup>   | –  |
| AS7W | (E)DR.71 – 132<br>(E)DRN80 – 132S   | Shaft-centered       | Spread shaft    | 7 – 30         | 1 V sin/<br>cos +<br>RS485<br>(peak-to-<br>peak) | ✓                 | ✓  |
| AS7Y | (E)DR.71 – 132<br>(E)DRN80 – 132S   | Shaft-centered       | Spread shaft    | 7 – 30         | 1 V sin/<br>cos + SSI<br>(peak-to-<br>peak)      | ✓                 | ✓  |
| AV1Y | DR.71 – 225 DRN71 –<br>280          | Flange-<br>centered  |                 | 7 – 12         | 1 V sin/<br>cos + SSI<br>(peak-to-<br>peak)      | –                 | –  |
| AV1H | DR.71 – 225 DRN71 –<br>280          | Flange-<br>centered  |                 | 7 – 12         | HIPERFA<br>CE®                                   | –                 | –  |
| AV7W | (E)DR.71 – 280<br>(E)DRN80 – 280    | Flange-<br>centered  |                 | 7 – 30         | 1 V sin/<br>cos +<br>RS485<br>(peak-to-<br>peak) | –                 | ✓  |

# 4 Further information on the encoders

## Encoder designs

| Type | Motors                           | Mech. inter-<br>face | Shaft<br>design | Supply<br>DC V | Electrical<br>interface                          | FS | EX |
|------|----------------------------------|----------------------|-----------------|----------------|--------------------------------------------------|----|----|
| AV7Y | (E)DR.71 – 280<br>(E)DRN80 – 280 | Flange-<br>centered  |                 | 7 – 30         | 1 V sin/<br>cos + SSI<br>(peak-to-<br>peak)      | –  | ✓  |
| AV8H | DRN../DRU../DR2.71 –<br>355      | Flange-<br>centered  |                 | 7 – 12         | HIPERFA<br>CE®                                   | –  | –  |
| AV8W | (E)DRN../DRU../DR2.71<br>– 355   | Flange-<br>centered  |                 | 7 – 30         | 1 V sin/<br>cos +<br>RS485<br>(peak-to-<br>peak) | –  | ✓  |
| AV8Y | (E)DRN../DRU../DR2.71<br>– 355   | Flange-<br>centered  |                 | 7 – 30         | 1 V sin/<br>cos + SSI<br>(peak-to-<br>peak)      | –  | ✓  |
| EK8W | DR2C.71 – 180                    | Shaft-centered       | Cone shaft      | 7 – 30         | 1 V sin/<br>cos +<br>RS485<br>(peak-to-<br>peak) | ✓  | ✓  |
| EK9Z | DR2C.71 – 180                    | Shaft-centered       | Cone shaft      | 24             | MOVILINK®<br>DDI                                 | ✓  | –  |
| RK8M | DRN../DRU../DR2.63 –<br>355      | Shaft-centered       | Cone shaft      | AC 7 V         | Resolver                                         | –  | –  |

1) For motor design with a brake/safety brake, the AG7W/AG7Y encoders are available up to size DR../DRN225.

2) Available as a safety encoder up to motor size 315.

3) Size DRN../DRU..255 or DR2.180 or larger only permitted with insulation coupling /IK.

## 4.5.3 Encoder mounting adapters

| Type | Motors                                  | For encoder                              | FS              | EX | Disassembly/<br>assembly in-<br>formation |
|------|-----------------------------------------|------------------------------------------|-----------------|----|-------------------------------------------|
| EG7A | DR.160 – 280<br>DRN132M – 280           | .G7.                                     | ✓ <sup>1)</sup> | ✓  | (→ 231)                                   |
| EI7A | DRN../DRU../DR2.63 – 132S               | EI7.                                     | –               | –  | (→ 167)<br>(→ 179)                        |
| EI8A | DRN../DRU../DR2.71 – 132S               | EI8.                                     | –               | –  | (→ 186)<br>(→ 190)                        |
| EK8A | DRN../DRU../DR2.63 – 355                | EK8., RK8., AK8.                         | ✓ <sup>1)</sup> | ✓  | (→ 195)                                   |
| ES7A | DR.71 – 132<br>DRN80 – 132S             | .S7.                                     | ✓ <sup>1)</sup> | ✓  | (→ 228)                                   |
| XH.A | –                                       | Third-party encoder, hollow shaft        | –               | –  | (→ 228)                                   |
| XV8A | DRN../DRU../DR2.71 – 315                | .V8.                                     | –               | ✓  | (→ 223)                                   |
| XV.A | DR.71 – 280<br>DRN../DRU../DR2.71 – 315 | Third-party encoder, solid/plug-in shaft | –               | –  | (→ 223)                                   |

1) If retrofitting of a safety encoder is performed by the user, the user accepts responsibility and liability. Retrofitting by SEW-EURODRIVE Service is recommended.

- ✓ Applicable  
– Not applicable

The EK8A and XV8A encoder mounting adapters generally allow a motor to be retrofitted with a corresponding encoder.

Retrofitted .K8. and .V8. encoders are currently only available with the connection options of integrated encoder connectors A1GA, A2GA, and with M23 directly on the KIGA encoder.

Currently, encoders with a MOVILINK® DDI interface cannot be retrofitted by the customer. Contact SEW-EURODRIVE if necessary.



## 4.6 Connection options

SEW-EURODRIVE recommends using prefabricated cables.

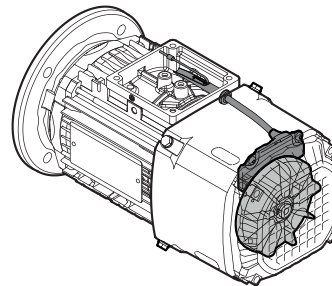
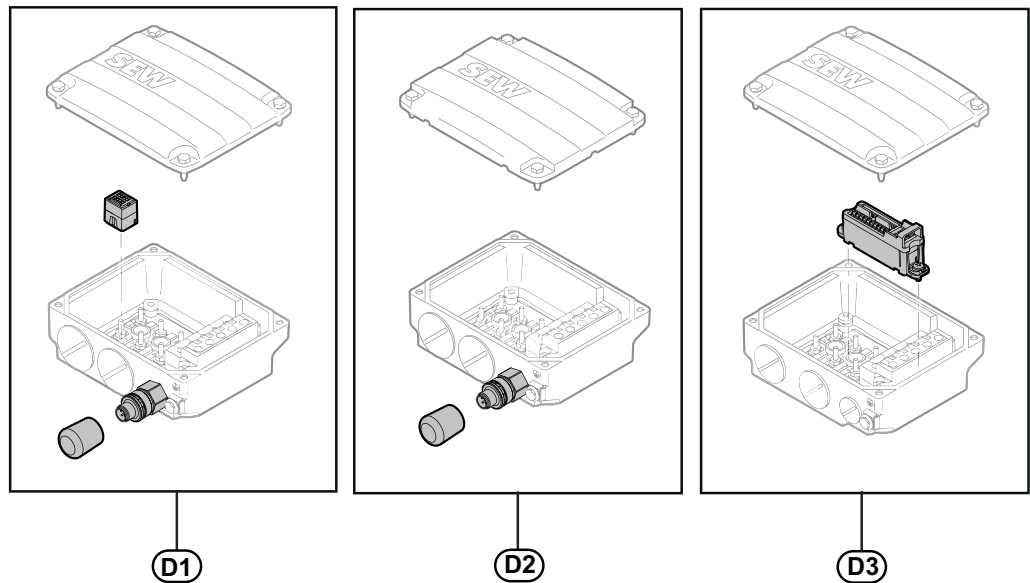
The encoders are available with the following connection options:

### 4.6.1 /EI7.

Note that only connection option D2 is available for the EI7C FS safety encoder.

- On/in the terminal box:
  - D1: With an M12 connector (8-pin with optional AVRE temperature sensor or 4-pin without AVSE temperature sensor) on the terminal box and configuration box in the terminal box  
 EI7. to M12: Encoder cable connected directly to the M12 connector. The litz wires for adjustment go to the configuration box. No FS
  - D2: With EI7C FS safety encoder: With an M12 connector (8-pin AVRE, without temperature sensor) on the terminal box. No configuration box required  
 EI7C FS safety encoder: Encoder cable connected directly to the M12 connector.
  - D3: With a terminal strip (connection unit with integrated configuration box, with or without temperature sensor) in the terminal box (without type designation)

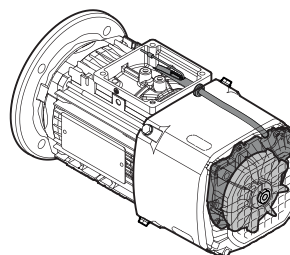
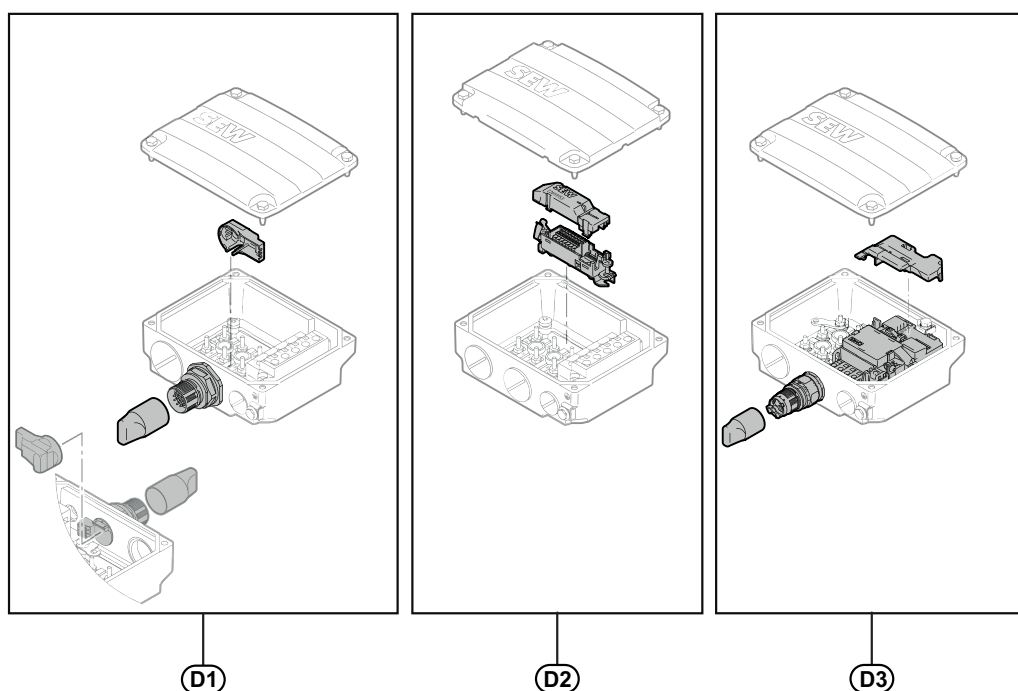
The cable from the inverter to the encoder is fed through one of the screw fittings into the terminal box and connected to the connection unit with integrated configuration box.



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## 4.6.2 /EI8.

- On/in the terminal box:
  - D1: With an M23 connector (with AIGB temperature sensor or without AIGA temperature sensor) on the terminal box
  - D2: With a terminal strip (connection unit, with or without temperature sensor) in the terminal box (without type designation)
  - D3: With connection technology of digital motor integration KD1, KDB, KD, or KDD with MOVILINK® DDI interface (only EI8Z)
  - With an M12 connector (8-pin with optional AVRE temperature sensor) on the terminal box (in preparation):



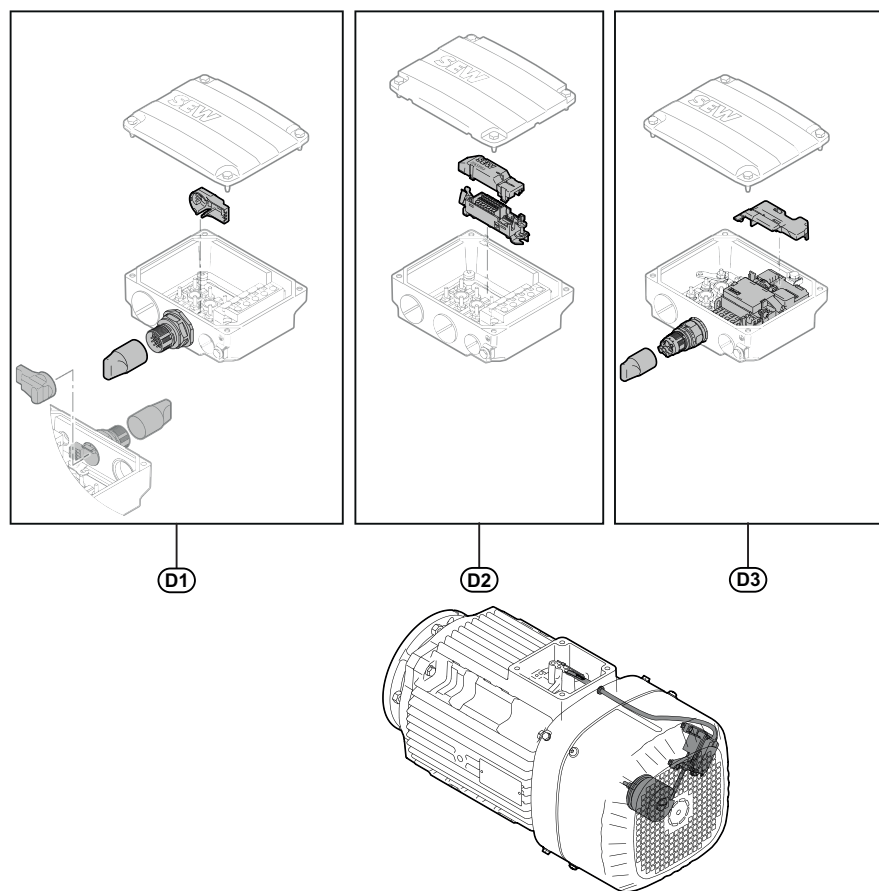
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#### 4.6.3 /EK8., /EK9., /AK8., /EV8., /AV8., /RK8M

The EK8A and XV8A encoder mounting adapters generally allow a motor to be retrofitted with a corresponding encoder.

Retrofitted .K8. and .V8. encoders are currently only available with the connection options of integrated encoder connectors A1GA, A2GA, and with M23 directly on the KIGA encoder.

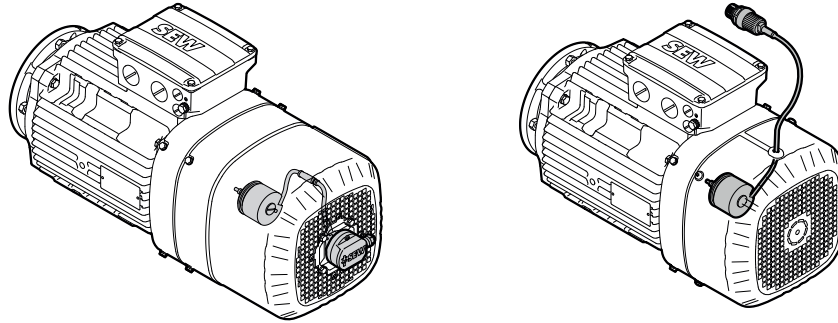
- On/in the terminal box:
  - D1: With an M23 connector (with AIGB temperature sensor or without AIGA temperature sensor) on the terminal box
  - D2: With a terminal strip (connection unit, with or without temperature sensor) in the terminal box (without type designation)
  - D3: With connection technology of digital motor integration KD1, KDB, KD, or KDD with MOVILINK® DDI interface (only EK8Z, EK9Z, and AK8Z)



- With an integrated encoder connector, installed on the fan guard side or optionally on the rear of the fan guard:
  - Without A2GA connection cover
  - With A1GA connection cover
  - With A1GA connection cover, cable (length 0.36 m), and KIGA M23 connector
- Without integrated encoder connector:
  - With M23 and cable (length 0.36 m) directly on the KIGA encoder
- Connected in the terminal box, D2 and D3:

- With a terminal strip (connection unit, with or without temperature sensor) in the terminal box (without type designation)
- With an M23 connector (with AIGB temperature sensor or without AIGA temperature sensor) on the terminal box

When using prefabricated cables from SEW-EURODRIVE, you can order the encoders without a connection cover because this cover is part of the cable.



**4.6.4    /ES7., /EG7., /EV7., /AS7., /AG7., /AV7.**

- On the encoder:
  - Without connection cover
  - With connection cover
  - With connection cover, cable (length 0.3 m) and M23 connector

When using prefabricated cables from SEW-EURODRIVE, you can order the encoders without a connection cover because this cover is part of the cable.

**4.6.5    /EH7. /AH7.**

- On the encoder:
  - With M23 connector

## 4.7 Encoder mounting adapter

An encoder mounting adapter allows for mounting an encoder, which is not part of the standard delivery, at a later time. SEW-EURODRIVE distinguishes between 2 types of encoder mounting adapters:

- Encoder mounting adapters for encoders from SEW-EURODRIVE
- Encoder mounting adapters for encoders of other manufacturers

### 4.7.1 Encoder mounting adapters for encoders from SEW-EURODRIVE

For the various tool flanges (depending on the size) for an encoder mounting adapter for encoders from SEW-EURODRIVE, refer to chapter "Add-on encoders" and "Built-in encoder" (→  35).

Encoder mounting adapters are available for all standard encoders from SEW-EURODRIVE:

| Identifier | Description                                                                                                                    | Sizes      |
|------------|--------------------------------------------------------------------------------------------------------------------------------|------------|
| EI7A       | For built-in encoders of types EI7.                                                                                            | 63 - 132S  |
| EI8A       | For built-in encoders of types EI8.                                                                                            | 71 – 132S  |
| EK8A       | For cone shaft encoders of types .K8./K9. (for retrofitting with integrated encoder connector or M23 connector on the encoder) | 63 – 355   |
| XV8A       | For cone shaft encoders of types .K8./K9. in coupling add-on with fan guard with encoder mount                                 | 71 – 315   |
| EG7A       | For plug-in-shaft encoders of types .G7.                                                                                       | 132M – 280 |
| EV7A/XV7A  | For spread-shaft encoders of types .S7. in coupling add-on with fan guard with encoder mount                                   | 80MS – 225 |
| ES7A       | For spread-shaft encoders of types .S7.                                                                                        | 80M        |
| EH7A       | For hollow-shaft encoders of types .H7.                                                                                        | 315        |

#### 4.7.2 Encoder mounting adapters for EI7. and EI8. built-in encoders

An encoder mounting adapter allows for mounting an encoder, which is not part of the standard delivery, at a later time. This makes it possible to flexibly retrofit motors with an encoder.

EI7A is the encoder mounting adapter for retrofitting EI71, EI72, EI76, or EI7C encoders.

EI8A is the encoder mounting adapter for retrofitting EI8R or EI8C encoders.

The motor is fully prepared for subsequently installing these encoder types. Retrofit sets and service kits are available from SEW-EURODRIVE. Observe possible restrictions for the EI7C safety encoder.

##### Connection technology for retrofitted encoders

The same connection options as for EI7. and EI8. are retrofitted.

##### Mechanical design of motors with mounting adapters

If you have selected an EI7A or EI8A encoder mounting adapter, the motor is equipped with an EI7./EI8.-capable rear endshield and a suitable terminal box to enable a retrofit.

##### Combinatorics

The following applies for all first- and second-generation DR.. motors:

- EI7A and EI8A mounting adapters for built-in encoders from the EI7. and EI8. family are available.
- Terminal boxes with an NPT cable gland are not possible with EI7A/EI8A, as the NPT terminal box cannot be retrofitted with M12/M23 connectors.
- EI7A can be combined with all motors and options with which an EI7. encoder can be combined.
- EI8A can be combined with all motors and options with which an EI8. encoder can be combined.
- EI7A and EI8A cannot be combined with add-on encoders of the .S7. and .K8./K9. families.
- EI7A and EI8A cannot be combined with add-on encoders in the .V7. and .V8. flange guard mounting.

The following also applies for DR2C.. motors:

- When retrofitted, built-in encoders are not included in the closed loop system and are not suitable for closed-loop operation.
- Built-in encoders are suitable for an external evaluation device to obtain additional incremental position information.

The following also applies for DRM.. and DR2M.. motors:

- EI7A or EI8A are each possible only with an additional forced cooling fan.

#### 4.7.3 Encoder mounting adapters for XV.A encoders according to customer specifications

With this type of encoder mounting adapter, the AC motor is equipped with a mechanical interface that can be mounted to an encoder specified by the customer. This encoder is not a product of SEW-EURODRIVE and must be purchased separately. Third-party encoders are installed by SEW-EURODRIVE solely by means of special solutions. Contact SEW-EURODRIVE in such cases.

#### Dimensions

Refer to the following table for dimensions of XV.A encoder mounting adapters:

| Mounting adapter | Design                              |           |
|------------------|-------------------------------------|-----------|
|                  | Encoder shaft                       | Centering |
| XV0A             | according to customer specification |           |
| XV1A             | 6 mm                                | 50 mm     |
| XV2A             | 10 mm                               | 50 mm     |
| XV3A             | 12 mm                               | 80 mm     |
| XV4A             | 11 mm                               | 85 mm     |
| XV5A             | 12 mm                               | 45 mm     |
| XV6A             | 10 mm                               | 36 mm     |

A fan guard with encoder mount allows the encoder to be mounted on the motor shaft. These encoders are usually attached using three conical spring washers.

The connection between the encoder shaft and the motor shaft is realized using a coupling.

The dimensions of the mounting adapters for customer-specific encoders are not listed here. If necessary, request the required dimension sheets from SEW-EURODRIVE.

#### INFORMATION



The combinations with forced cooling fan require knowledge of the installation space of the encoder to be mounted. Several forced cooling fan guards with different lengths are available. Contact SEW-EURODRIVE for more information.



## 4.8 Phase-outs – Predecessor and successor encoder types

The newly developed .K8./K9. cone shaft encoders and the compact EI7. and EI8. built-in encoders for asynchronous motors of the DRN../DRU../DR2.. series replace the previous encoder types of the .S7., .H7., .G7., and .V7. series. The respective predecessors and the successors are shown for the various mechanical add-on variants.

### 4.8.1 Add-on encoder

#### Predecessor spread shaft – Integrated successor/cone shaft

|                    | Predecessor        | Successor  |
|--------------------|--------------------|------------|
| <b>Incremental</b> | ES7S               | EK8S       |
|                    | ES7R               | EI8R, EK8R |
|                    | ES7C (used as TTL) | EK8C       |
|                    | ES7C (used as HTL) | EI8C, EK8C |
|                    | ES12               | EI72       |
|                    | ES16               | EI76       |
| <b>Multi-turn</b>  | AS7W               | AK8W       |
|                    | AS7Y               | AK8Y       |
|                    | AS7H               | AK8H       |
|                    | AS3H               | AK8H       |
|                    | AS4H               | AK8H       |

#### Predecessor plug-in shaft – Successor cone shaft

|                    | Predecessor | Successor |
|--------------------|-------------|-----------|
| <b>Incremental</b> | EG7S        | EK8S      |
|                    | EG7R        | EK8R      |
|                    | EG7C        | EK8C      |
| <b>Multi-turn</b>  | AG7W        | AK8W      |
|                    | AG7Y        | AK8Y      |

#### Predecessor hollow shaft – Successor cone shaft

|                    | Predecessor | Successor                     |
|--------------------|-------------|-------------------------------|
| <b>Incremental</b> | EH7S        | EK8S                          |
|                    | EH7R        | EK8R                          |
|                    | EH7C        | EK8C                          |
|                    | EH7T        | EK8C (at $V_B = 5\text{ V}$ ) |
| <b>Multi-turn</b>  | AH7Y        | AK8Y                          |

## Mounting adapters

|                         | Predecessor | Successor |
|-------------------------|-------------|-----------|
| <b>Mounting adapter</b> | ES1A        | EK8A      |
|                         | ES7A        | EK8A      |
|                         | EG7A        | EK8A      |
|                         | EH7A        | EK8A      |

### 4.8.2 Add-on encoder with add-on fan guard with encoder mount

#### Predecessor spread shaft – Successor cone shaft

|                    | Predecessor | Successor |
|--------------------|-------------|-----------|
| <b>Incremental</b> | EV7S        | EV8S      |
|                    | EV7R        | EV8R      |
|                    | EV7C        | EV8C      |
| <b>Multi-turn</b>  | AV7W        | AV8W      |
|                    | AV7Y        | AV8Y      |

#### Predecessor solid shaft – Successor cone shaft

|                    | Predecessor | Successor                     |
|--------------------|-------------|-------------------------------|
| <b>Incremental</b> | EV2S        | EV8S                          |
|                    | EV2C        | EV8C                          |
|                    | EV2R        | EV8R                          |
|                    | EV2T        | EV8C (at $V_B = 5\text{ V}$ ) |
| <b>Multi-turn</b>  | AV2Y        | AV8Y                          |

## Mounting adapters

|                         | Predecessor | Successor |
|-------------------------|-------------|-----------|
| <b>Mounting adapter</b> | EV7A        | XV8A      |
|                         | XV7A        | XV8A      |

## 4.8.3 Predecessor HTL encoder with various low resolutions – Successor EK8X

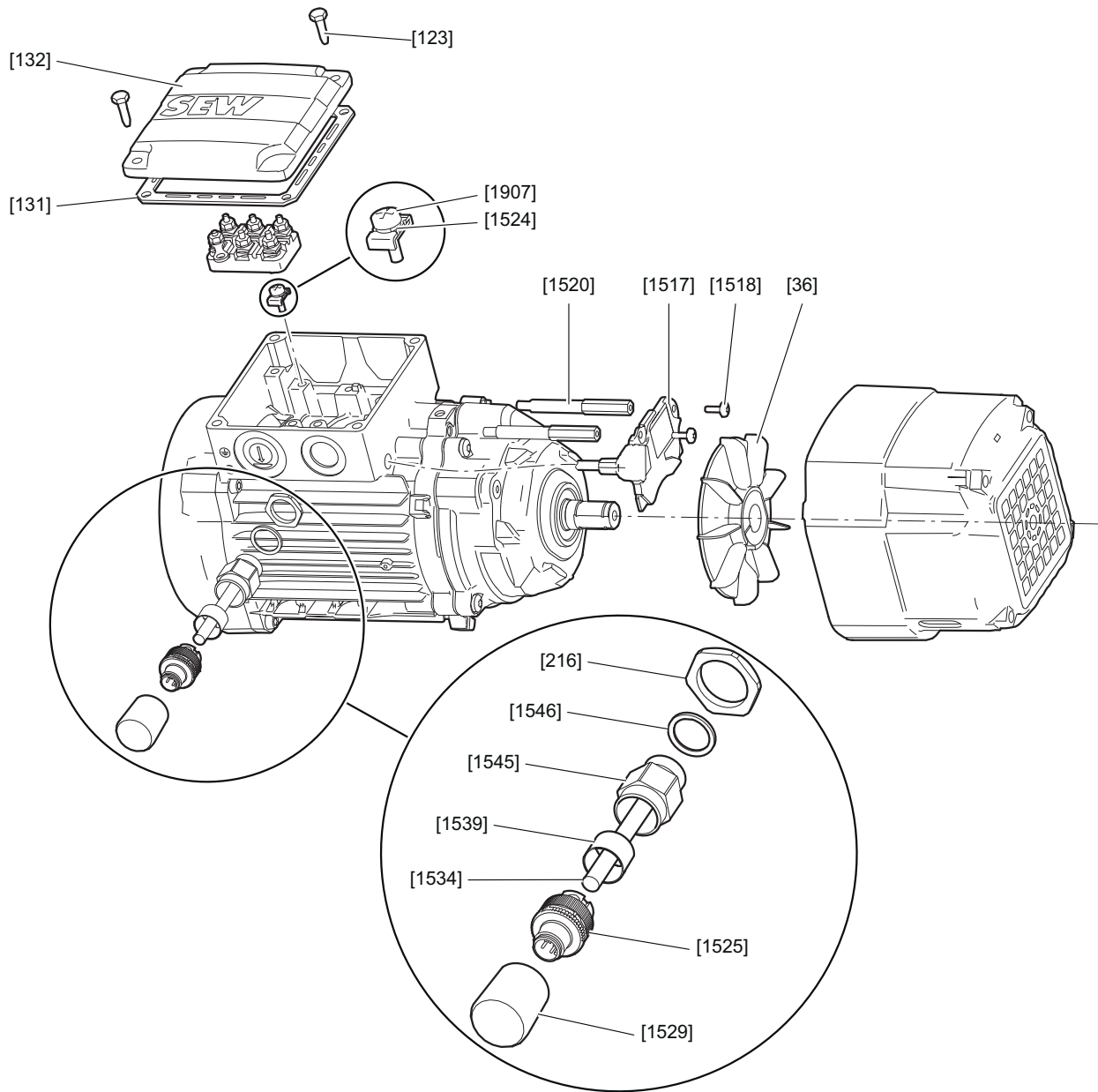
|             | Predecessor           | Resolution | Successor             |
|-------------|-----------------------|------------|-----------------------|
| Incremental | ES12                  | 1 or 2     | EK8X (down to -30 °C) |
|             | ES16                  | 6          |                       |
|             | ES22                  | 2          |                       |
|             | ES26                  | 6          |                       |
|             | XG7C                  | 100        |                       |
|             | XS11                  | 1          |                       |
|             | XS16                  | 6          |                       |
|             | XS1C                  | 100        |                       |
|             | XS1R                  | 100        |                       |
|             | XS1T                  | 100        |                       |
|             | XS21                  | 1          |                       |
|             | XS72                  | 2          |                       |
|             | XS7C                  | 100        |                       |
|             | XV1C (down to -40 °C) | 100        |                       |
|             | XV4T                  | 128        |                       |
|             | XV7C                  | 100        |                       |

5 Device structure

5.1 Device overview

5.1.1 Structure of built-in encoder

Structure of EI7C built-in encoder – DRN63 motors

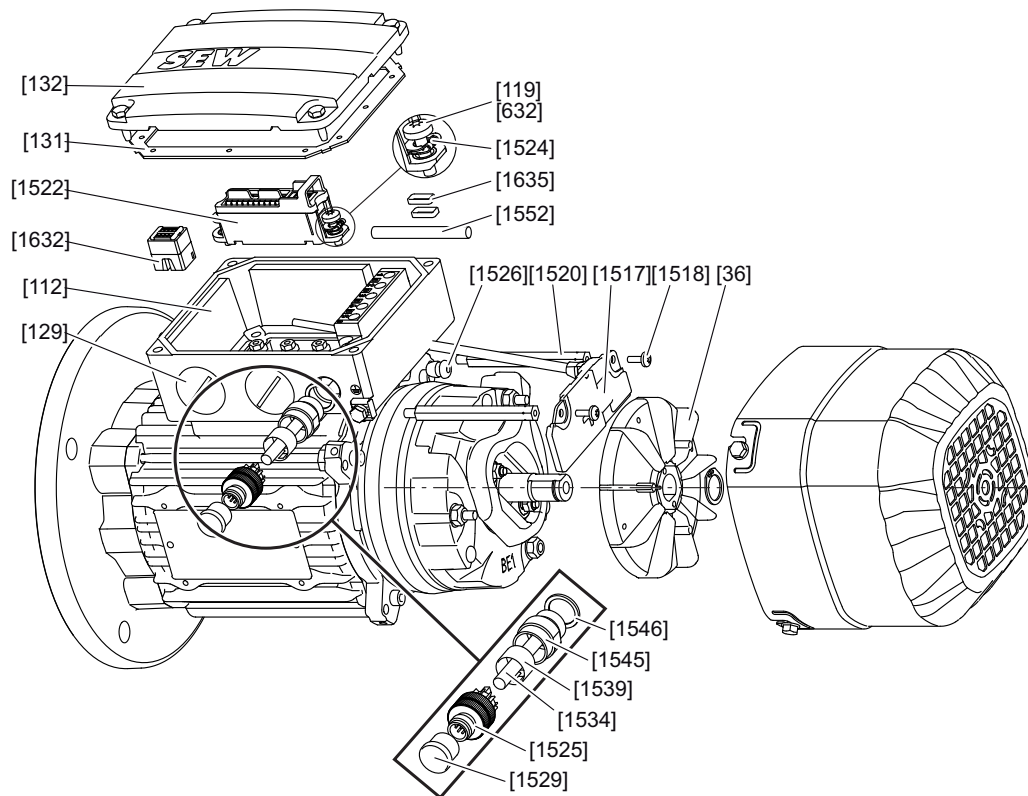


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|        |                    |        |                       |
|--------|--------------------|--------|-----------------------|
| [36]   | Fan, complete      | [1524] | Terminal washer       |
| [123]  | Screw              | [1525] | Connector             |
| [131]  | Gasket for cover   | [1529] | Protection cap        |
| [132]  | Terminal box cover | [1534] | Glass fiber sheathing |
| [216]  | Nut                | [1539] | Sleeve                |
| [1517] | Encoder module     | [1545] | Circular socket       |
| [1518] | Flat head screw    | [1546] | O-ring                |
| [1520] | Spacer             | [1907] | Screw                 |

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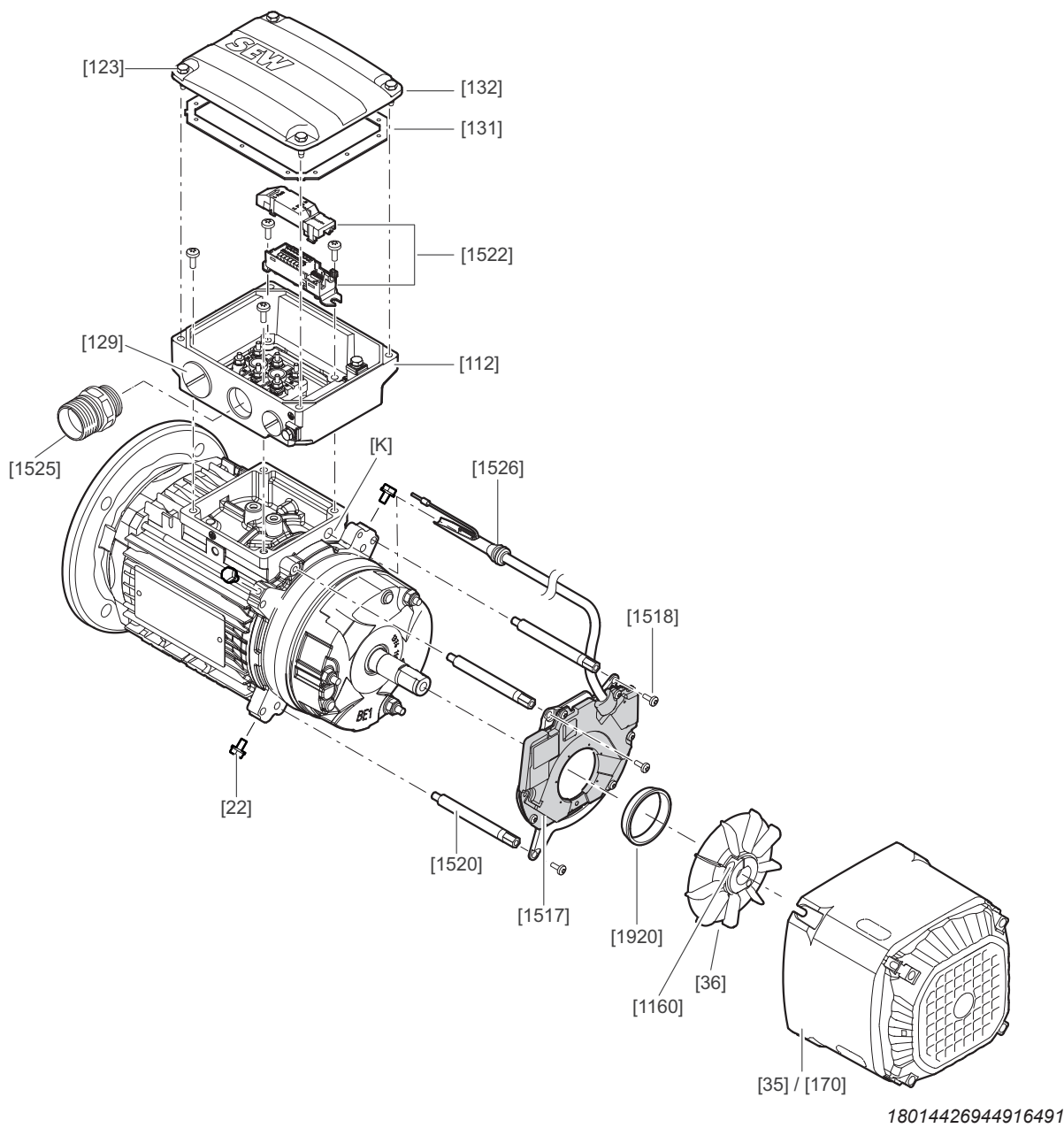
## Structure of EI7C built-in encoder – DR./DRN71 – 132S motors



18014401416894731

|        |                         |        |                       |
|--------|-------------------------|--------|-----------------------|
| [35]   | Fan guard               | [1524] | Terminal washer       |
| [36]   | Fan, complete           | [1525] | M23 connector         |
| [112]  | Terminal box lower part | [1526] | Grommet               |
| [119]  | Screw                   | [1529] | Protection cap        |
| [129]  | Screw plug              | [1534] | Glass fiber sheathing |
| [131]  | Gasket for cover        | [1539] | Sleeve                |
| [132]  | Terminal box cover      | [1545] | Circular socket       |
| [632]  | Screw                   | [1546] | O-ring                |
| [1517] | Encoder module          | [1552] | Glass fiber sheathing |
| [1518] | Flat head screw         | [1632] | Connection unit       |
| [1520] | Spacer                  | [1635] | Cable ties            |
| [1522] | Connection unit         |        |                       |

Structure of EI8. built-in encoder – DRN../DRU../DR2..71 – 132S motors

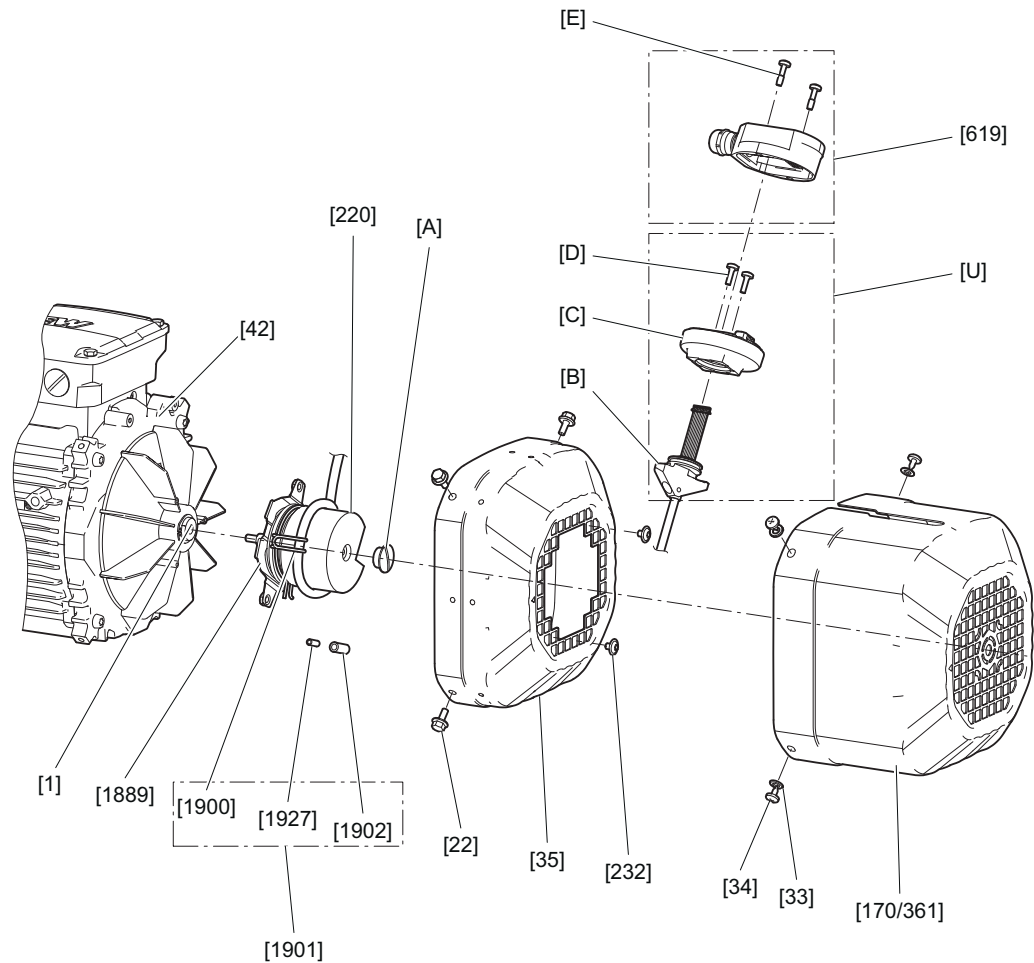


|       |                         |        |                    |        |                      |
|-------|-------------------------|--------|--------------------|--------|----------------------|
| [22]  | Screw                   | [131]  | Gasket for cover   | [1522] | Connection unit      |
| [35]  | Fan guard               | [132]  | Terminal box cover | [1525] | M23 connector        |
| [36]  | Fan, complete           | [170]  | Forced cooling fan | [1526] | Grommet              |
| [112] | Terminal box lower part | [1160] | Cap screw          | [1920] | Centering ring (aid) |
| [119] | Screw                   | [1517] | Encoder module     | [K]    | Knock-out            |
| [123] | Screw                   | [1518] | Screw              |        |                      |
| [129] | Screw plug              | [1520] | Hexagonal spacer   |        |                      |

31974473/EN – 03/2025

### 5.1.2 Structure of conical encoders

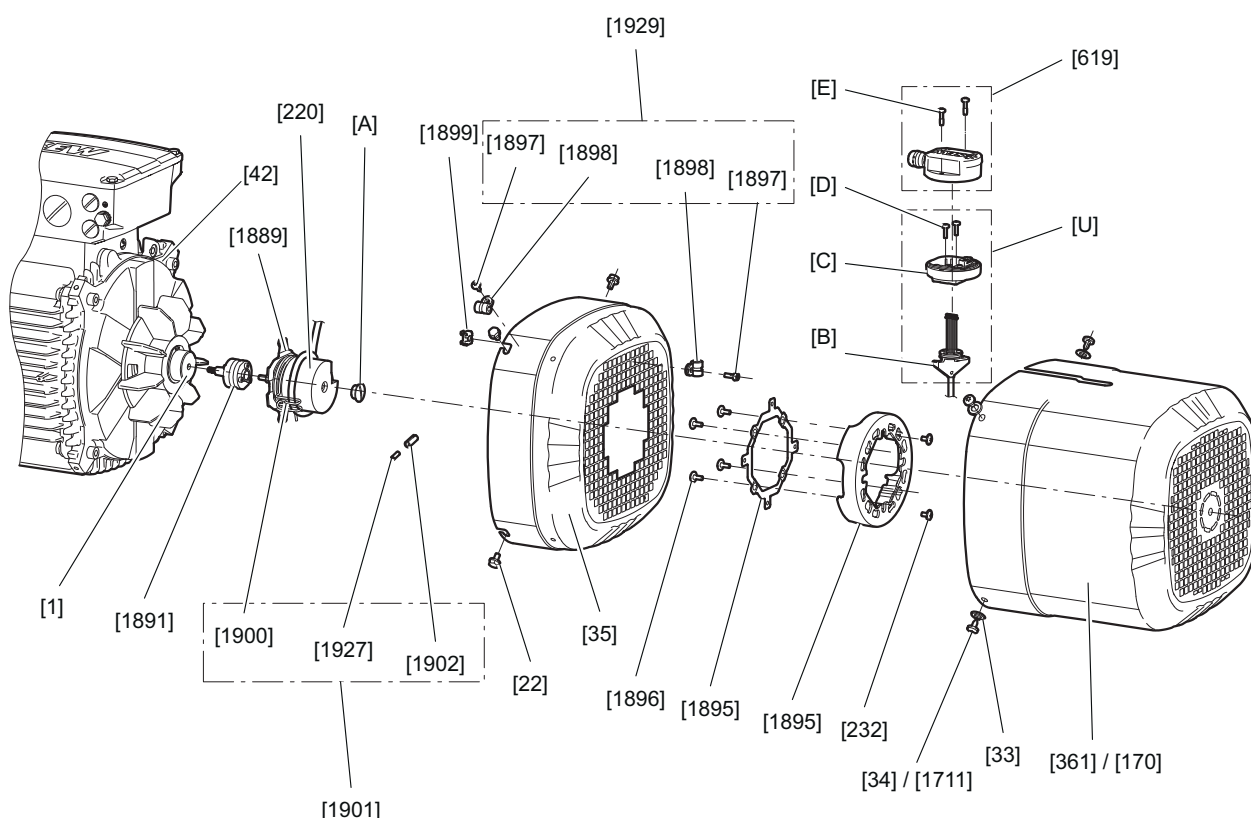
Structure of .K8./.K9. conical encoder – (E)DRN../DRU../DR2..63 – 132S motors with integrated A1GA encoder connector with connection cover or A2GA without connection cover



18014427029025803

|       |                      |        |                    |
|-------|----------------------|--------|--------------------|
| [1]   | Rotor                | [U]    | Connection adapter |
| [22]  | Screw (hexagonal)    | [1889] | Torque bracket     |
| [33]  | Washer               | [1900] | Cable retainer     |
| [34]  | Screw (cross recess) | [1901] | Accessory bag      |
| [35]  | Fan guard            | [1902] | Threaded sleeve    |
| [42]  | B-side endshield     | [1927] | Set screw          |
| [170] | Forced cooling fan   | [A]    | Screw plug         |
| [220] | Encoder              | [B]    | T-slot nut         |
| [232] | Screw (hexalobular)  | [C]    | Lower part         |
| [361] | Safety cover         | [D]    | Screw              |
| [619] | Connection cover     | [E]    | Screw              |

# Structure of .K8../K9. conical encoder – (E)DRN../DRU../DR2..132M – 315 motors

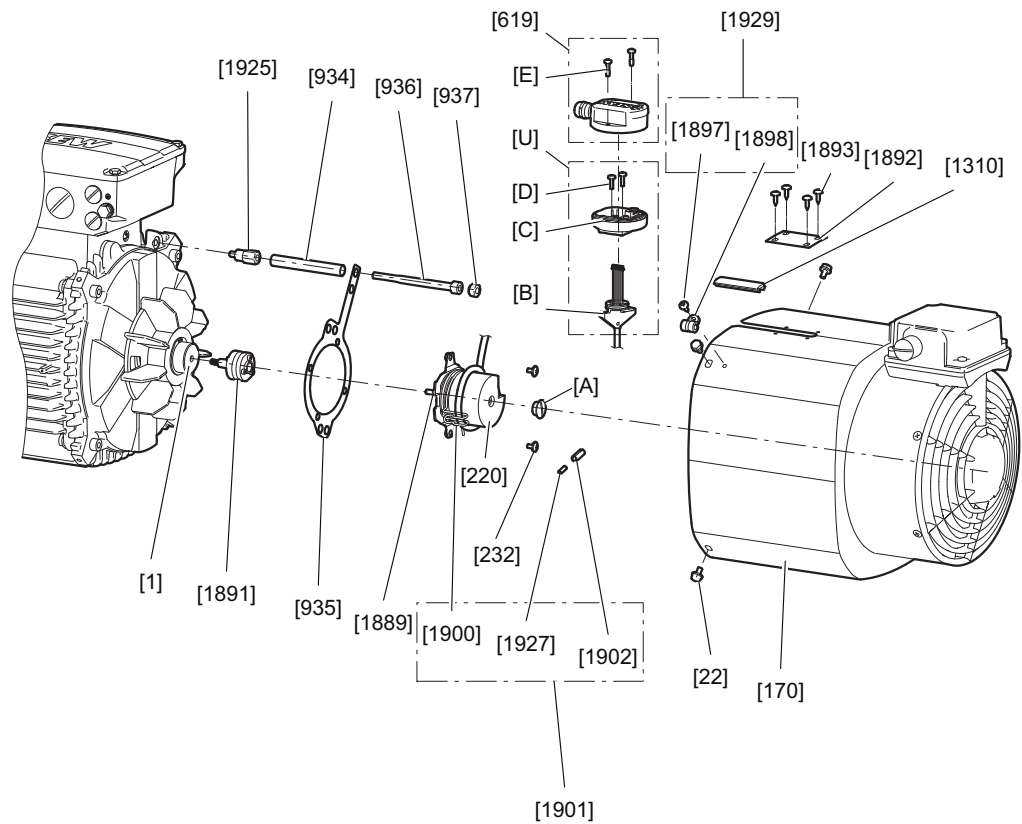


27021626298396683

|        |                          |        |                        |
|--------|--------------------------|--------|------------------------|
| [1]    | Rotor                    | [1896] | Screw (hexalobular)    |
| [22]   | Screw (hexagonal)        | [1897] | Screw (hexagon socket) |
| [33]   | Washer                   | [1898] | Clamp                  |
| [34]   | Screw (cross recess)     | [1899] | Cage nut               |
| [35]   | Fan guard                | [1900] | Cable retainer         |
| [42]   | B-side endshield         | [1901] | Accessory bag          |
| [170]  | Forced cooling fan       | [1902] | Threaded sleeve        |
| [220]  | Encoder                  | [1927] | Set screw              |
| [232]  | Screw (hexalobular)      | [1929] | Accessory bag          |
| [361]  | Safety cover             | [A]    | Screw plug             |
| [619]  | Connection cover         | [B]    | T-slot nut             |
| [U]    | Connection adapter       | [C]    | Lower part             |
| [1711] | Screw (hexagonal)        | [D]    | Screw                  |
| [1889] | Torque bracket           | [E]    | Screw                  |
| [1891] | Insulation coupling      |        |                        |
| [1895] | Support ring/spacer ring |        |                        |



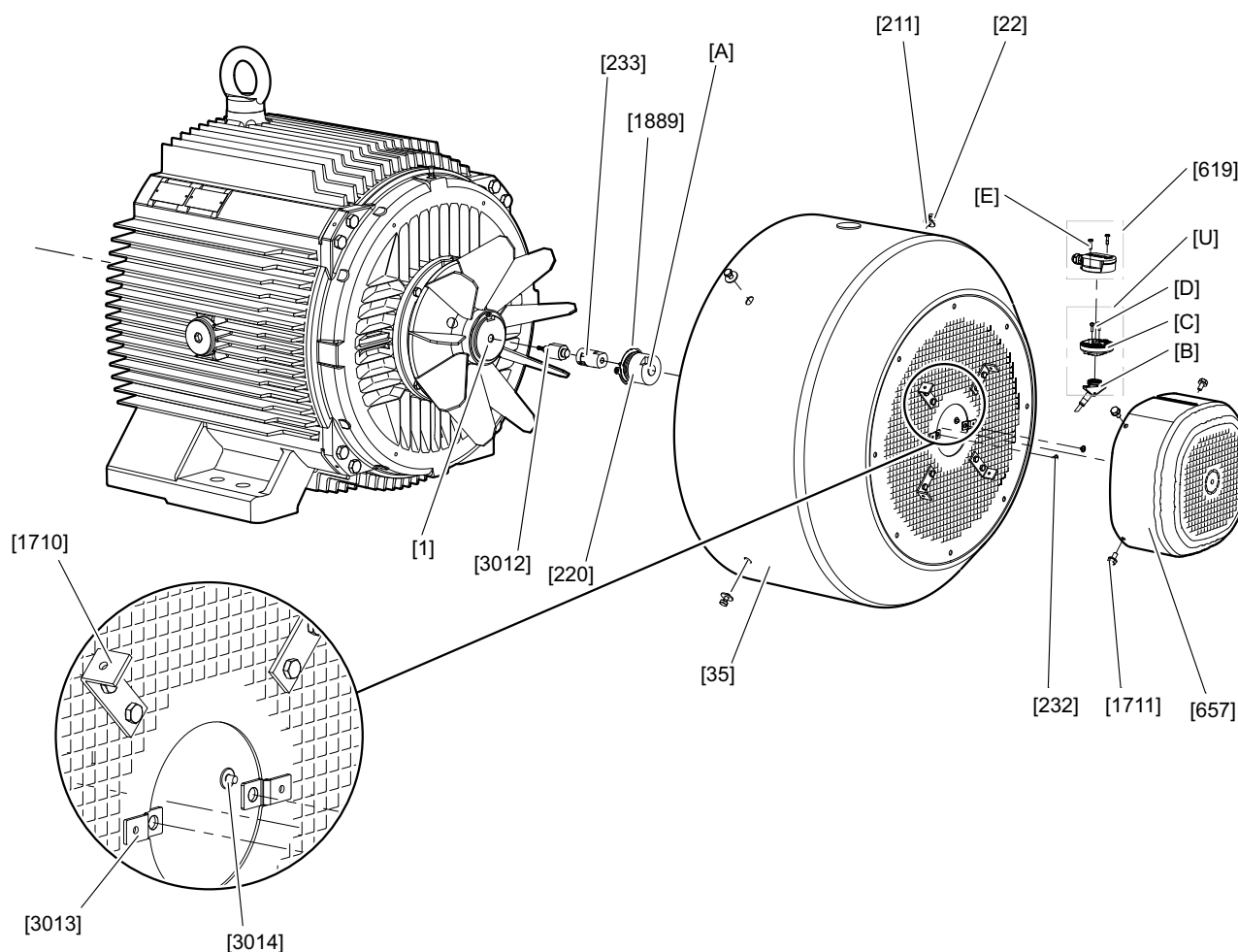
Structure of .K8./.K9. conical encoder – (E)DRN../DRU../DR2..132M – 355 motors with forced cooling fan and integrated A1GA encoder connector with connection cover or A2GA without connection cover



36028825563057675

|        |                      |        |                        |
|--------|----------------------|--------|------------------------|
| [1]    | Rotor                | [1892] | Support plate          |
| [22]   | Screw (hexagonal)    | [1893] | Screw (cross recess)   |
| [33]   | Washer               | [1897] | Screw (hexagon socket) |
| [34]   | Screw (cross recess) | [1898] | Clamp                  |
| [170]  | Forced cooling fan   | [1900] | Cable retainer         |
| [220]  | Encoder              | [1901] | Accessory bag          |
| [232]  | Screw (hexalobular)  | [1902] | Threaded sleeve        |
| [361]  | Safety cover         | [1925] | Spacer bolt            |
| [619]  | Connection cover     | [1927] | Set screw              |
| [934]  | Spacer bushing       | [1929] | Accessory bag          |
| [935]  | Torque bracket       | [A]    | Screw plug             |
| [936]  | Cap screw            | [B]    | T-slot nut             |
| [937]  | Hex nut              | [C]    | Lower part             |
| [1310] | Sealing profile      | [D]    | Screw                  |
| [1889] | Torque bracket       | [E]    | Screw                  |
| [1891] | Insulation coupling  | [U]    | Connection adapter     |

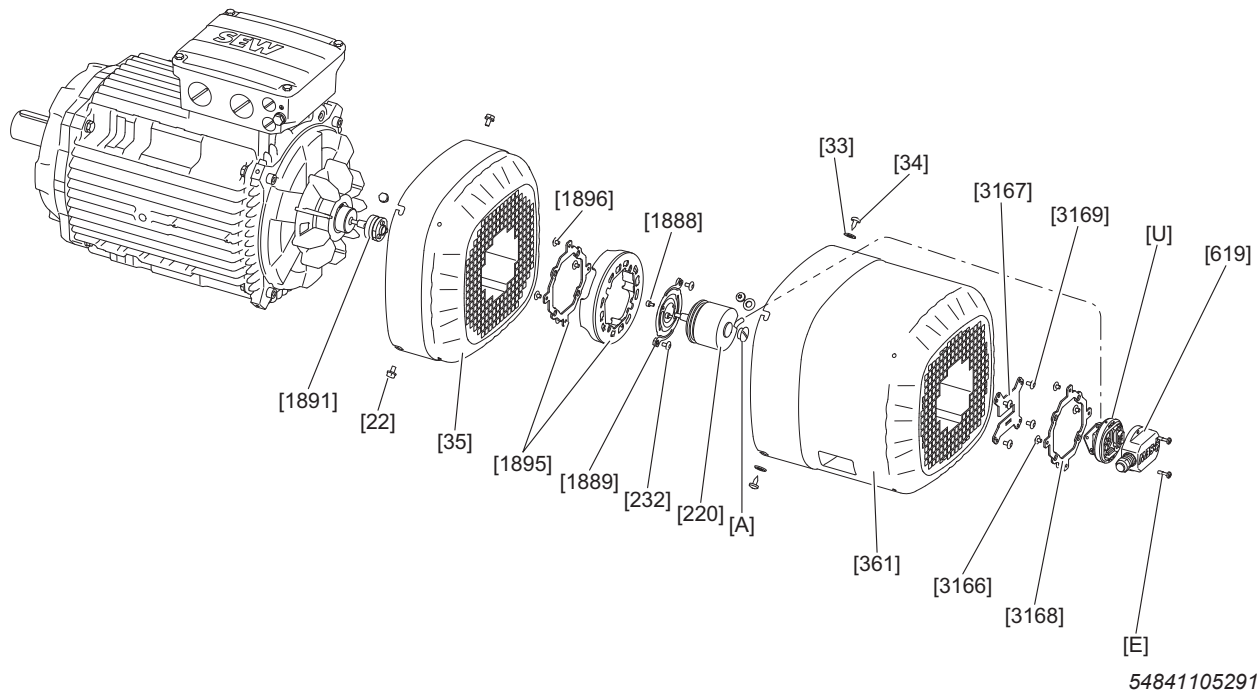
**Structure of .K8./.K9. conical encoder – DRN355 motors with integrated A1GA encoder connector with connection cover or A2GA without connection cover**



9007232638950155

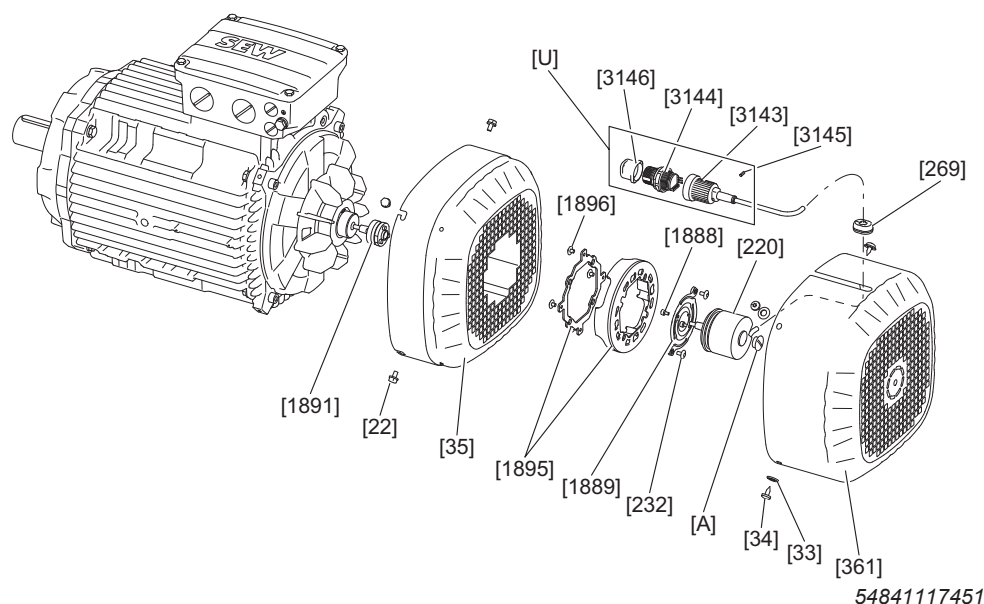
|        |                     |        |                  |
|--------|---------------------|--------|------------------|
| [1]    | Rotor               | [1889] | Torque bracket   |
| [22]   | Screw (hexagonal)   | [1902] | Threaded sleeve  |
| [35]   | Fan guard           | [1927] | Set screw        |
| [211]  | Washer              | [3012] | Bolt             |
| [220]  | Encoder             | [3013] | Fastening plate  |
| [232]  | Screw (hexalobular) | [3014] | Round-head screw |
| [233]  | Coupling            |        |                  |
| [619]  | Connection cover    | [A]    | Screw plug       |
| [657]  | Safety cover        | [B]    | T-slot nut       |
| [U]    | Connection adapter  | [C]    | Lower part       |
| [1710] | Angle bracket       | [D]    | Screw            |
| [1711] | Screw (hexagonal)   | [E]    | Screw            |

Structure of .K8./.K9. conical encoder – (E)DRN../DRU../DR2..63 – 315 motors with integrated encoder connector on the rear of the guard with A1GA axial cover, without A2GA axial cover



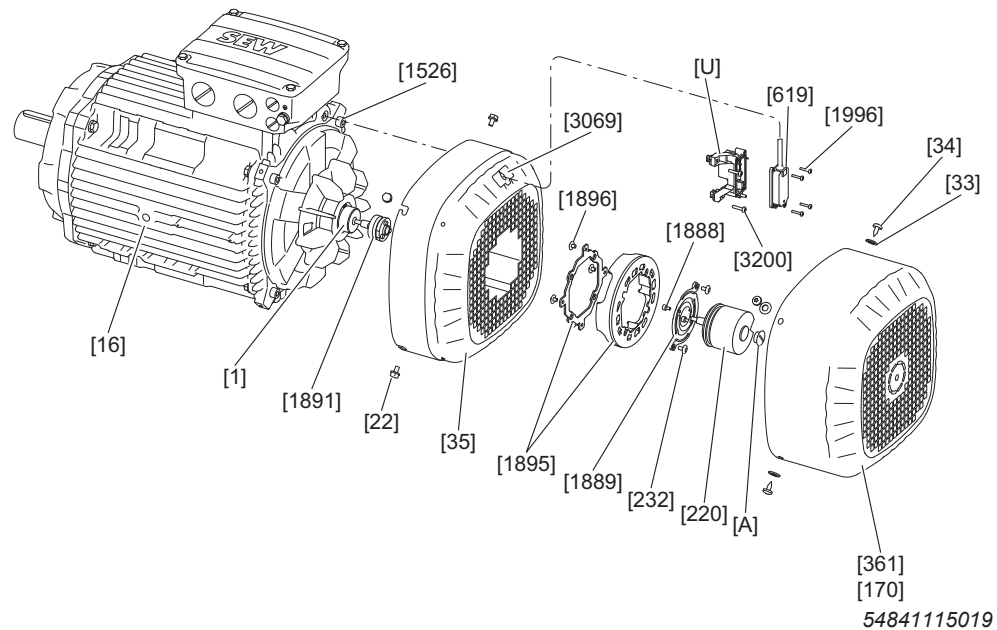
|       |                      |        |                           |
|-------|----------------------|--------|---------------------------|
| [22]  | Screw (hexagonal)    | [619]  | Complete connection cover |
| [32]  | Retaining ring       | [U]    | Connection adapter        |
| [33]  | Washer               | [1889] | Torque bracket            |
| [34]  | Screw (cross recess) | [1891] | Insulation coupling       |
| [35]  | Fan guard            | E      | Screw                     |
| [36]  | Fan                  | [3169] | Screw                     |
| [220] | Encoder              | [3167] | Support plate             |
| [232] | Screw (hexalobular)  |        |                           |
| [361] | Safety cover         |        |                           |

Structure of .K8./.K9. conical encoder – (E)DRN../DRU../DR2..63 – 355 motors with M23 connector directly on the KIGA encoder



|       |                      |        |                           |
|-------|----------------------|--------|---------------------------|
| [22]  | Screw (hexagonal)    | [361]  | Safety cover              |
| [32]  | Retaining ring       | [619]  | Complete connection cover |
| [33]  | Washer               | [U]    | Connection adapter        |
| [34]  | Screw (cross recess) | [1889] | Torque bracket            |
| [35]  | Fan guard            | [1891] | Insulation coupling       |
| [36]  | Fan                  | [1995] | Connection cover          |
| [220] | Encoder              | [1996] | Flat head screw           |
| [232] | Screw (hexalobular)  | [3169] | Screw                     |
| [269] | Grommet              | [3167] | Support plate             |

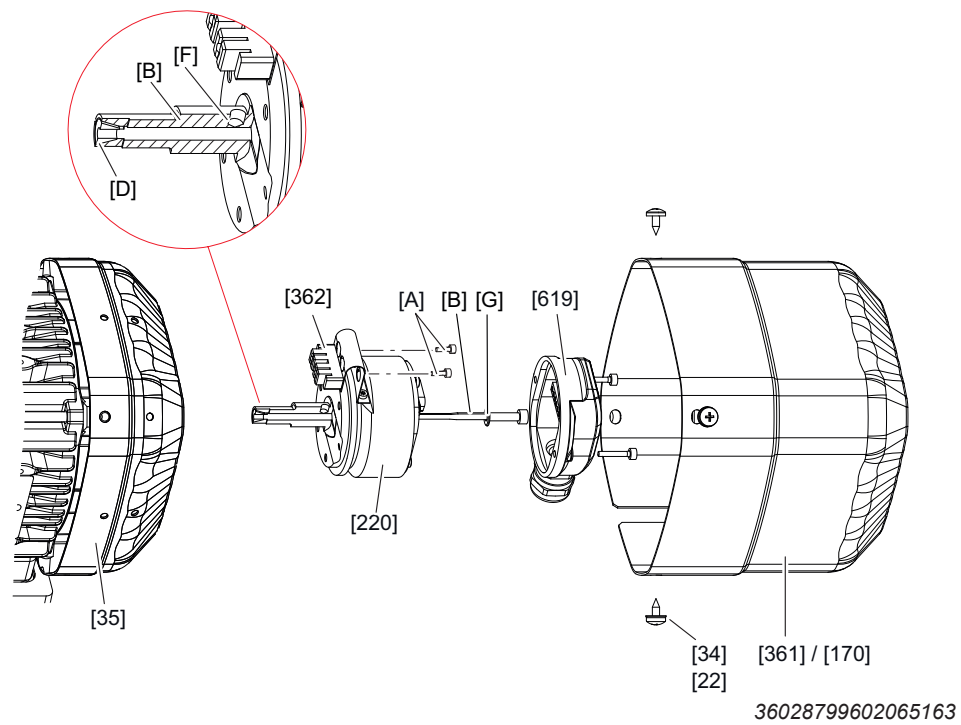
Structure of .K8../.K9. conical encoder – (E)DRN../DRU../DR2..71 – 225 motors with A-BOX-U connection unit for connection option in/on the terminal box



|       |                      |        |                           |
|-------|----------------------|--------|---------------------------|
| [1]   | Rotor                | [619]  | Complete connection cover |
| [16]  | Stator               | [U]    | Connection adapter        |
| [22]  | Screw (hexagonal)    | [1526] | Grommet                   |
| [32]  | Retaining ring       | [1889] | Torque bracket            |
| [33]  | Washer               | [1891] | Insulation coupling       |
| [34]  | Screw (cross recess) | [1996] | Connection cover          |
| [35]  | Fan guard            | [1996] | Flat head screw           |
| [36]  | Fan                  | [3069] | Locking piece             |
| [220] | Encoder              | [3169] | Screw                     |
| [232] | Screw (hexalobular)  | [3167] | Support plate             |
| [361] | Safety cover         |        |                           |

### 5.1.3 Design of spread/plug-in shaft encoder

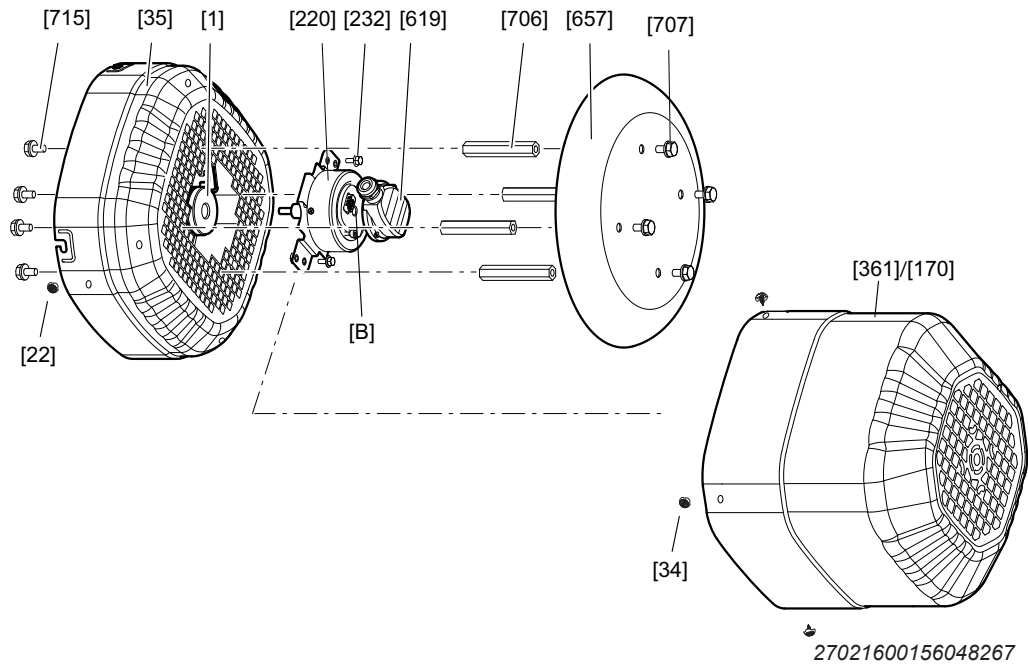
#### Removing/installing rotary encoder ES7./AS7. – DR..80 – 132S motors



- [22] Screw
- [34] Tapping screw
- [35] Fan guard
- [220] Encoder
- [361] Safety cover
- [170] Forced cooling fan
- [362] Expansion anchor

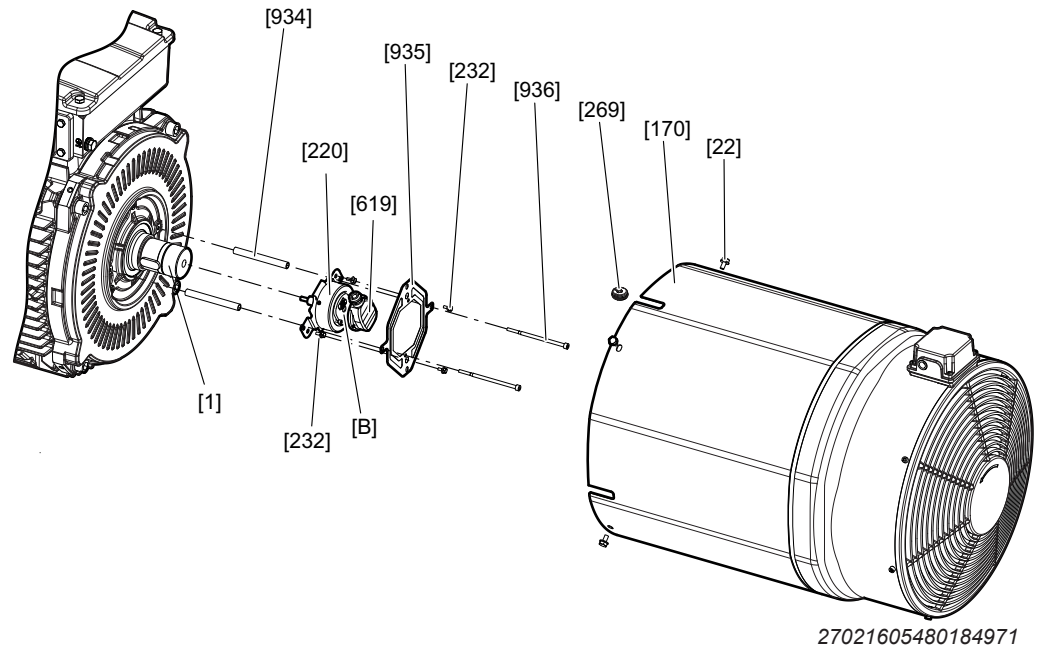
- [619] Connection cover
- [A] Retaining screws for torque bracket
- [B] Central retaining screw
- [D] Cone
- [F] Bore
- [G] Tooth lock washer

## EG7., AG7. rotary encoder – DR..160 – 280, DRN132M – 280 motors



|       |               |       |                         |
|-------|---------------|-------|-------------------------|
| [1]   | Rotor         | [619] | Connection cover        |
| [34]  | Tapping screw | [657] | Canopy                  |
| [35]  | Fan guard     | [706] | Spacer bolt             |
| [220] | Encoder       | [707] | Screws                  |
| [232] | Screws        | [715] | Screws                  |
| [361] | Safety cover  | [B]   | Central retaining screw |

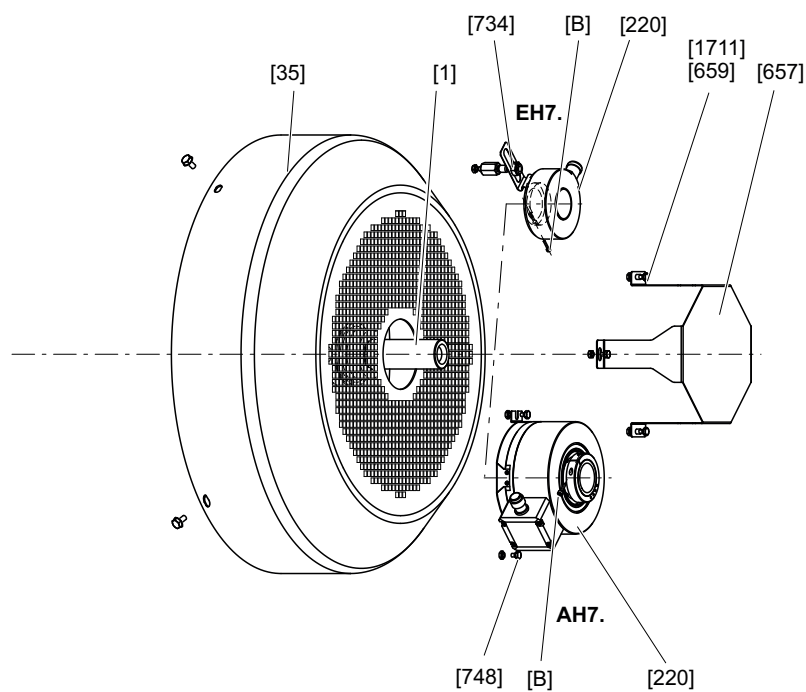
EG7., AG7. rotary encoder – (E)DR..160 – 280, (E)DRN132M – 280 motors – with forced cooling fan /V



|       |                    |       |                  |
|-------|--------------------|-------|------------------|
| [1]   | Rotor              | [619] | Connection cover |
| [22]  | Screw              | [934] | Spacer bushing   |
| [170] | Forced cooling fan | [935] | Torque bracket   |
| [220] | Encoder            | [936] | Screw            |
| [232] | Screws             | [B]   | Retaining screw  |
| [269] | Grommet            |       |                  |



## EH7., AH7. rotary encoder – (E)DR..315 motors

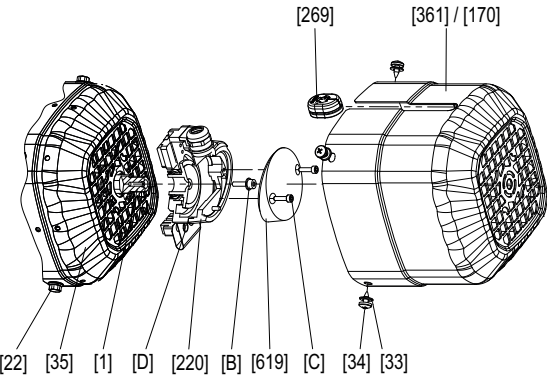


|       |                 |        |                |
|-------|-----------------|--------|----------------|
| [1]   | Rotor           | [659]  | Screw          |
| [35]  | Fan guard       | [1711] | Screw          |
| [220] | Encoder         | [734]  | Nut            |
| [367] | Retaining screw | [748]  | Screw          |
| [657] | Cover plate     | [B]    | Clamping screw |

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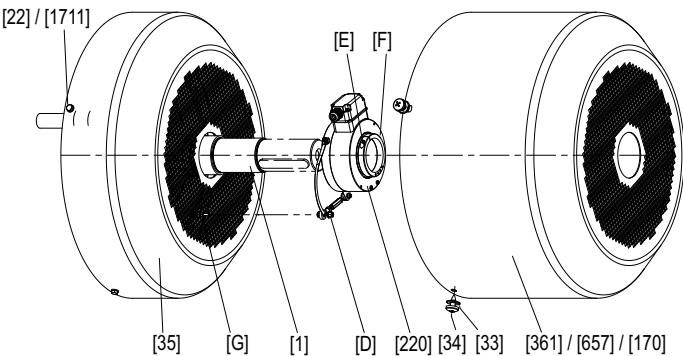
**XH.A hollow-shaft rotary encoders – DR..71 – 225, DRN71 – 225, DR2..71 – 80 motors**

Encoder mounting with XH1A encoder mounting adapter



- [1] Rotor
- [33] Washer
- [34] Tapping screw
- [35] Fan guard
- [170] Forced cooling fan
- [220] Encoder
- [269] Grommet
- [361] Safety cover
- [657] Safety cover

Encoder mounting with XH7A and XH8A encoder mounting adapter



- [619] Connection cover
- [1711] Screw
- [B] Central retaining screw
- [C] Connection cover screws
- [D] Torque bracket screws
- [E] Screw
- [F] Clamping ring
- [G] Nut of the torque bracket

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## 5.2 Nameplates and type designations of encoders

### 5.2.1 Type designation for safety encoders



#### INFORMATION

Safety encoders do not have their own nameplate. Encoders that are designed as a safety encoder have a corresponding FS marking on the nameplate of the motor.

### 5.2.2 Structure of the type designation

| EI8R |                                                      |
|------|------------------------------------------------------|
| E    | Encoder design                                       |
| I    | Tool flange                                          |
| 8    | Key figure for the generation of the encoder or type |
| R    | Electrical interface                                 |

### 5.2.3 Type designation for encoders from SEW-EURODRIVE

The type designation of SEW-EURODRIVE encoders consists of 4 characters, e.g. EI8R, and is included in the type designation of the motor.

#### 1st digit: encoder design

| Identifier | Description                                             |
|------------|---------------------------------------------------------|
| A          | Multi-turn absolute encoder                             |
| E          | Single-turn absolute encoder or incremental encoder     |
| N          | Low resolution proximity switch and incremental encoder |
| R          | Resolver                                                |
| X          | Special encoder <sup>1)</sup>                           |

1) Special encoder with functions for customer-specific applications.

#### 2nd digit: tool flange to the motor

The add-on encoder is mounted to the motor on the B-side by means of various tool flanges. The interface to be used depends on the motor size or the selected option.

| Identifier | Description                                                         |
|------------|---------------------------------------------------------------------|
| K          | Cone shaft (shaft centered)                                         |
| V          | Solid shaft with coupling (flange-centered with flange cover)       |
| H          | Hollow shaft (shaft centered)                                       |
| I          | Built-in encoder, integrated in the motor without additional length |
| F          | Positive                                                            |
| L          | Linear                                                              |
| S          | Spread shaft (shaft centered)                                       |
| G          | Plug-in shaft (shaft centered)                                      |

### 3rd digit: key figure for the generation of the encoder/type

| Identifier | Description                                                                                                    |
|------------|----------------------------------------------------------------------------------------------------------------|
| 9          | Built-in encoders of the high class or add-on encoders of the medium and high class of the second generation   |
| 8          | Built-in encoders of the medium class or add-on encoders of the medium and high class of the second generation |
| 7          | Built-in encoders of the basic class or add-on encoders of the medium and high class of the first generation   |
| 1 – 6      | Various geometric variants                                                                                     |
| 0          | Special design                                                                                                 |

### 4th digit: electrical interface of the encoder

| Identifier | Description                                                             |
|------------|-------------------------------------------------------------------------|
| 1 – 6      | Signal periods per revolution                                           |
| A          | Design as mounting adapter (see chapter "Encoder mounting adapter")     |
| C          | HTL (with or without index track) at typically $V_B = 9 - 30 \text{ V}$ |
| H          | Sin/cos + RS485 HIPERFACE® (multi-turn)                                 |
| L          | Resolver signal                                                         |
| M          | Resolver signal                                                         |
| R          | TTL (RS422) at typically $V_B = 9 - 30 \text{ V}$                       |
| S          | Sin/cos + RS485 (optional)                                              |
| T          | TTL (RS422) at $V_B = 5 \text{ V}$                                      |
| W          | Sin/cos + RS485 (single-turn or multi-turn)                             |
| X          | Adjustable interface and/or resolution or special interface             |
| Y          | Sin/cos or TTL(RS422) + SSI (multi-turn)                                |
| Z          | MOVILINK® DDI                                                           |

## 5.2.4 Part number

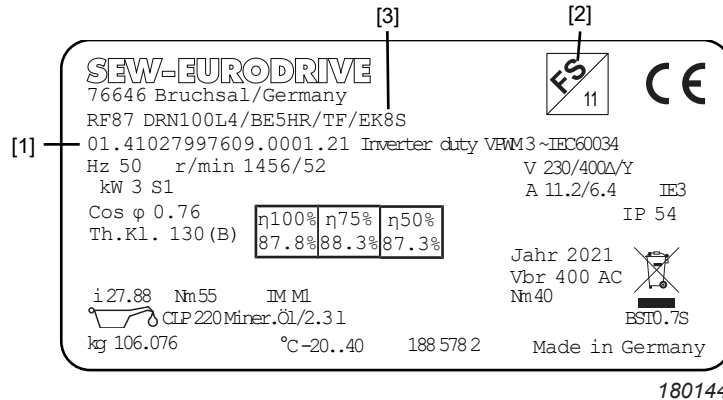
Two part numbers can be specified on the nameplate for the encoders.

The assignment of the part numbers and the position on the nameplate can be found in chapters ".K8./.K9. nameplate - Baumer" (→ 82) and ".K8./.K9. nameplate - Kübler" (→ 83).

Additional information can be found in chapters "Manufacturer information about conical encoders" (→ 32) and "Spare parts" (→ 355).

### 5.2.5 Motor

The existing encoder type is indicated in the motor type designation on the motor nameplate. If the FS logo is additionally displayed on the motor nameplate, then a functionally safe motor option is present, e.g. a safety encoder or a safety brake. The following figure shows an example motor nameplate with an EK8S encoder. The FS logo indicates that the EK8S encoder is designed as a safety encoder. For details on the FS logo, see chapter "FS marking" (→ 39).



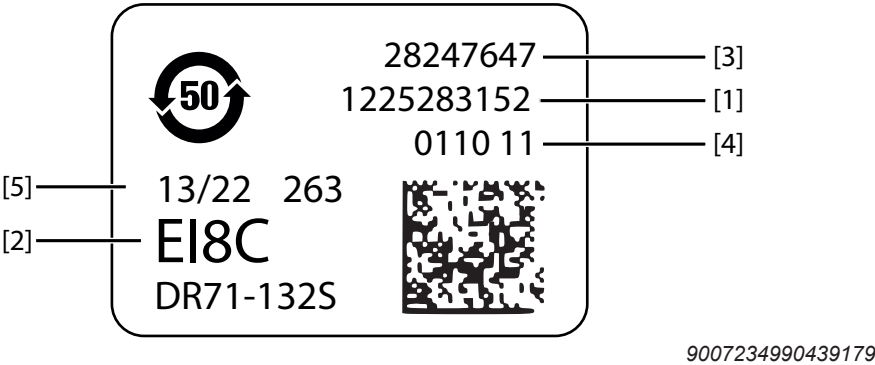
- [1] Motor serial number
- [2] FS logo for functional safety
- [3] Type designation

In addition to the motor nameplate, the encoder has its own nameplate with specific information on the encoder.

5.2.6 EI7., EI8. built-in encoder

The following figures show examples of the nameplates of the EI7. and EI8. encoders. For the structure of the type designation, refer to chapter "Type designation for encoders from SEW-EURODRIVE" (→ 78).

Design 1



Design 2

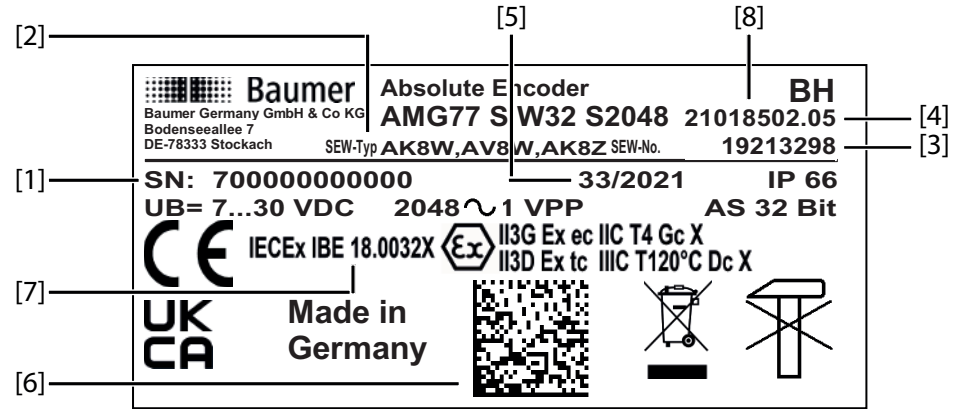


- [1] Serial number
- [2] Type designation
- [3] Part number from SEW-EURODRIVE
- [4] Version
- [5] Manufacturing date in ww/yy format
- [9] Test date in ww/yy format
- [10] Construction status

## 5.2.7 .K8./.K9./.V8. conical encoder

## .K8./.K9. nameplate - Baumer

The following figure shows an example of a nameplate for a Baumer encoder. For the structure of the type designation, refer to chapter "Type designation for encoders from SEW-EURODRIVE" (→ 78).



18014434238808715

- [1] Serial number
- [2] Type designation
- [3] Part number from SEW-EURODRIVE
- [4] Version
- [5] Manufacturing date in ww/yyyy format
- [6] QR code
- [7] Identifications relating to explosion protection
- [8] SEW-EURODRIVE part number

**For encoders with 1 part number on the nameplate**

Part number of the encoder set (consisting of encoder and mount-on parts with the lower part of the integrated encoder connector)

**For encoders with 2 part numbers on the nameplate**

Part number of the encoder (without torque bracket and mount-on parts).

1st part number [8] + version [4] (listed above):

- Manufacturer-specific part number of the encoder.

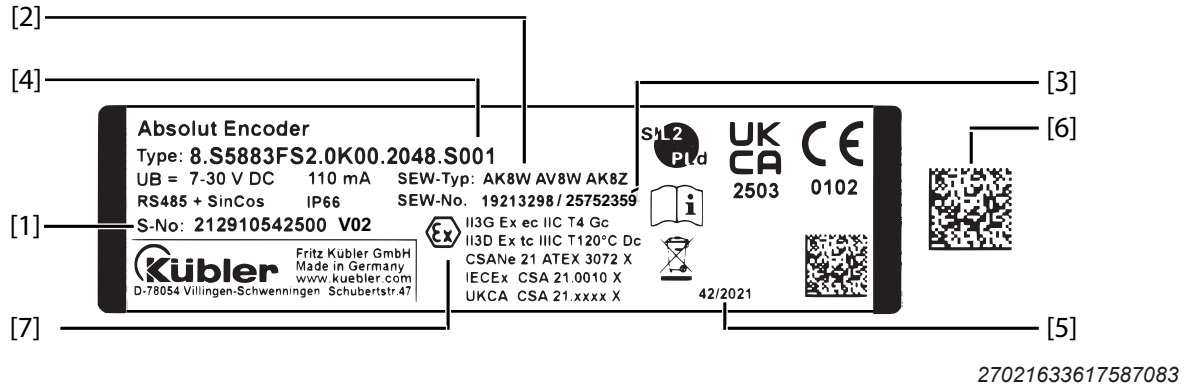
2nd part number [3] (listed below):

- Manufacturer-neutral part number of the encoder. This part number lists encoders from both manufacturers without any specific sorting.

For additional information, see chapter "Manufacturer information about conical encoders" (→ 32) and chapter "Spare parts" (→ 355).

## .K8./.K9. nameplate – Kübler

The following figure shows an example of a nameplate for a Kübler encoder. For the structure of the type designation, refer to chapter "Type designation for encoders from SEW-EURODRIVE" (→ 78).



- [1] Serial number
- [2] Type designation
- [3] Part number from SEW-EURODRIVE/manufacturer-specific part number
- [4] Version
- [5] Manufacturing date in ww/yyyy format
- [6] QR code
- [7] Identifications relating to explosion protection

The last two digits of the serial number denote the version of the encoder.

### For encoders with 1 part number on the nameplate

Part number of the encoder set (consisting of encoder and mount-on parts with the lower part of the integrated encoder connector)

### For encoders with 2 part numbers on the nameplate

Part number of the encoder (without torque bracket and mount-on parts).

1st part number [3] (on the left):

- Manufacturer-neutral part number of the encoder. This part number lists encoders from both manufacturers without any specific sorting.

2nd part number [3] (on the right):

- Manufacturer-specific part number of the encoder.

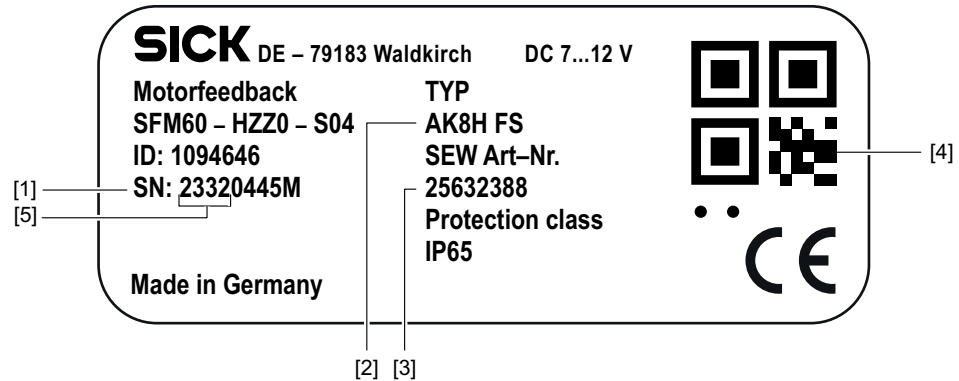
For additional information, see chapter "Manufacturer information about conical encoders" (→ 32) and chapter "Spare parts" (→ 355).



**.K8./.K9. nameplate – Sick**

The following figure shows an example of a nameplate for a Sick encoder. For the structure of the type designation, refer to chapter "Type designation for encoders from SEW-EURODRIVE" (→ 78).

Sick encoders with functional safety have a yellow nameplate.



18014442417046667

- [1] Serial number
- [2] Type designation
- [3] Part number from SEW-EURODRIVE
- [4] QR code
- [5] Manufacturing date in yyww format

The following designs must be taken into account regarding the encoders:

**Design 1**

Manufacturing date up to CW31/2023 (date code 2331): Part number of the encoder set from SEW-EURODRIVE, consisting of encoder and mount-on parts with the lower part of the integrated encoder connector.

**Design 2**

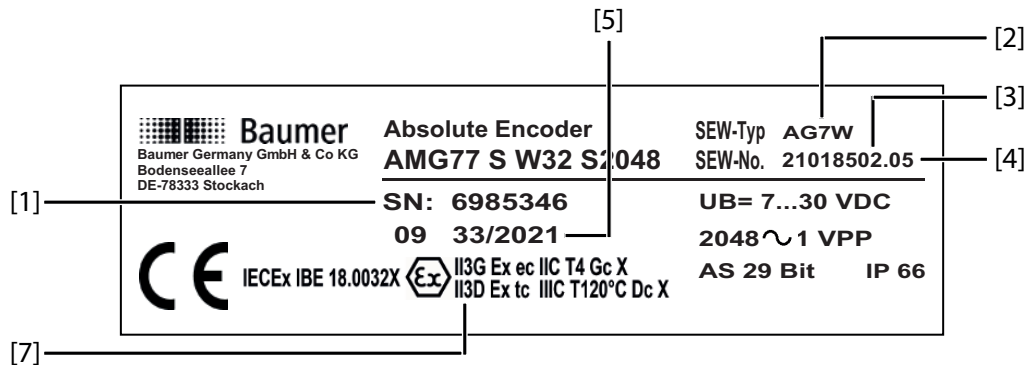
Manufacturing date as of CW32/2023 (date code 2332): Part number of encoders from SEW-EURODRIVE.

For additional information, see chapter "Manufacturer information about conical encoders" (→ 32) and chapter "Spare parts" (→ 355).

### 5.2.8 .S7., .G7. spread/plug-in shaft encoders

#### .S7./G7. nameplate - Baumer

The following figure shows an example of a nameplate for a Baumer encoder. For the structure of the type designation, refer to chapter "Type designation for encoders from SEW-EURODRIVE" (→ 78).



39531662347

- [1] Serial number
- [2] Type designation
- [3] Part number from SEW-EURODRIVE
- [4] Version
- [5] Manufacturing date in ww/yyyy format
- [7] Identifications relating to explosion protection

#### For encoders with 1 part number on the nameplate

Part number of the encoder set (consisting of encoder and mount-on parts with the lower part of the integrated encoder connector)

For additional information, see chapter "Manufacturer information about conical encoders" (→ 32) and chapter "Spare parts" (→ 355).

## 6 Technical data

### 6.1 Use in corrosive, damp, and galvanic environments

The respective information for corrosion protection and surface protection apply for the encoder's operating conditions.

The following encoders are also suitable for the described operating conditions:

Built-in encoders: EI71, EI72, EI76, EI7C, EI8R, EI8C, EI8Z

Add-on encoders: EK8R, EK8C, EK8X, EK8S, EK8W, AK8W, AK8Y, EK8Z, EK9Z, AK8Z

- Proximity to electroplating baths (caustic sodas, phosphoric acids, sulfuric acids, nitric acids); the motor and encoder must not be directly exposed to the electroplating bath
- Environments with salty air and moisture; the encoder has been inspected in accordance with:
  - 1440 h salt spray (salt spray test in accordance with DIN EN ISO 9227 NSS: 2017-07),
  - 720 h condensation (condensation constant climate in accordance with DIN EN ISO 6270-2 CH: 2018-04)
  - 240 h CASS (salt spray test in accordance with DIN EN ISO 9227 CASS: 2017-07; CASS: Copper accelerated salt spray test).

Note that disassembly can be made more difficult by prolonged, excessive exposure of the mount-on parts to salt.

## 6.2 Supply voltage for MOVILINK® DDI electronics

The motor-integrated electronics of MOVILINK® DDI are generally supplied with a voltage of 24 V by an inverter from the MOVI-C® modular automation system. The inverters provide at least 150 mA of current. Depending on the 24 V configuration of the entire drive train, and taking the optional equipment of the motor and the selected inverter into account, the inverter may require an external 24 V backup voltage supply.

The following table provides an overview of the options of the MOVILINK® DDI modular system. The listed values are maximum permitted values that may be required by the options at the minimum permissible supply voltages.

| Option                        | Power demand<br>24 V supply via MOVILINK® DDI |
|-------------------------------|-----------------------------------------------|
| Without encoder               | 60 mA                                         |
| EI8Z built-in encoder         | 115 mA                                        |
| EK8Z encoder                  | 110 mA                                        |
| EK9Z encoder                  | 110 mA                                        |
| AK8Z encoder                  | 110 mA                                        |
| EK8Z safety encoder           | 120 mA                                        |
| EK9Z safety encoder           | 120 mA                                        |
| AK8Z safety encoder           | 120 mA                                        |
| Integrated BG1Z brake control | 40 mA                                         |
| DriveRadar® SensorModule DU1Z | 25 mA                                         |

Example:

A motor with MOVILINK® DDI and EI8Z built-in encoder and integrated brake control has an electronics current demand of 155 mA and must be operated with an additional backup voltage.

## 6.3 Built-in encoders

### 6.3.1 EI7., EI8.

#### EI7.

| Encoder                                                                                          | Size, unit             | EI71 <sup>1)</sup>                                                                                                                                                                               | EI72 <sup>1)</sup> | EI76 <sup>1)</sup> | EI7C <sup>1)</sup> |
|--------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|
| Motor series and size                                                                            |                        | DRN../DRU../DR2.63 – 132S                                                                                                                                                                        |                    |                    |                    |
| Pulse output                                                                                     |                        | HTL                                                                                                                                                                                              |                    |                    |                    |
| Supply voltage                                                                                   | V <sub>B</sub>         | DC 9 V – 30 V                                                                                                                                                                                    |                    |                    |                    |
| Maximum current consumption, free of load                                                        | I <sub>in</sub>        | 120 mA                                                                                                                                                                                           |                    |                    |                    |
| Maximum pulse frequency                                                                          | f <sub>pulse max</sub> | 2.4 kHz                                                                                                                                                                                          |                    |                    |                    |
| Direction of rotation                                                                            |                        | A before B when looking at the motor output shaft in clockwise rotation                                                                                                                          |                    |                    |                    |
| Incremental tracks; periods per revolution                                                       | A, B                   | 1, 2, 6, 24<br>(size 63: 24 only)                                                                                                                                                                |                    |                    |                    |
|                                                                                                  | C                      | –                                                                                                                                                                                                |                    |                    |                    |
| Position resolution, increments per revolution                                                   | A, B                   | 4, 8, 24, 96<br>(size 63: 96 only)                                                                                                                                                               |                    |                    |                    |
| Voltage output signal, differential (peak-to-peak)<br>(A' = A - $\bar{A}$ ; B' = B - $\bar{B}$ ) | V <sub>Ldiff</sub>     | –                                                                                                                                                                                                |                    |                    |                    |
| Voltage output signal, non-differential (peak-to-peak)                                           | V <sub>L</sub>         | V <sub>Low</sub> ≤ 3 V<br>V <sub>High</sub> ≥ U <sub>B</sub> - 3.5 V                                                                                                                             |                    |                    |                    |
| Signal level output, nominal offset against 0 V<br>(A, B, C, $\bar{A}$ , $\bar{B}$ , $\bar{C}$ ) | V <sub>L0</sub>        | –                                                                                                                                                                                                |                    |                    |                    |
| Load current                                                                                     | I <sub>L</sub>         | 60 mA                                                                                                                                                                                            |                    |                    |                    |
| Terminating resistor                                                                             | kΩ                     | 1 – 3                                                                                                                                                                                            |                    |                    |                    |
| Resistance between tracks and reference ground                                                   | R <sub>gnd</sub>       | –                                                                                                                                                                                                |                    |                    |                    |
| Load capacitance, output                                                                         | C <sub>o</sub>         | –                                                                                                                                                                                                |                    |                    |                    |
| Voltage output signal, differential (C' = C - $\bar{C}$ )<br>(peak-to-peak)                      | V <sub>Ldiff e</sub>   | –                                                                                                                                                                                                |                    |                    |                    |
| C track offset                                                                                   | g                      | –                                                                                                                                                                                                |                    |                    |                    |
| Voltage output signal, non-differential (C, $\bar{C}$ )<br>(peak-to-peak)                        | V <sub>Lc</sub>        | –                                                                                                                                                                                                |                    |                    |                    |
| Phase angle track C', n = constant                                                               | k, l                   | –                                                                                                                                                                                                |                    |                    |                    |
| Signal width track C                                                                             | W <sub>c</sub>         | –                                                                                                                                                                                                |                    |                    |                    |
| Signal logic track C                                                                             |                        | –                                                                                                                                                                                                |                    |                    |                    |
| Pulse duty factor in accordance with IEC 60469-1, n = constant                                   |                        | 50% ± 20%                                                                                                                                                                                        |                    |                    |                    |
| Phase offset A : B; $\bar{A}$ : $\bar{B}$<br>n = constant                                        | d                      | 90° ± 20°                                                                                                                                                                                        |                    |                    |                    |
| Incremental part accuracy                                                                        |                        | ±3.75° (±225')                                                                                                                                                                                   |                    |                    |                    |
| Vibration resistance in accordance with EN 60068-2-6                                             |                        | ≤ 10 g (f > 18.5 Hz)                                                                                                                                                                             |                    |                    |                    |
| Shock resistance in accordance with EN 60068-2-27                                                |                        | ≤ 100 g (t = 6 ms, 18 pulses)                                                                                                                                                                    |                    |                    |                    |
| Maximum permissible magnetic field external to the motor (outer motor contour)                   |                        | 25 mT / 20 kA/m                                                                                                                                                                                  |                    |                    |                    |
| Maximum speed                                                                                    | n <sub>max</sub>       | 6000 min <sup>-1</sup>                                                                                                                                                                           |                    |                    |                    |
| Maximum cable length <sup>2)</sup>                                                               |                        | 50 m: MOVI-C® MOVITRAC® advanced inverters from SEW-EURODRIVE with connection to the binary input terminals and 24 V supply<br>100 m: Other inverters from SEW-EURODRIVE or third-party devices. |                    |                    |                    |

| Encoder                                                                   | Size, unit | EI71 <sup>1)</sup>                                                                                                                            | EI72 <sup>1)</sup> | EI76 <sup>1)</sup> | EI7C <sup>1)</sup> |
|---------------------------------------------------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|
| Duration until fault message (deactivated outputs)                        |            | –                                                                                                                                             |                    |                    |                    |
| Activation time of rotary encoder internal diagnostics after switching on |            | –                                                                                                                                             |                    |                    |                    |
| Degree of protection according to EN 60529                                |            | IP66                                                                                                                                          |                    |                    |                    |
| Installation altitude                                                     | h          | ≤ 4000 m above sea level                                                                                                                      |                    |                    |                    |
| Corrosion protection; surface protection                                  |            | KS, OS1 – OS4, OSG                                                                                                                            |                    |                    |                    |
| Connection                                                                |            | Size 63:<br>M12 (8-pin)<br>Size 71 – 132S:<br>M12 (8- or 4-pin)<br>or<br>connection unit (can be preassembled in the field) in a terminal box |                    |                    |                    |
| Ambient temperature of motor                                              | °C         | –40 to +60<br>DR2C: –30 to +60                                                                                                                |                    |                    |                    |
| Storage temperature                                                       | °C         | –15 to +70                                                                                                                                    |                    |                    |                    |
| Maximum angular acceleration                                              |            | 10 <sup>4</sup> rad/s <sup>2</sup>                                                                                                            |                    |                    |                    |
| Electronic nameplate                                                      |            | –                                                                                                                                             |                    |                    |                    |
| Functional safety                                                         |            | –                                                                                                                                             |                    |                    |                    |

1) See figure "HTL/TTL signals and phase relationship".

2) Observe the limitations of the motor and/or the frequency inverter.

## EI8.

## EI8R, EI8C

| Encoder                                                                                           | Unit, size             | EI8R <sup>1)</sup>                                                      | EI8C <sup>1)</sup>                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Motor series and size                                                                             |                        | DRN../DRU../DR2.71 – 132S                                               |                                                                                                                                                                                                  |
| Pulse output                                                                                      |                        | TTL (RS422)                                                             | HTL                                                                                                                                                                                              |
| Supply voltage                                                                                    | V <sub>B</sub>         | DC 7 V – 30 V                                                           | DC 7 V – 30 V                                                                                                                                                                                    |
| Maximum current consumption, free of load                                                         | I <sub>in</sub>        | 100 mA                                                                  |                                                                                                                                                                                                  |
| Maximum pulse frequency                                                                           | f <sub>pulse max</sub> | 102.4 kHz                                                               |                                                                                                                                                                                                  |
| Direction of rotation                                                                             |                        | A before B when looking at the motor output shaft in clockwise rotation |                                                                                                                                                                                                  |
| Incremental tracks; periods per revolution                                                        | A, B                   | 1024 (10 bits)                                                          |                                                                                                                                                                                                  |
|                                                                                                   | C                      | 1                                                                       |                                                                                                                                                                                                  |
| Position resolution, increments per revolution                                                    | A, B                   | 4096 (12 bits)                                                          |                                                                                                                                                                                                  |
| Voltage output signal, differential (peak-to-peak)<br>(A' = A - $\bar{A}$ ; B' = B - $\bar{B}$ )  | V <sub>t, diff</sub>   | –                                                                       |                                                                                                                                                                                                  |
| Voltage output signal, non-differential (peak-to-peak)                                            | V <sub>t</sub>         | V <sub>Low</sub> ≤ 0.5 V<br>V <sub>High</sub> ≥ 2.5 V                   | V <sub>Low</sub> ≤ 3 V<br>V <sub>High</sub> ≥ V <sub>B</sub> - 3.5 V                                                                                                                             |
| Signal level output, offset, nominal against 0 V<br>(A, B, C, $\bar{A}$ , $\bar{B}$ , $\bar{C}$ ) | V <sub>t, o</sub>      | –                                                                       |                                                                                                                                                                                                  |
| Load current                                                                                      | I <sub>L</sub>         | 25 mA                                                                   | 60 mA                                                                                                                                                                                            |
| Terminating resistor                                                                              | kΩ                     | 0.12                                                                    | 1 – 3                                                                                                                                                                                            |
| Resistance between tracks and reference ground                                                    | R <sub>gnd</sub>       | –                                                                       |                                                                                                                                                                                                  |
| Load capacitance, output                                                                          | C <sub>o</sub>         | –                                                                       |                                                                                                                                                                                                  |
| Voltage output signal, differential (C' = C - $\bar{C}$ ) (peak-to-peak)                          | V <sub>t, diff e</sub> | –                                                                       |                                                                                                                                                                                                  |
| C track offset                                                                                    | g                      | –                                                                       |                                                                                                                                                                                                  |
| Voltage output signal, non-differential (C, $\bar{C}$ ) (peak-to-peak)                            | V <sub>t, C</sub>      | V <sub>Low</sub> ≤ 0.5 V<br>V <sub>High</sub> ≥ 2.5 V                   | V <sub>Low</sub> ≤ 3 V<br>V <sub>High</sub> ≥ V <sub>B</sub> - 2.5 V                                                                                                                             |
| Phase angle track C', n = constant                                                                | k, l                   | –                                                                       |                                                                                                                                                                                                  |
| Signal width track C                                                                              | W <sub>C</sub>         | 90° electrical                                                          |                                                                                                                                                                                                  |
| Signal logic track C                                                                              |                        | C = log 1 when A = B = log 1                                            |                                                                                                                                                                                                  |
| Pulse duty factor in accordance with IEC 60469-1, n = constant                                    |                        | 50% ± 10%                                                               |                                                                                                                                                                                                  |
| Phase offset A : B; $\bar{A}$ : $\bar{B}$ n = constant                                            | d                      | 90° ± 20°                                                               |                                                                                                                                                                                                  |
| Incremental part accuracy                                                                         |                        | ± 0.2° (± 720")                                                         |                                                                                                                                                                                                  |
| Vibration resistance in accordance with EN 60068-2-6                                              |                        | ≤ 10 g (f > 18.5 Hz)                                                    |                                                                                                                                                                                                  |
| Shock resistance in accordance with EN 60068-2-27                                                 |                        | ≤ 100 g (t = 6 ms, 18 pulses)                                           |                                                                                                                                                                                                  |
| Maximum permissible magnetic field external to the motor (outer motor contour)                    |                        | 25 mT / 20 kA/m                                                         |                                                                                                                                                                                                  |
| Maximum speed                                                                                     | n <sub>max</sub>       | 6000 min <sup>-1</sup>                                                  |                                                                                                                                                                                                  |
| Maximum cable length <sup>2)</sup>                                                                |                        | 100 m                                                                   | 50 m: MOVI-C® MOVITRAC® advanced inverters from SEW-EURODRIVE with connection to the binary input terminals and 24 V supply<br>100 m: Other inverters from SEW-EURODRIVE or third-party devices. |
| Duration until fault message (deactivated outputs)                                                |                        | –                                                                       |                                                                                                                                                                                                  |

| Encoder                                                                   | Unit, size | EI8R <sup>1)</sup>                                                                                                                                                                                                                                              | EI8C <sup>1)</sup>       |
|---------------------------------------------------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Activation time of rotary encoder internal diagnostics after switching on |            | –                                                                                                                                                                                                                                                               |                          |
| Degree of protection according to EN 60529                                |            | IP66                                                                                                                                                                                                                                                            |                          |
| Installation altitude                                                     | h          | ≤ 4000 m above sea level                                                                                                                                                                                                                                        | ≤ 4000 m above sea level |
| Corrosion protection; surface protection                                  |            | KS, OS1 – OS4, OSG                                                                                                                                                                                                                                              |                          |
| Connection                                                                |            | <ul style="list-style-type: none"> <li>• M23 connector</li> <li>• Connection unit with terminals in the terminal box that can be assembled in the field</li> <li>• M12 connector (without negated tracks in non-differential/single-ended operation)</li> </ul> |                          |
| Ambient temperature of motor                                              | °C         | -30 to +60                                                                                                                                                                                                                                                      |                          |
| Storage temperature                                                       | °C         | -15 to +70                                                                                                                                                                                                                                                      |                          |
| Maximum angular acceleration                                              |            | 10 <sup>4</sup> rad/s <sup>2</sup>                                                                                                                                                                                                                              |                          |
| Electronic nameplate                                                      |            | –                                                                                                                                                                                                                                                               |                          |
| Functional safety                                                         |            | –                                                                                                                                                                                                                                                               |                          |

1) See figure "HTL/TTL signals and phase relationship".

2) Observe the limitations of the motor and/or the frequency inverter.



## EI8Z

|                                                                              | Size, unit       | EI8Z                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Capability class                                                             |                  | Medium class                                                                                                                                                                                                                                                                                  |
| Motor series and size                                                        |                  | DRN../DRU../DR2.71 – 132S                                                                                                                                                                                                                                                                     |
| Combination of brake/brake control                                           |                  | With motor-integrated BG1Z brake control: BE.. brake<br>With motor-external brake control: BE.. brake, BE.. safety brake                                                                                                                                                                      |
| Combination of motor protection/temperature                                  |                  | Motor protection: TF (in winding)<br>Motor protection/motor temperature: PI (Pt1000 in stator housing and motor temperature model with inverters from the MOVI-C® modular automation system)                                                                                                  |
| Combination of forced cooling fans                                           |                  | ✓                                                                                                                                                                                                                                                                                             |
| In combination with frequency inverters                                      |                  | MOVI-C® modular automation system<br>• Control cabinet devices: MOVIDRIVE® modular, MOVIDRIVE® technology, MOVIDRIVE® system, MOVITRAC® advanced<br>• Decentralized inverters mounted close to the motor: MOVIMOT® flexible<br>• Motor-integrated, decentralized inverters: MOVIMOT® advanced |
| Encoder type                                                                 |                  | Incremental encoder                                                                                                                                                                                                                                                                           |
| Encoder sensors                                                              |                  | Magnetic                                                                                                                                                                                                                                                                                      |
| Interface                                                                    |                  | MOVILINK® DDI, coaxial                                                                                                                                                                                                                                                                        |
| MOVILINK® DDI type code                                                      |                  | DI.E..                                                                                                                                                                                                                                                                                        |
| Electronic nameplate                                                         |                  | ET2000 (MOVILINK® DDI, integrated)                                                                                                                                                                                                                                                            |
| Voltage supply                                                               |                  | DC 24 V (MOVILINK® DDI, integrated)                                                                                                                                                                                                                                                           |
| Current requirement (DC 24 V via MOVILINK® DDI)                              |                  | 107 mA (without encoder: 60 mA)                                                                                                                                                                                                                                                               |
| Run-up time after switching on                                               | ms               | < 3000                                                                                                                                                                                                                                                                                        |
| Duration until fault message <sup>1)</sup> (de-activated outputs)            | ms               | –                                                                                                                                                                                                                                                                                             |
| Response time <sup>2)</sup> (Position, speed, acceleration)                  | ms               | 1                                                                                                                                                                                                                                                                                             |
| Incremental resolution (Position increments per motor revolution)            | A, B             | 4096 inc (12 bits)                                                                                                                                                                                                                                                                            |
| Single-turn resolution (Position resolution per motor revolution)            |                  | –                                                                                                                                                                                                                                                                                             |
| Multi-turn resolution (maximum counter value for complete motor revolutions) |                  | –                                                                                                                                                                                                                                                                                             |
| Accuracy of the incremental section <sup>3)</sup>                            |                  | ±0.2° (±720")                                                                                                                                                                                                                                                                                 |
| Accuracy of the absolute section                                             |                  | –                                                                                                                                                                                                                                                                                             |
| Maximum permitted magnetic field external to the motor                       |                  | Outer contour of the motor:<br>25 mT / 20 kA/m                                                                                                                                                                                                                                                |
| Vibration resistance in accordance with EN 60068-2-6                         |                  | ≤ 10 g (f > 18.5 Hz)                                                                                                                                                                                                                                                                          |
| Shock resistance in accordance with EN 60068-2-27                            |                  | ≤ 100 g (t = 6 ms, 18 pulses)                                                                                                                                                                                                                                                                 |
| Maximum speed                                                                | n <sub>max</sub> | 6000 min <sup>-1</sup>                                                                                                                                                                                                                                                                        |
| Maximum angular acceleration                                                 |                  | –                                                                                                                                                                                                                                                                                             |
| Degree of protection in accordance with EN 60529                             |                  | IP66                                                                                                                                                                                                                                                                                          |
| Corrosion and surface protection                                             |                  | KS, OS1 – OS4, OSG                                                                                                                                                                                                                                                                            |
| Installation altitude <sup>4)</sup>                                          | h                | ≤ 3866 m                                                                                                                                                                                                                                                                                      |
| Ambient temperature of motor <sup>4)</sup>                                   | °C               | With control cabinet inverters from the MOVI-C® modular automation system and MOVIMOT® flexible decentralized inverter: -30 – +60<br>With MOVIMOT® advanced decentralized inverters: See the MOVIMOT® advanced operating instructions/manual                                                  |
| Cable length, maximum <sup>5)</sup>                                          | l                | 200 m                                                                                                                                                                                                                                                                                         |

|                       | Size,<br>unit | EI8Z                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Connection technology |               | KD1: M23 hybrid connector on the terminal box, 1.5 – 4.0 mm <sup>2</sup> motor connection, 1.0 mm <sup>2</sup> brake connection<br>KDB: M40 hybrid connector on the terminal box, 6.0 – 10.0 mm <sup>2</sup> motor connection, 1.5 mm <sup>2</sup> brake connection<br>KD: Cable gland on the terminal box for hybrid cables with 1.5 – 10 mm <sup>2</sup> motor connection and 1 – 1.5 mm <sup>2</sup> brake connection<br>KDD: Motor and brake connection via cable gland; M23 signal connector on the terminal box |
| Explosion protection  |               | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Functional safety     |               | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

- 1) The safety encoder has a self-diagnostic function. If a fault is detected, the sensor reports it to the evaluation electronics by deactivating the output signals (CS..A safety option).
- 2) In addition, observe the filter times set in the CS..A safety option.
- 3) Due to the stiffness of the torque bracket, you have to take into account an automatically resetting  $\pm 0.6^\circ$  twist (depending on the direction of rotation) of the encoder housing compared to the encoder shaft.
- 4) Observe the restrictions of the ambient temperature and potential derating of the respective motor/inverter when used at an increased ambient temperature and/or depending on the installation altitude.
- 5) Also dependent on the selected inverter type and configured PWM frequency and/or brake type; see documentation of the respective inverters.

## 6.3.2 EI7C FS

| Encoder                                                                        | Size, unit       | EI7C FS                                                                                           |
|--------------------------------------------------------------------------------|------------------|---------------------------------------------------------------------------------------------------|
| Motor series and size                                                          |                  | DRN../DRU../DR2.71 – 132S                                                                         |
| Pulse output                                                                   |                  | HTL                                                                                               |
| Supply voltage                                                                 | $V_B$            | DC 19.2 V – 30 V<br>Exclusively SEL/PELV circuits in accordance with DIN EN 61131-2 are permitted |
| Maximum current consumption, free of load                                      | $I_{in}$         | 120 mA                                                                                            |
| Maximum output current per track                                               | $I_{in}$         | ±30 mA                                                                                            |
| Maximum pulse frequency                                                        | $f_{pulse\ max}$ | 1.44 kHz                                                                                          |
| Direction of rotation                                                          |                  | A before B when looking at the motor output shaft in clockwise rotation                           |
| Periods per revolution                                                         | A, B             | 24                                                                                                |
|                                                                                | C                | –                                                                                                 |
| Increments per revolution                                                      | A, B             | 96                                                                                                |
| Voltage output signal non-differential (peak-to-peak)                          | $V_t$            | $V_{Low} \leq 3\ V$<br>$V_{High} \geq U_B - 3.5\ V$                                               |
| Pulse duty factor in accordance with IEC 60469-1, n = constant                 |                  | 50% ± 20%                                                                                         |
| Phase offset A : B; $\bar{A}$ : $\bar{B}$<br>n = constant                      | d                | 90° ± 20°                                                                                         |
| Vibration resistance in accordance with EN 60068-2-6                           |                  | ≤ 10 g (5 – 2000 Hz)                                                                              |
| Shock resistance in accordance with EN 60068-2-27                              |                  | ≤ 100 g (t = 6 ms, 18 pulses)                                                                     |
| Maximum permissible magnetic field external to the motor (outer motor contour) |                  | 25 mT / 20 kA/m                                                                                   |
| Maximum speed                                                                  | $n_{max}$        | 3600 min <sup>-1</sup>                                                                            |
| Maximum angular acceleration                                                   | $n_{max}$        | 3000 rad/s <sup>2</sup>                                                                           |
| Maximum cable length <sup>1)</sup>                                             |                  | 100 m                                                                                             |
| Duration until fault message <sup>2)</sup> (deactivated outputs)               |                  | min. 100 ms – max. 300 ms                                                                         |
| Output leakage current in deactivated state (= fault message) <sup>2)</sup>    |                  | 250 µA                                                                                            |
| Activation time of the encoder-internal diagnostics after switching on         |                  | 300 ms (from $V_B > 9\ V$ )                                                                       |
| Degree of protection according to EN 60529                                     |                  | IP66                                                                                              |
| Installation altitude                                                          | h                | ≤ 3800 m above sea level                                                                          |
| Corrosion protection; surface protection                                       |                  | KS, OS1 – OS4, OSG                                                                                |
| Connection                                                                     |                  | M12 (8-pin) without temperature sensor <sup>3)</sup>                                              |
| Ambient temperature of motor                                                   | °C               | -30 to +60                                                                                        |
| Storage temperature                                                            | °C               | -15 to +70                                                                                        |
| Maximum angular acceleration                                                   |                  | 10 <sup>4</sup> rad/s <sup>2</sup>                                                                |
| Electronic nameplate                                                           |                  | –                                                                                                 |
| Functional safety                                                              |                  | ✓                                                                                                 |

1) Observe the limitations of the motor and/or the frequency inverter.

2) The EI7C FS built-in encoder has a self-diagnostic function. If a fault is detected, the system reports it to the encoder evaluation unit by deactivating the output signals.

3) In the case of EI7C FS built-in encoders, the motor temperature sensor may not be included in the encoder cable due to functional safety requirements.

### 6.3.3 Increase in inertia

|                                  |                                                                         |
|----------------------------------|-------------------------------------------------------------------------|
| $J_{\text{mot}}$                 | Mass moment of inertia of the motor                                     |
| $J_{\text{EI7}}, J_{\text{EI8}}$ | Mass moment of inertia of the pole ring fan of the EI7. or EI8. encoder |
| $J_{\text{PO}}$                  | Mass moment of inertia of the standard plastic fan of the motor         |

#### EI7., EI7C FS

| Motor                | $J_{\text{mot}} + J_{\text{EI7}} - J_{\text{PO}}$<br>$10^{-4} \text{ kgm}^2$ | Increase in inertia<br>% |
|----------------------|------------------------------------------------------------------------------|--------------------------|
| DRN63MS              | 3.4                                                                          | 14                       |
| DRN63M               | 4.2                                                                          | 11                       |
| DRN../DRU../DR2.71MS | 8                                                                            | 48                       |
| DRN../DRU../DR2.71M  | 9.7                                                                          | 36                       |
| DRN../DRU../DR2.80MK | 19.5                                                                         | 14                       |
| DRN../DRU../DR2.80MS | 21                                                                           | 14                       |
| DRN../DRU../DR2.80M  | 27.2                                                                         | 10                       |
| DRN../DRU../DR2.90S  | 64.3                                                                         | 19                       |
| DRN../DRU../DR2.90L  | 77.5                                                                         | 15                       |
| DRN100LS             | 91.7                                                                         | 13                       |
| DRN100LM             | 100                                                                          | 11                       |
| DRN100L              | 121.6                                                                        | 9                        |
| DRN../DRU../DR2.112M | 192                                                                          | 8                        |
| DRN../DRU../DR2.132S | 255                                                                          | 6                        |

#### EI8.

| Motor                | $J_{\text{mot}} + J_{\text{EI8}} - J_{\text{PO}}$<br>$10^{-4} \text{ kgm}^2$ | Increase in inertia<br>% |
|----------------------|------------------------------------------------------------------------------|--------------------------|
| DRN../DRU../DR2.71MS | 5.65                                                                         | 4                        |
| DRN../DRU../DR2.71M  | 7.37                                                                         | 3                        |
| DRN../DRU../DR2.80MK | 16.7                                                                         | -2                       |
| DRN../DRU../DR2.80MS | 18.1                                                                         | -2                       |
| DRN../DRU../DR2.80M  | 24.3                                                                         | -2                       |
| DRN../DRU../DR2.90S  | 53.3                                                                         | -1                       |
| DRN../DRU../DR2.90L  | 66.5                                                                         | -1                       |
| DRN100LS             | 80.7                                                                         | -1                       |
| DRN100LM             | 89.0                                                                         | -1                       |
| DRN100L              | 111.3                                                                        | -1                       |
| DRN../DRU../DR2.112M | 179.6                                                                        | 1                        |
| DRN../DRU../DR2.132S | 242.6                                                                        | 1                        |

## 6.4 Add-on encoders

### 6.4.1 EK8. EK9. EV8.

#### EK8.

EK8S, EK8R, EK8C

| Encoder                                                                                         | Size, unit       | EK8S                                                                    | EK8R                                          | EK8C                                                                    |
|-------------------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------|-----------------------------------------------|-------------------------------------------------------------------------|
| Motor series and size                                                                           |                  | DRN../DRU../DR2.63 – 355                                                |                                               |                                                                         |
| Pulse output                                                                                    |                  | Sin/cos                                                                 | TTL (RS422)                                   | HTL/TTL                                                                 |
| Supply voltage                                                                                  | $V_B$            | DC 7 V – 30 V                                                           | DC 7 V – 30 V                                 | DC 4.75 V – 30 V                                                        |
| Supply voltage for design as safety encoder                                                     | $V_{BFS}$        | DC 7 V – 30 V                                                           | Without specification                         | Without specification                                                   |
| Maximum current consumption, free of load                                                       | $I_{in}$         | 100 mA (at $V_B = 7$ V)                                                 |                                               |                                                                         |
| Maximum pulse frequency                                                                         | $f_{pulse\ max}$ | 150 kHz                                                                 | 120 kHz                                       | 120 kHz                                                                 |
| Direction of rotation                                                                           |                  | A before B when looking at the motor output shaft in clockwise rotation |                                               |                                                                         |
| Incremental tracks; periods per revolution                                                      | A, B             | 1024 (10 bits)                                                          |                                               |                                                                         |
|                                                                                                 | C                | 1                                                                       |                                               |                                                                         |
| Position resolution, increments per revolution                                                  | A, B             | 4096 (12 bits)                                                          |                                               |                                                                         |
| Voltage output signal differential (peak-to-peak) ( $B' = B - \bar{B}$ ) ( $A' = A - \bar{A}$ ) | $V_{t\ diff}$    | 1 V $\pm$ 10%                                                           | Typical: $\geq 2$ V                           | Typical: $\geq 2$ V                                                     |
| Voltage output signal non-differential (peak-to-peak)                                           | $V_t$            | 0.5 V $\pm$ 10%                                                         | $V_{Low} \leq 0.5$ V<br>$V_{High} \geq 2.5$ V | $V_B \leq 6$ V: TTL<br>$V_{Low} \leq 0.5$ V<br>$V_{High} \geq 2.5$ V    |
|                                                                                                 |                  |                                                                         |                                               | $V_B > 6$ V: HTL<br>$V_{Low} \leq 3$ V<br>$V_{High} \geq (V_B - 2.5)$ V |
| Signal level output, nominal offset against 0 V ( $A, B, C, \bar{A}, \bar{B}, \bar{C}$ )        | $V_{tO}$         | 2.5 V $\pm$ 0.3 V                                                       | Without specification                         | Without specification                                                   |
| Total harmonic distortion (THD)                                                                 |                  | 40 dB (1%), 60 dB (0.1%) from 7th harmonic                              | Without specification                         | Without specification                                                   |
| Load resistance/load current, differential                                                      | $R_L/I_L$        | 120 $\Omega \pm$ 10%                                                    | 120 $\Omega \pm$ 10%                          | $V_B \leq 6$ V:<br>120 $\Omega \pm$ 10%                                 |
|                                                                                                 |                  |                                                                         |                                               | $V_B > 6$ V:<br>1 – 3 k $\Omega$                                        |
| Resistance between tracks and reference ground                                                  | $R_{gnd}$        | $\geq 1$ k $\Omega$                                                     | Without specification                         | Without specification                                                   |
| Load capacitance, output                                                                        | $C_o$            | $\leq 20$ nF                                                            | Without specification                         | Without specification                                                   |
| Voltage output signal, differential ( $C' = C - \bar{C}$ ) (peak-to-peak)                       | $V_{t\ diff\ e}$ | 0.3 – 1.4 V                                                             | Typical: $\geq 2$ V                           | Typical: $\geq 2$ V                                                     |
| C track offset                                                                                  | g                | 192 mV $\pm$ 5 mV                                                       | Without specification                         | Without specification                                                   |
| Voltage output signal, non-differential ( $C, \bar{C}$ ) (peak-to-peak)                         | $V_{tC}$         | Without specification                                                   | $V_{Low} \leq 0.5$ V<br>$V_{High} \geq 2.5$ V | $V_B \leq 6$ V: TTL<br>$V_{Low} \leq 0.5$ V<br>$V_{High} \geq 2.5$ V    |
|                                                                                                 |                  |                                                                         |                                               | $V_B > 6$ V: HTL<br>$V_{Low} \leq 3$ V<br>$V_{High} \geq (V_B - 2.5)$ V |
| Phase angle track $C'$ , $n = \text{constant}$                                                  | k, l             | k = 180° $\pm$ 90°<br>l = 180° $\pm$ 90°                                | See "Signal logic track C"                    | See "Signal logic track C"                                              |
| Signal width track C                                                                            | $W_C$            | See "Phase relationships" ( $\rightarrow$ 136)                          | 90° electrical                                | 90° electrical                                                          |
| Signal logic track C                                                                            |                  | See "Phase relationships" ( $\rightarrow$ 136)                          | C = log 1, when<br>A = B = log 1              | C = log 1, when<br>A = B = log 1                                        |
| Pulse duty factor in accordance with IEC 60469-1, $n = \text{constant}$                         |                  | Without specification                                                   | 50% $\pm$ 10%                                 | 50% $\pm$ 10%                                                           |
| Phase offset A : B; $\bar{A}$ : $\bar{B}$<br>$n = \text{constant}$                              | d                | 90° $\pm$ 2°                                                            | 90° $\pm$ 20°                                 | 90° $\pm$ 20°                                                           |
| Vibration resistance in accordance with EN 60068-2-6                                            |                  | $\leq 10$ g ( $f > 18.5$ Hz)                                            |                                               |                                                                         |

| Encoder                                                                        |                          | Size, unit       | EK8S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | EK8R                | EK8C                     |
|--------------------------------------------------------------------------------|--------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------------|
| Shock resistance in accordance with EN 60068-2-27                              |                          |                  | ≤ 100 g (t = 6 ms, 18 pulses)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                     |                          |
| Accuracy of the incremental section <sup>1)</sup>                              |                          |                  | ±0.0194° (±70")                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ±0.033° (±120")     | ±0.033° (±120")          |
| Accuracy of the absolute section                                               |                          |                  | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | –                   | –                        |
| Maximum permissible magnetic field external to the motor (outer motor contour) |                          |                  | 25 mT / 20 kA/m (on the encoder housing: 10 mT / 8 kA/m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |                          |
| Maximum speed                                                                  |                          | n <sub>max</sub> | 6000 min <sup>-1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                     |                          |
| Maximum cable length <sup>2)</sup>                                             |                          |                  | 100 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 300 m <sup>3)</sup> | 50 – 300 m <sup>4)</sup> |
| Duration until fault message <sup>5)</sup> (deactivated outputs)               |                          |                  | ≤ 25 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | –                   | –                        |
| Activation time of encoder-internal diagnostics after switching on             |                          |                  | ≤ 200 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | –                   | –                        |
| Degree of protection according to EN 60529                                     |                          |                  | IP66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |                          |
| Installation altitude                                                          |                          | h                | ≤ 4000 m above sea level                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |                          |
|                                                                                |                          |                  | In areas at risk of explosion: Permitted external pressure 0.8 – 1.1 bar (at typical altitude ≤ 1800 m above sea level)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |                          |
| Explosion protection marking ATEX/IECEX                                        |                          |                  | ATEX equipment category 3 (3G, 3D, 3GD)<br>II3G Ex ec IIC T4 Gc<br>II3D Ex tc IIIC T120°C Dc<br>IECEX EPL .c (3G-c, 3D-c, 3GD-c)<br>Ex ec IIC T4 Gc<br>Ex tc IIIC T120°C Dc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |                          |
| IECEX certificate of conformity depending on encoder                           |                          |                  | IECEX IBE 18.0032X<br>IECEX CSA 21.0010X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |                          |
| Corrosion protection; surface protection                                       |                          |                  | KS, OS1 – OS4, OSG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |                          |
| Connection                                                                     |                          |                  | <ul style="list-style-type: none"> <li>• M23 connector on the terminal box (optionally with or without temperature sensor)</li> <li>• Terminal strip in the terminal box (optionally with or without temperature sensor)</li> <li>• M23 connector with 0.36 m cable directly on the encoder (without temperature sensor)</li> <li>• Integrated encoder connector on the fan guard side (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor</li> <li>• Integrated encoder connector at the rear of the fan guard (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor<sup>6)</sup></li> </ul> |                     |                          |
| Ambient temperature of motor                                                   | DRN../DR2../DRU63 – 132L | °C               | -30 to +80<br>With FS encoder:<br>-30 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -30 to +60          | -30 to +60               |
|                                                                                | DRN../DR2../DRU160 – 355 | °C               | -30 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -30 to +60          | -30 to +60               |
|                                                                                | EDRN71 – 280             | °C               | -30 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -30 to +60          | -30 to +60               |
|                                                                                | EDRN280M                 | °C               | -30 to +40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -30 to +60          | -30 to +60               |
| Storage temperature                                                            |                          | °C               | -15 to +70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     |                          |
| Maximum angular acceleration                                                   |                          |                  | 2x10 <sup>4</sup> rad/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |                          |
| Electronic nameplate                                                           |                          |                  | RS485 (serial, asynchronous); 1920 bytes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | –                   | –                        |
| Maximum degree of pollution during installation work                           |                          |                  | Degree of pollution 1 (IEC 61010-1, EN 60664-1, VDE 0110-1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |                          |

| Encoder           | Size, unit | EK8S | EK8R | EK8C |
|-------------------|------------|------|------|------|
| Functional safety |            | ✓    | –    | –    |

- 1) Due to the stiffness of the torque bracket, you have to take into account an automatically resetting twist of  $\pm 0.6^\circ$  (depending on the direction of rotation) of the encoder housing compared to the encoder shaft.
- 2) Observe the requirements for the cables and the supply voltage.
- 3) Cable length 300 m: Observe the voltage drop on the encoder signal cable and the requirements of the minimum input levels of the encoder evaluation card.
- 4) 50 m: MOVI-C<sup>®</sup> MOVITRAC<sup>®</sup> advanced inverters from SEW-EURODRIVE with connection to the binary input terminals and 24 V supply; 300 m: Inverters from the MOVI-C<sup>®</sup> modular automation system from SEW-EURODRIVE or generation B inverters with DEU21B encoder cards, or with an encoder supply up to max. 12 V; 100 m: in all other cases.
- 5) The encoder has a self-diagnostic function. If a fault is detected, the sensor reports it to the encoder evaluation unit by deactivating the output signals.
- 6) Note that the permissible ambient temperature of the motor is limited with this connection variant. Contact SEW-EURODRIVE with regard to this.

EK8X

| Encoder                                                                                         | Size, unit       | EK8X                                                                    |
|-------------------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------|
| Motor series and size                                                                           |                  | DRN../DRU../DR2.63 – 355                                                |
| Pulse output                                                                                    |                  | HTL/TTL                                                                 |
| Supply voltage                                                                                  | $V_B$            | DC 4.75 V – 30 V                                                        |
| Supply voltage for design as safety encoder                                                     | $V_{B\_FS}$      | Without specification                                                   |
| Maximum current consumption, free of load                                                       | $I_{in}$         | 100 mA (at $V_B = 7$ V)                                                 |
| Maximum pulse frequency                                                                         | $f_{pulse\_max}$ | 120 kHz                                                                 |
| Direction of rotation                                                                           |                  | A before B when looking at the motor output shaft in clockwise rotation |
| Incremental tracks; periods per revolution                                                      | A, B             | 1, 2, 6, 24, 100, 128, 1024 (adjustable)                                |
|                                                                                                 | C                | 1 (at resolution of 1024 periods per revolution only)                   |
| Position resolution, increments per revolution                                                  | A, B             | 4, 8, 24, 96, 400, 512, 4096                                            |
| Voltage output signal differential (peak-to-peak) ( $B' = B - \bar{B}$ ) ( $A' = A - \bar{A}$ ) | $V_{t\_diff}$    | Typical: $\geq 2$ V                                                     |
| Voltage output signal non-differential (peak-to-peak)                                           | $V_t$            | $V_B \leq 6$ V: TTL<br>$V_{Low} \leq 0.5$ V<br>$V_{High} \geq 2.5$ V    |
|                                                                                                 |                  | $V_B > 6$ V: HTL<br>$V_{Low} \leq 3$ V<br>$V_{High} \geq (V_B - 2.5$ V) |
| Signal level output, nominal offset against 0 V ( $A, B, C, \bar{A}, \bar{B}, \bar{C}$ )        | $V_{t\_o}$       | Without specification                                                   |
| Total harmonic distortion (THD)                                                                 |                  | Without specification                                                   |
| Load resistance/load current, differential                                                      | $R_L/I_L$        | $V_B \leq 6$ V:<br>120 $\Omega \pm 10\%$                                |
|                                                                                                 |                  | $V_B > 6$ V:<br>1 – 3 k $\Omega$                                        |
| Resistance between tracks and reference ground                                                  | $R_{gnd}$        | Without specification                                                   |
| Load capacitance, output                                                                        | $C_o$            | Without specification                                                   |
| Voltage output signal, differential ( $C' = C - \bar{C}$ ) (peak-to-peak)                       | $V_{t\_diff\_e}$ | Typical: $\geq 2$ V                                                     |
| C track offset                                                                                  | g                | Without specification                                                   |
| Voltage output signal, non-differential ( $C, \bar{C}$ ) (peak-to-peak)                         | $V_{t\_c}$       | $V_B \leq 6$ V: TTL<br>$V_{Low} \leq 0.5$ V<br>$V_{High} \geq 2.5$ V    |
|                                                                                                 |                  | $V_B > 6$ V: HTL<br>$V_{Low} \leq 3$ V<br>$V_{High} \geq (V_B - 2.5$ V) |
| Phase angle track $C'$ , $n = \text{constant}$                                                  | k, l             | See "Signal logic track C"                                              |
| Signal width track C                                                                            | $W_c$            | 90° electrical                                                          |
| Signal logic track C                                                                            |                  | $C = \log 1$ , when $A = B = \log 1$                                    |
| Pulse duty factor in accordance with IEC 60469-1, $n = \text{constant}$                         |                  | 50% $\pm 10\%$                                                          |
| Phase offset A : B; $\bar{A} : \bar{B}$ $n = \text{constant}$                                   | d                | 90° $\pm 20^\circ$                                                      |
| Vibration resistance in accordance with EN 60068-2-6                                            |                  | $\leq 10$ g ( $f > 18.5$ Hz)                                            |
| Shock resistance in accordance with EN 60068-2-27                                               |                  | $\leq 100$ g ( $t = 6$ ms, 18 pulses)                                   |
| Accuracy of the incremental section <sup>1)</sup>                                               |                  | $\pm 0.033^\circ$ ( $\pm 120''$ )                                       |
| Accuracy of the absolute section                                                                |                  | –                                                                       |
| Maximum permissible magnetic field external to the motor (outer motor contour)                  |                  | 25 mT / 20 kA/m (on the encoder housing: 10 mT / 8 kA/m)                |
| Maximum speed                                                                                   | $n_{max}$        | 6000 min <sup>-1</sup>                                                  |
| Maximum cable length <sup>2)</sup>                                                              |                  | 50 – 300 m <sup>3)</sup>                                                |

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| Encoder                                                            |                          | Size, unit | EK8X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------|--------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Duration until fault message (deactivated outputs)                 |                          |            | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Activation time of encoder-internal diagnostics after switching on |                          |            | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Degree of protection according to EN 60529                         |                          |            | IP66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Installation altitude                                              |                          |            | ≤ 4000 m above sea level                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                    |                          | h          | In areas at risk of explosion: Permitted external pressure 0.8 – 1.1 bar (at typical altitude ≤ 1800 m above sea level)                                                                                                                                                                                                                                                                                                                                                                              |
| Explosion protection marking ATEX/IECEX                            |                          |            | ATEX equipment category 3 (3G, 3D, 3GD)<br>II3G Ex ec IIC T4 Gc<br>II3D Ex tc IIIC T120°C Dc<br>IECEX EPL .c (3G-c, 3D-c, 3GD-c)<br>Ex ec IIC T4 Gc<br>Ex tc IIIC T120°C Dc                                                                                                                                                                                                                                                                                                                          |
| IECEX certificate of conformity depending on encoder               |                          |            | IECEX IBE 18.0032X<br>IECEX CSA 21.0010X                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Corrosion protection; surface protection                           |                          |            | KS, OS1 – OS4, OSG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Connection                                                         |                          |            | <ul style="list-style-type: none"> <li>Terminal strip in the terminal box (optionally with or without temperature sensor)</li> <li>Integrated encoder connector on the fan guard side (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor</li> <li>Integrated encoder connector at the rear of the fan guard (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor<sup>4)</sup></li> </ul> |
| Ambient temperature of motor                                       | DRN../DR2../DRU63 – 132L | °C         | -30 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                    | DRN../DR2../DRU160 – 355 | °C         | -30 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                    | EDRN71 – 280             | °C         | -30 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                    | EDRN280M                 | °C         | -30 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Storage temperature                                                |                          | °C         | -15 to +70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Maximum angular acceleration                                       |                          |            | 2x10 <sup>4</sup> rad/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Electronic nameplate                                               |                          |            | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Maximum degree of pollution during installation work               |                          |            | Degree of pollution 1 (IEC 61010-1, EN 60664-1, VDE 0110-1)                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Functional safety                                                  |                          |            | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

1) Due to the stiffness of the torque bracket, you have to take into account an automatically resetting twist of ±0.6° (depending on the direction of rotation) of the encoder housing compared to the encoder shaft.

2) Observe the requirements for the cables and the supply voltage.

3) 50 m: MOVI-C® MOVITRAC® advanced inverters from SEW-EURODRIVE with connection to the binary input terminals and 24 V supply; 300 m: Inverters from the MOVI-C® modular automation system from SEW-EURODRIVE or generation B inverters with DEU21B encoder cards, or with an encoder supply up to max. 12 V; 100 m: in all other cases.

4) Note that the permissible ambient temperature of the motor is limited with this connection variant. Contact SEW-EURODRIVE with regard to this.

## EK8W

Note the following regarding the encoder interfaces:

The electrical specifications of encoders with the ...W interface (sin/cos + RS485) correspond to the sin/cos signal definitions of the HIPERFACE® interface. However, in the digital interface RS485, they deviate from the HIPERFACE® standard and are only suitable for operation on inverters from SEW-EURODRIVE.

| Encoder                                                                                               | Size, unit       | EK8W                                                                    |
|-------------------------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------|
| Motor series and size                                                                                 |                  | DRN../DRU../DR2.63 – 355                                                |
| Pulse output                                                                                          |                  | sin/cos + RS485                                                         |
| Supply voltage                                                                                        | $V_B$            | DC 7 V – 30 V                                                           |
| Supply voltage for design as safety encoder                                                           | $V_{B\_FS}$      | DC 7 V – 30 V                                                           |
| Maximum current consumption, free of load                                                             | $I_{in}$         | 100 mA (at $V_B = 7$ V)                                                 |
| Maximum pulse frequency                                                                               | $f_{pulse\_max}$ | 200 kHz                                                                 |
| Direction of rotation                                                                                 |                  | A before B when looking at the motor output shaft in clockwise rotation |
| Incremental tracks; periods per revolution                                                            | A, B             | 2048 (11 bits)                                                          |
|                                                                                                       | C                | –                                                                       |
| Position resolution, increments per revolution                                                        | A, B             | 65536 (16 bits)<br>(RS485)                                              |
| Voltage output signal, differential<br>(peak-to-peak)<br>(A' = A - $\bar{A}$ ; B' = B - $\bar{B}$ )   | $V_{t\_diff}$    | 1 V $\pm$ 10%                                                           |
| Voltage output signal<br>non-differential<br>(peak-to-peak)                                           | $V_t$            | 0.5 V $\pm$ 10%                                                         |
| Signal level output, offset<br>nominal against 0 V<br>(A, B, C, $\bar{A}$ , $\bar{B}$ , $\bar{C}$ ) V | $V_{t\_o}$       | 2.5 V $\pm$ 0.3 V                                                       |
| Total harmonic distortion (THD)                                                                       |                  | 40 dB (1%), 60 dB (0.1%) from 7th harmonic                              |
| Load resistance/load current<br>differential                                                          | $R_L/I_L$        | 120 $\Omega \pm$ 10%                                                    |
| Resistance between track and reference<br>ground                                                      | $R_{gnd}$        | $\geq$ 1 k $\Omega$                                                     |
| Load capacitance, output                                                                              |                  | $\leq$ 20 nF                                                            |
| Voltage output signal,<br>differential (C' = C - $\bar{C}$ )<br>(peak-to-peak)                        | $V_{t\_diff\_e}$ | –                                                                       |
| C track offset                                                                                        | g                | –                                                                       |
| Voltage output signal, non-differential (C, $\bar{C}$ )<br>(peak-to-peak)                             | $V_{t\_C}$       | –                                                                       |
| Phase angle track C',<br>n = constant                                                                 | k, l             | –                                                                       |
| Signal width track C                                                                                  | $W_C$            | –                                                                       |
| Signal logic track C                                                                                  |                  | –                                                                       |
| Voltage output signal, differential<br>(peak-to-peak)<br>(D' = D - $\bar{D}$ )                        | $V_{t\_diff}$    | Typical: 6.6 V – 10 V ( $\pm$ 10%)                                      |
| Voltage output signal<br>non-differential<br>(peak-to-peak)<br>(D, /D)                                | $V_t$            | Typical: 3.3 V – 5 V ( $\pm$ 10%)                                       |
| Signal level output, offset nominal against<br>0 V<br>(D, /D) V                                       | $V_{t\_o}$       | Typical: 0 V                                                            |
| Voltage input signal, differential<br>(peak-to-peak)<br>(D' = D - $\bar{D}$ )                         | $V_{t\_diff}$    | Typical: 6.6 V – 10 V ( $\pm$ 10%)                                      |
| Voltage input signal,<br>non-differential<br>(peak-to-peak)<br>(D, /D)                                | $V_t$            | Typical: 3.3 V – 5 V ( $\pm$ 10%)                                       |

| Encoder                                                                        |              | Size, unit | EK8W                                                                                         |
|--------------------------------------------------------------------------------|--------------|------------|----------------------------------------------------------------------------------------------|
| Signal level input, offset nominal against 0 V (D, /D) V                       |              | $V_{t.o}$  | Typical: 0 V                                                                                 |
| Pulse duty factor in accordance with IEC 60469-1, n = constant                 |              |            | –                                                                                            |
| Phase offset A : B; $\bar{A}$ : $\bar{B}$<br>n = constant                      |              |            | 90° ±2°                                                                                      |
| Accuracy of the incremental section <sup>1)</sup>                              |              |            | ±0.0194° (±70")                                                                              |
| Accuracy of the absolute section                                               |              |            | ±3 LSB (Least Significant Bit)                                                               |
| Scanning code/counting direction                                               |              |            | Binary code, ascending with the direction of rotation specified above                        |
| Multi-turn resolution                                                          |              |            | –                                                                                            |
| Communication, interface                                                       |              |            | RS485 (asynchronous, serial)                                                                 |
| Communication, modules                                                         |              |            | Driver to EIA RS485                                                                          |
| Clock frequency/bandwidth                                                      |              |            | 9600 baud                                                                                    |
| Clock-pulse space period                                                       |              |            | –                                                                                            |
| Vibration resistance in accordance with EN 60068-2-6                           |              |            | ≤ 10 g (f > 18.5 Hz)                                                                         |
| Shock resistance in accordance with EN 60068-2-27                              |              |            | ≤ 100 g (t = 6 ms, 18 pulses)                                                                |
| Maximum permissible magnetic field external to the motor (outer motor contour) |              |            | 25 mT / 20 kA/m (on the encoder housing: 10 mT / 8 kA/m)                                     |
| Maximum speed                                                                  |              | $n_{max}$  | 6000 min <sup>-1</sup>                                                                       |
| Maximum cable length <sup>2)</sup>                                             |              |            | 100 m                                                                                        |
| Duration until fault message (deactivated outputs) <sup>3)</sup>               |              |            | ≤ 25 ms + 3/4 revolution                                                                     |
| Activation time of the encoder-internal diagnostics after switching on         |              |            | 200 ms                                                                                       |
| Degree of protection according to EN 60529                                     |              |            | IP66                                                                                         |
| Installation altitude                                                          |              | h          | ≤ 4000 m above sea level                                                                     |
| Explosion protection marking ATEX/IECEx                                        |              |            | –                                                                                            |
| IECEx certificate of conformity depending on encoder                           |              |            | –                                                                                            |
| Corrosion protection; surface protection                                       |              |            | KS, OS1 – OS4, OSG                                                                           |
| Connection                                                                     |              |            | Integrated encoder connector on the fan guard (can be preassembled and plugged in the field) |
| Storage temperature                                                            |              | °C         | -15 to +70                                                                                   |
| Maximum angular acceleration                                                   |              |            | 2×10 <sup>4</sup> rad/s <sup>2</sup>                                                         |
| Electronic nameplate                                                           |              |            | RS485 (serial, asynchronous); 1920 bytes                                                     |
| Maximum degree of pollution during installation work                           |              |            | Degree of pollution 1 (IEC 61010-1, EN 60664-1, VDE 0110-1)                                  |
| Ambient temperature of motor                                                   | DR2C71 – 180 | °C         | -30 to +60                                                                                   |
| Functional safety                                                              |              |            | ✓                                                                                            |

1) Due to the stiffness of the torque bracket, you have to take into account an automatically resetting twist of ±0.6° (depending on the direction of rotation) of the encoder housing compared to the encoder shaft.

2) Observe the requirements for the cables.

3) The encoder has a self-diagnostic function. If a fault is detected, the sensor reports it to the encoder evaluation unit by deactivating the output signals.

EK8Z

|                                                                                 | Size, unit       | EK8Z                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Capability class                                                                |                  | High class                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Motor series and size                                                           |                  | DRN../DRU../DR2.71 – 180 (200/225 in preparation)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Combination of brake/brake control                                              |                  | With motor-integrated BG1Z brake control: BE.. brake<br>With motor-external brake control: BE.. safety brake                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Combination of motor protection/temperature                                     |                  | Motor protection: TF (in winding)<br>Motor protection/motor temperature: PI (Pt1000 in stator housing and motor temperature model with MOVI-C® inverters)                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Combination of forced cooling fans                                              |                  | ✓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Encoder type                                                                    |                  | Incremental encoder                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Encoder sensors                                                                 |                  | Optical                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Interface                                                                       |                  | MOVILINK® DDI, coaxial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| MOVILINK® DDI type code                                                         |                  | DI.E..                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Electronic nameplate                                                            |                  | ET2000 (MOVILINK® DDI, integrated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Voltage supply                                                                  |                  | DC 24 V (MOVILINK® DDI, integrated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Current requirement (DC 24 V via MOVILINK® DDI)                                 |                  | 107 mA (without encoder: 60 mA)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Run-up time after switching on                                                  | ms               | < 3000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Duration until fault message <sup>1)</sup> (deactivated outputs)                | ms               | 26 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Response time <sup>2)</sup> (Position, speed, acceleration)                     | ms               | 1 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Incremental resolution<br>(Position increments per motor revolution)            |                  | 65536 inc (16 bits)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Single-turn resolution<br>(Position resolution per motor revolution)            |                  | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Multi-turn resolution<br>(maximum counter value for complete motor revolutions) |                  | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Accuracy of the incremental section <sup>3)</sup>                               |                  | ±0.0194° (±70")                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Accuracy of the absolute section                                                |                  | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Maximum permitted magnetic field external to the motor                          |                  | Outer contour of the motor: 25 mT / 20 kA/m<br>On the encoder housing: 10 mT / 8 kA/m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Vibration resistance in accordance with EN 60068-2-6                            |                  | ≤ 10 g (f > 18.5 Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Shock resistance in accordance with EN 60068-2-27                               |                  | ≤ 100 g (t = 6 ms, 18 pulses)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Maximum speed                                                                   | n <sub>max</sub> | 6000 min <sup>-1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Maximum angular acceleration                                                    |                  | 2 × 10 <sup>4</sup> rad/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Degree of protection in accordance with EN 60529                                |                  | IP66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Corrosion and surface protection                                                |                  | KS, OS1 – OS4, OSG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Installation altitude <sup>4)</sup>                                             | h                | ≤ 3800 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Ambient temperature of motor <sup>4)</sup>                                      | °C               | With MOVI-C® control cabinet inverters and MOVIMOT® flexible decentralized inverter: -30 to +60 <sup>4)</sup><br>With MOVIMOT® advanced decentralized inverters: See the MOVIMOT® advanced operating instructions/manual                                                                                                                                                                                                                                                                                                                                                            |
| Cable length, maximum <sup>5)</sup>                                             | l                | 200 m<br>EK8Z safety encoder: 100 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Connection technology                                                           |                  | <ul style="list-style-type: none"> <li>KD1: M23 hybrid connector on the terminal box, 1.5 – 4.0 mm<sup>2</sup> motor connection, 1.0 mm<sup>2</sup> brake connection</li> <li>KDB: M40 hybrid connector on the terminal box, 6.0 – 10.0 mm<sup>2</sup> motor connection, 1.5 mm<sup>2</sup> brake connection</li> <li>KD: Cable gland on the terminal box for hybrid cables with 1.5 – 10 mm<sup>2</sup> motor connection and 1 – 1.5 mm<sup>2</sup> brake connection</li> <li>KDD: Motor and brake connection via cable gland; M23 signal connector on the terminal box</li> </ul> |
| Explosion protection                                                            |                  | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

|                   | Size, unit | EK8Z |
|-------------------|------------|------|
| Functional safety |            | ✓    |

- 1) The safety encoder has a self-diagnostic function. If a fault is detected, the sensor reports it to the evaluation electronics by deactivating the output signals (CS..A safety option).
- 2) In addition, observe the filter times set in the CS..A safety option.
- 3) Due to the stiffness of the torque bracket, you have to take into account an automatically resetting twist of  $\pm 0.6^\circ$  (depending on the direction of rotation) of the encoder housing compared to the encoder shaft.
- 4) Observe the restrictions of the ambient temperature and potential derating of the respective motor/inverter when used at an increased ambient temperature and/or depending on the installation altitude.
- 5) Also dependent on the selected inverter type and configured PWM frequency and/or brake type; see documentation of the respective inverters.

## EK9Z

|                                                                                 | Size, unit       | EK9Z                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Capability class                                                                |                  | High class                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Motor series and size                                                           |                  | DRN../DRU../DR2.71 – 225                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Combination of brake/brake control                                              |                  | With motor-integrated BG1Z brake control: BE.. brake<br>With motor-external brake control: BE.. safety brake                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Combination of motor protection/temperature                                     |                  | Motor protection: TF (in winding)<br>Motor protection/motor temperature: PI (Pt1000 in stator housing and motor temperature model with MOVI-C® inverters)                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Combination of forced cooling fans                                              |                  | ✓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Encoder type                                                                    |                  | Single-turn encoder                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Encoder sensors                                                                 |                  | Optical                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Interface                                                                       |                  | MOVILINK® DDI, coaxial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| MOVILINK® DDI type code                                                         |                  | DI.E..                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Electronic nameplate                                                            |                  | ET2000 (MOVILINK® DDI, integrated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Voltage supply                                                                  |                  | DC 24 V (MOVILINK® DDI, integrated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Current requirement (DC 24 V via MOVILINK® DDI)                                 |                  | 107 mA (without encoder: 60 mA)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Run-up time after switching on                                                  | ms               | < 3000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Duration until fault message <sup>1)</sup> (deactivated outputs)                | ms               | ≤ 25 ms + 3/4 revolution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Response time <sup>2)</sup> (Position, speed, acceleration)                     | ms               | 1 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Incremental resolution<br>(Position increments per motor revolution)            |                  | 65536 inc (16 bits)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Single-turn resolution<br>(Position resolution per motor revolution)            |                  | 65536 inc (16 bits)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Multi-turn resolution<br>(maximum counter value for complete motor revolutions) |                  | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Accuracy of the incremental section <sup>3)</sup>                               |                  | ±0.0194 (±70")                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Accuracy of the absolute section                                                |                  | ± 3 LSB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Maximum permitted magnetic field external to the motor                          |                  | Outer contour of the motor: 25 mT / 20 kA/m<br>On the encoder housing: 10 mT / 8 kA/m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Vibration resistance in accordance with EN 60068-2-6                            |                  | ≤ 10 g (f > 18.5 Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Shock resistance in accordance with EN 60068-2-27                               |                  | ≤ 100 g (t = 6 ms, 18 pulses)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Maximum speed                                                                   | n <sub>max</sub> | 6000 min <sup>-1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Maximum angular acceleration                                                    |                  | 2 × 10 <sup>4</sup> rad/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Degree of protection in accordance with EN 60529                                |                  | IP66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Corrosion and surface protection                                                |                  | KS, OS1 – OS4, OSG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Installation altitude <sup>4)</sup>                                             | h                | ≤ 3800 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Ambient temperature of motor <sup>4)</sup>                                      | °C               | With MOVI-C® control cabinet inverters and MOVIMOT® flexible decentralized inverter: -30 to +60 <sup>4)</sup><br>With MOVIMOT® advanced decentralized inverters: See the MOVIMOT® advanced operating instructions/manual                                                                                                                                                                                                                                                                                                                                                            |
| Cable length, maximum <sup>5)</sup>                                             | l                | 200 m<br>EK9Z safety encoder: 100 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Connection technology                                                           |                  | <ul style="list-style-type: none"> <li>KD1: M23 hybrid connector on the terminal box, 1.5 – 4.0 mm<sup>2</sup> motor connection, 1.0 mm<sup>2</sup> brake connection</li> <li>KDB: M40 hybrid connector on the terminal box, 6.0 – 10.0 mm<sup>2</sup> motor connection, 1.5 mm<sup>2</sup> brake connection</li> <li>KD: Cable gland on the terminal box for hybrid cables with 1.5 – 10 mm<sup>2</sup> motor connection and 1 – 1.5 mm<sup>2</sup> brake connection</li> <li>KDD: Motor and brake connection via cable gland; M23 signal connector on the terminal box</li> </ul> |
| Explosion protection                                                            |                  | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

|                   | Size, unit | EK9Z |
|-------------------|------------|------|
| Functional safety |            | ✓    |

- 1) The safety encoder has a self-diagnostic function. If a fault is detected, the sensor reports it to the evaluation electronics by deactivating the output signals (CS..A safety option).
- 2) In addition, observe the filter times set in the CS..A safety option.
- 3) Due to the stiffness of the torque bracket, you have to take into account an automatically resetting twist of  $\pm 0.6^\circ$  (depending on the direction of rotation) of the encoder housing compared to the encoder shaft.
- 4) Observe the restrictions of the ambient temperature and potential derating of the respective motor/inverter when used at an increased ambient temperature and/or depending on the installation altitude.
- 5) Also dependent on the selected inverter type and configured PWM frequency and/or brake type; see documentation of the respective inverters.

EV8.

| Encoder                                                                      | Size, unit                     | EV8S <sup>1)</sup>                                                      | EV8R <sup>2)</sup>                                    | EV8C <sup>2)</sup>                                                                                  |
|------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Motor series and size                                                        |                                | DRN71 – 355                                                             |                                                       |                                                                                                     |
| Signal output                                                                |                                | Sin/cos                                                                 | TTL (RS422)                                           | HTL                                                                                                 |
| Supply voltage                                                               | V <sub>B</sub>                 | DC 7 V – 30 V                                                           | DC 7 V – 30 V                                         | DC 4.75 V – 30 V                                                                                    |
| Supply voltage for design as safety encoder                                  | V <sub>B,FS</sub>              | DC 7 V – 30 V                                                           | –                                                     | –                                                                                                   |
| Maximum current consumption, free of load                                    | I <sub>in</sub>                | 100 mA (at V <sub>B</sub> = 7 V)                                        |                                                       |                                                                                                     |
| Maximum pulse frequency                                                      | f <sub>pulse max</sub>         | 150 kHz                                                                 | 120 kHz                                               | 120 kHz                                                                                             |
| Direction of rotation                                                        |                                | A before B when looking at the motor output shaft in clockwise rotation |                                                       |                                                                                                     |
| Incremental tracks; periods per revolution                                   | A, B                           | 1024 (10 bits)                                                          |                                                       |                                                                                                     |
|                                                                              | C                              | 1                                                                       |                                                       |                                                                                                     |
| Position resolution, increments per revolution                               | A, B                           | 4096 (12 bits)                                                          |                                                       |                                                                                                     |
| Voltage output signal differential (peak-to-peak) (B' = B - B̄) (A' = A - Ā) | V <sub>t,diff</sub>            | 1 V ± 10%                                                               | Typical: ≥ 2 V                                        | Typical: ≥ 2 V                                                                                      |
| Voltage output signal non-differential (peak-to-peak)                        | V <sub>t</sub>                 | 0.5 V ± 10%                                                             | V <sub>Low</sub> ≤ 0.5 V<br>V <sub>High</sub> ≥ 2.5 V | V <sub>B</sub> ≤ 6 V: TTL<br>V <sub>Low</sub> ≤ 0.5 V<br>V <sub>High</sub> ≥ 2.5 V                  |
|                                                                              |                                |                                                                         |                                                       | V <sub>B</sub> > 6 V: HTL<br>V <sub>Low</sub> ≤ 3 V<br>V <sub>High</sub> ≥ (V <sub>B</sub> - 2.5 V) |
| Signal level output, nominal offset against 0 V (A, B, C, Ā, B̄, C̄)         | V <sub>t,o</sub>               | 2.5 V ± 0.3 V                                                           | –                                                     | –                                                                                                   |
| Total harmonic distortion (THD)                                              |                                | 40 dB (1%), 60 dB (0.1%) from 7th harmonic                              | –                                                     | –                                                                                                   |
| Load resistance/load current differential                                    | R <sub>L</sub> /I <sub>L</sub> | 120 Ω ± 10%                                                             | 120 Ω ± 10%                                           | V <sub>B</sub> ≤ 6 V:<br>120 Ω ± 10%                                                                |
|                                                                              |                                |                                                                         |                                                       | V <sub>B</sub> > 6 V:<br>1 – 3 kΩ                                                                   |
| Resistance between tracks and reference ground                               | R <sub>gnd</sub>               | ≥ 1 kΩ                                                                  | –                                                     | –                                                                                                   |
| Load capacitance, output                                                     | C <sub>o</sub>                 | ≤ 20 nF                                                                 | –                                                     | –                                                                                                   |
| Voltage output signal, differential (C' = C - C̄) (peak-to-peak)             | V <sub>t,diff e</sub>          | 0.3 – 1.4 V                                                             | Typical: ≥ 2 V                                        | Typical: ≥ 2 V                                                                                      |
| C track offset                                                               | g                              | 192 mV ± 5 mV                                                           | –                                                     | –                                                                                                   |
| Voltage output signal, non-differential (C, C̄) (peak-to-peak)               | V <sub>t,C</sub>               | –                                                                       | V <sub>Low</sub> ≤ 0.5 V<br>V <sub>High</sub> ≥ 2.5 V | V <sub>B</sub> ≤ 6 V: TTL<br>V <sub>Low</sub> ≤ 0.5 V<br>V <sub>High</sub> ≥ 2.5 V                  |
|                                                                              |                                |                                                                         |                                                       | V <sub>B</sub> > 6 V: HTL<br>V <sub>Low</sub> ≤ 3 V<br>V <sub>High</sub> ≥ (V <sub>B</sub> - 2.5 V) |
| Phase angle track C', n = constant                                           | k, l                           | k = 180° ± 90°<br>l = 180° ± 90°                                        | –                                                     | –                                                                                                   |
| Signal width track C                                                         | W <sub>C</sub>                 | See figure                                                              | 90° electrical                                        | 90° electrical                                                                                      |
| Signal logic track C                                                         |                                | See figure                                                              | C = log 1, when<br>A = B = log 1                      | C = log 1, when<br>A = B = log 1                                                                    |
| Pulse duty factor in accordance with IEC 60469-1, n = constant               |                                | –                                                                       | 50% ± 10%                                             | 50% ± 10%                                                                                           |
| Phase offset A : B; Ā : B̄<br>n = constant                                   | d                              | 90° ± 2°                                                                | 90° ± 20°                                             | 90° ± 20°                                                                                           |
| Accuracy of the incremental section <sup>3)</sup>                            |                                | ±0.0194° (±70")                                                         | ±0.033° (±120")                                       | ±0.033° (±120")                                                                                     |
| Accuracy of the absolute section                                             |                                | –                                                                       | –                                                     | –                                                                                                   |
| Vibration resistance in accordance with EN 60068-2-6                         |                                | ≤ 10 g (f > 18.5 Hz)                                                    |                                                       |                                                                                                     |



| Encoder                                                            |               | Size, unit       | EV8S <sup>1)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | EV8R <sup>2)</sup> | EV8C <sup>2)</sup>                                                                                                                         |
|--------------------------------------------------------------------|---------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Shock resistance in accordance with EN 60068-2-27                  |               |                  | ≤ 100 g (t = 6 ms, 18 pulses)                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                                                                                                                                            |
| Maximum speed                                                      |               | n <sub>max</sub> | 6000 min <sup>-1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                                                                                                                                            |
| Maximum cable length <sup>4)</sup>                                 |               |                  | 100 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 300 m              | 50 m: MOVITRAC® advanced inverters with connections to the binary input terminals and 24 V supply.                                         |
|                                                                    |               |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    | 300 m: Inverters from the MOVI-C® modular system or generation B with DEU21B encoder cards or with encoder supply up to a maximum of 12 V. |
|                                                                    |               |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    | 100 m: in all other cases.                                                                                                                 |
| Duration until fault message <sup>5)</sup> (deactivated outputs)   |               |                  | ≤ 25 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | –                  | –                                                                                                                                          |
| Activation time of encoder-internal diagnostics after switching on |               |                  | ≤ 200 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | –                  | –                                                                                                                                          |
| Degree of protection according to EN 60529                         |               |                  | IP66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                                                                                                                                            |
| Installation altitude                                              |               | h                | ≤ 4000 m above sea level                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                                                                                                                                            |
|                                                                    |               |                  | In areas at risk of explosion: Permitted external pressure 0.8 – 1.1 bar (at typical altitude ≤ 1800 m above sea level)                                                                                                                                                                                                                                                                                                                                                                   |                    |                                                                                                                                            |
| Explosion protection marking ATEX/IECEX                            |               |                  | ATEX equipment category 3 (3G, 3D, 3GD)<br>II3G Ex ec IIC T4 Gc<br>II3D Ex tc IIIC T120°C Dc<br>IECEX EPL .c (3G-c, 3D-c, 3GD-c)<br>Ex ec IIC T4 Gc<br>Ex tc IIIC T120°C Dc                                                                                                                                                                                                                                                                                                               |                    |                                                                                                                                            |
| IECEX certificate of conformity depending on encoder               |               |                  | IECEX IBE 18.0032X                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                                                                                                                                            |
| Corrosion protection; surface protection                           |               |                  | KS, OS1 – OS4, OSG                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                                                                                                                                            |
| Connection                                                         |               |                  | <ul style="list-style-type: none"> <li>M23 connector with 0.36 m cable directly on the encoder (without temperature sensor)</li> <li>Integrated encoder connector on the fan guard side (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor</li> <li>Integrated encoder connector at the rear of the fan guard (can be preassembled and plugged in the field); optionally with M23 connector, without temperature sensor</li> </ul> |                    |                                                                                                                                            |
| Ambient temperature of motor                                       | DRN71 – 132L  | °C               | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -30 to +60         | -30 to +60                                                                                                                                 |
|                                                                    | DRN160 – 355  | °C               | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -30 to +60         | -30 to +60                                                                                                                                 |
|                                                                    | DRN71 – 225   | °C               | -30 to +80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -30 to +60         | -30 to +60                                                                                                                                 |
|                                                                    | DRN250        | °C               | -30 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -30 to +60         | -30 to +60                                                                                                                                 |
|                                                                    | DRN280        | °C               | -30 to +40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -30 to +40         | -30 to +40                                                                                                                                 |
|                                                                    | EDRN71 – 280  | °C               | -30 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -30 to +60         | -30 to +60                                                                                                                                 |
|                                                                    | EDRN71 – 280S | °C               | -30 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -30 to +60         | -30 to +60                                                                                                                                 |
|                                                                    | EDRN280M      | °C               | -30 to +40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -30 to +40         | -30 to +40                                                                                                                                 |
| Storage temperature                                                |               | °C               | -15 to +70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                                                                                                                                            |
| Maximum angular acceleration                                       |               |                  | 2x10 <sup>4</sup> rad/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                                                                                                                                            |
| Electronic nameplate                                               |               |                  | RS485 (serial, asynchronous); 1920 bytes                                                                                                                                                                                                                                                                                                                                                                                                                                                  | –                  | –                                                                                                                                          |
| Maximum degree of pollution during installation work               |               |                  | Degree of pollution 1 (IEC 61010-1, EN 60664-1, VDE 0110-1)                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                                                                                                                                            |

| Encoder           | Size, unit | EV8S <sup>1)</sup> | EV8R <sup>2)</sup> | EV8C <sup>2)</sup> |
|-------------------|------------|--------------------|--------------------|--------------------|
| Functional safety |            |                    | –                  |                    |

1) See figure "Sin/cos signals and phase relationship".

2) See figure "HTL/TTL signals and phase relationship".

3) Due to the stiffness of the torque bracket, you have to take into account an automatically resetting twist of  $\pm 0.6^\circ$  (depending on the direction of rotation) of the encoder housing compared to the encoder shaft.

4) Observe the requirements for the cables and the supply voltage.

5) The encoder has a self-diagnostic function. If a fault is detected, the sensor reports it to the encoder evaluation unit by deactivating the output signals.

## 6.4.2 RK8M

## Functional description

A sinusoidal voltage is induced in the cos (S1 – S3) and sin (S2 – S4) secondary side when supplying the primary winding Ref1 – Ref2 with a sinusoidal excitation signal.

The strength of the induced voltage depends on the transformation ratio and the angle position of the rotor  $\alpha$ . The secondary windings are mechanically offset by  $90^\circ$ .

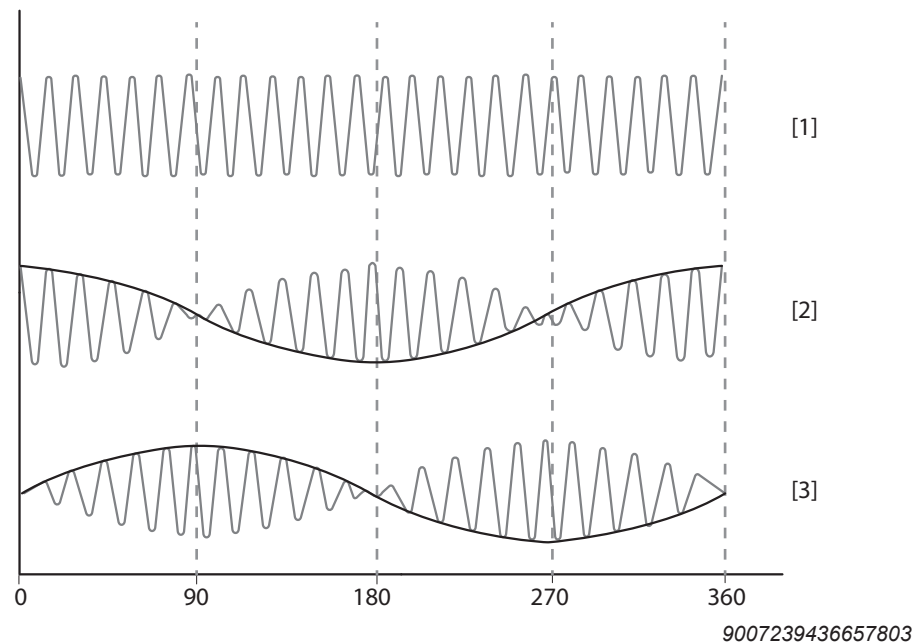
This results in 2 signals (sine and cosine) that are phase-shifted by  $90^\circ$ . These signals can be interpreted by the encoder evaluation unit in order to calculate an absolute position within a rotor revolution.

The sin and cos signal voltage are calculated according to the following calculation rule:

$$V_{S1-S3} = T_R \times U_{Ref1-Ref2} \times \cos(\alpha)$$

$$V_{S2-S4} = T_R \times V_{Ref1-Ref2} \times \sin(\alpha)$$

## Signal pattern



[1] Excitation voltage Ref1 – Ref2

[2] Signal cos (S1 – S3)

[3] Signal sin (S2 – S4)

The X-axis describes the mechanical rotor position.

## Technical data

The technical data presented here concerns typical values that apply within the specified limit values. It is possible to operate the encoder with differing parameters. Note that this may result in deviations from the specified transfer behavior of the signal tracks.

The encoder is approved for operation with encoder evaluation units and inverters from SEW-EURODRIVE.

The resolver can be operated on third-party inverters and controllers. Check the technical data for compatibility in this regard. If necessary, contact SEW-EURODRIVE.

| Encoder                                                                                        | Size, unit                 | RK8M                                                                                                             |
|------------------------------------------------------------------------------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------|
| Motor series and size                                                                          |                            | DRN../DRU../DR2.63 – 355                                                                                         |
| Encoder type                                                                                   |                            | Resolver                                                                                                         |
| Excitation signal                                                                              |                            | Ref1 – Ref2                                                                                                      |
| Pulse output                                                                                   |                            | sin/cos, differential, amplitude-modulated                                                                       |
| Signal tracks                                                                                  | $V_{S1-S3}$<br>$V_{S2-S4}$ | cos = S1 – S3; sin = S2 – S4                                                                                     |
| Number of pole pairs                                                                           | $p_R$                      | 1 = 2 poles                                                                                                      |
| Direction of rotation                                                                          |                            | Cosine before sine when looking at the motor output shaft in clockwise rotation; see also functional description |
| Input voltage/excitation voltage                                                               | $V_{Ref1-Ref2}$            | $7 V_{rms} (2 - 10 V_{rms}) = 19.8 V_{pp} (5.7 - 28.2 V_{pp})$                                                   |
| Input frequency/excitation frequency                                                           | $f_E$                      | 10 kHz (4 to 20 kHz)                                                                                             |
| Current consumption, free of load                                                              |                            | 60 mA <sub>rms</sub> ( $\leq 100$ mA) at 4 kHz                                                                   |
| Encoder system accuracy, analog                                                                |                            | $\pm 10'$                                                                                                        |
| Gear unit ratio/transformation ratio                                                           | $T_R$                      | $0.5 \pm 10\%$                                                                                                   |
| Phase shift                                                                                    |                            | $0^\circ \pm 5^\circ$                                                                                            |
| Residual voltage (offset voltage on signal tracks)                                             |                            | Max. 25 mV <sub>rms</sub>                                                                                        |
| Ref1 – Ref2 input impedance, open between Ref1 and Ref2                                        | $Z_{RO}$ at $f_E = 10$ kHz | 120 $\Omega$ (70 + j95 $\Omega$ ) $\pm 15\%$                                                                     |
| Ref1 – Ref2 input impedance, short circuit between S1 and S3 and between S2 and S4             | $Z_{RS}$ at $f_E = 10$ kHz | 110 $\Omega$ (65 + j90 $\Omega$ ) $\pm 15\%$                                                                     |
| S2 – S4 output impedance at position 0° minimum coupling, open between Ref1 and Ref2           | $Z_{SO}$ at $f_E = 10$ kHz | 230 $\Omega$ (120 + j200 $\Omega$ ) $\pm 15\%$                                                                   |
| S1 – S3 output impedance at position 0° maximum coupling, short circuit between Ref1 and Ref2  | $Z_{SS}$ at $f_E = 10$ kHz | 305 $\Omega$ (150 + j270 $\Omega$ ) $\pm 15\%$                                                                   |
| Ref1 – Ref2 input inductance, open between Ref1 and Ref2                                       | $L_{RO}$ at $f_E = 10$ kHz | 1.5 mH $\pm 20\%$                                                                                                |
| Ref1 – Ref2 input inductance, short circuit between S1 and S3 and between S2 and S4            | $L_{RS}$ at $f_E = 10$ kHz | 1.4 mH $\pm 20\%$                                                                                                |
| S2 – S4 output inductance at position 0° minimum coupling, open between Ref1 and Ref2          | $L_{SO}$ at $f_E = 10$ kHz | 3.1 mH $\pm 20\%$                                                                                                |
| S1 – S3 output inductance at position 0° maximum coupling, short circuit between Ref1 and Ref2 | $L_{SS}$ at $f_E = 10$ kHz | 4.3 mH $\pm 20\%$                                                                                                |
| DC resistance of the input                                                                     | $R_{Ref1-Ref2}$            | 36 $\Omega \pm 10\%$                                                                                             |
| DC resistance of the output                                                                    | $R_{S1-S3}$<br>$R_{S2-S4}$ | 62 $\Omega \pm 10\%$                                                                                             |
| Temperature coefficient                                                                        |                            | 0.39%/K                                                                                                          |

| Encoder                                              |                          | Size, unit | RK8M                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------|--------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Connection                                           |                          |            | <ul style="list-style-type: none"> <li>• M23 signal connector on the terminal box (optionally with or without temperature sensor)</li> <li>• Terminal strip in the terminal box (optionally with or without temperature sensor)</li> <li>• M23 with 0.36 m cable directly on the encoder (without temperature sensor)</li> <li>• Integrated encoder connector on the fan guard side (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor</li> <li>• Integrated encoder connector at the rear of the fan guard (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor<sup>1)</sup></li> </ul> |
| Shaft load                                           |                          |            | Max. ≤ 30 N axial; max. ≤ 40 N radial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Degree of protection according to EN 60529           |                          |            | IP66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Corrosion protection, surface protection for motor   |                          |            | KS, OS1 – OS4, OSG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Corrosion protection for encoder                     |                          |            | IEC 60068-2-52 salt spray according to C5 (C5-I) as per ISO 12944-2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Installation altitude                                |                          | h          | ≤ 4000 m above sea level                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Maximum speed                                        |                          | $n_{\max}$ | 6000 min <sup>-1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Maximum mechanical speed                             |                          | $n_{\max}$ | 6000 min <sup>-1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Vibration resistance in accordance with EN 60068-2-6 |                          |            | 10g = 98.1 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Shock resistance in accordance with EN 60068-2-27    |                          |            | 100g = 981 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Maximum angular acceleration                         |                          |            | ≤ 2 × 10 <sup>4</sup> rad/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Maximum degree of pollution during installation work |                          |            | Degree of pollution 1 (IEC 61010-1, EN 60664-1, VDE 0110-1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Ambient temperature of motor                         | DRN../DR2../DRU.63 – 355 | °C         | -30 to +60<br>DR2C...: -30 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Ambient temperature of encoder                       |                          | °C         | -30 to +85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Storage temperature of encoder                       |                          | °C         | -15 to +70 (dry, dust-free, protected against sun)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Maximum cable length                                 |                          |            | 100 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Explosion protection mark ATEX/IECEx                 |                          |            | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| IECEx certificate of conformity                      |                          |            | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Electronic nameplate                                 |                          |            | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Functional safety                                    |                          |            | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

1) Note that the permissible ambient temperature of the motor is limited with this connection variant. Contact SEW-EURODRIVE with regard to this.

### 6.4.3 E.7S

#### EG7S, EH7S

| Encoder                                                                   | Size, unit               | EG7S                                                                        | EH7S                                    |
|---------------------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------|-----------------------------------------|
| Motor series and size                                                     |                          | DRN../DRU../DR2.71 – 315                                                    |                                         |
| Pulse output                                                              |                          | Sin/cos                                                                     |                                         |
| Supply voltage                                                            | V <sub>B</sub>           | DC 7 V – 30 V                                                               | DC 10 V – 30 V                          |
| Maximum current consumption, effective value                              | I <sub>in</sub>          | 140 mA                                                                      |                                         |
| Maximum pulse frequency                                                   | f <sub>max</sub>         | 150 kHz                                                                     | 180 kHz                                 |
| Incremental tracks; periods per revolution                                | A, B                     | 1024 (10 bits)                                                              |                                         |
|                                                                           | C                        | 1                                                                           |                                         |
| Position resolution, increments per revolution                            | A, B                     | 4096 (12 bits)                                                              |                                         |
| Output amplitude per track (peak-to-peak)                                 | V <sub>high</sub>        | 1 V                                                                         |                                         |
|                                                                           | V <sub>low</sub>         |                                                                             |                                         |
| Output current per track, effective value                                 | I <sub>out</sub>         | 10 mA                                                                       |                                         |
| Pulse duty factor in accordance with IEC 60469-1, n = constant            |                          | –                                                                           |                                         |
| Phase offset A : B<br>n = constant                                        |                          | 90° ±2°                                                                     | 90° ±10°                                |
| Accuracy <sup>1)</sup>                                                    |                          | 0.0194°                                                                     | –                                       |
| Vibration resistance in accordance with EN 60068-2-6                      |                          | ≤ 100 m/s <sup>2</sup> (at 10 Hz to 2 kHz)                                  |                                         |
| Shock resistance in accordance with EN 60068-2-27                         |                          | ≤ 2000 m/s <sup>2</sup>                                                     |                                         |
| Maximum speed                                                             | n <sub>max</sub>         | 6000 min <sup>-1</sup>                                                      |                                         |
| Maximum cable length                                                      |                          | 100 m                                                                       |                                         |
| Duration until fault message (deactivated outputs) <sup>2)</sup>          |                          | 25 ms                                                                       | –                                       |
| Activation time of rotary encoder internal diagnostics after switching on |                          | –                                                                           |                                         |
| Storage temperature                                                       | °C                       | -15 to +70                                                                  |                                         |
| Maximum angular acceleration                                              |                          | 10 <sup>4</sup> rad/s <sup>2</sup>                                          |                                         |
| Degree of protection according to EN 60529                                |                          | IP66                                                                        | IP65                                    |
| Explosion protection mark ATEX/IECEx                                      |                          | ATEX equipment category 3 (3G, 3D, 3GD)<br>IECEx EPL .c (3G-c, 3D-c, 3GD-c) | ATEX equipment category 3 (3G, 3D, 3GD) |
| IECEx certificate of conformity                                           |                          | IECEx IBE 13.0015X                                                          | –                                       |
| Connection                                                                |                          | Terminal box on the encoder                                                 | M23, 12-pin connector                   |
| Maximum degree of pollution during installation work                      |                          | Degree of pollution 2 (IEC 61010-1, EN 60664-1, VDE 0110-1)                 |                                         |
| Ambient temperature of motor <sup>3)</sup>                                | DRN../DR2../DRU315       | °C                                                                          | -30 to +60                              |
|                                                                           | DRN../DR2../DRU132 – 280 | °C                                                                          | –                                       |
|                                                                           | EDRN..                   | °C                                                                          | -30 to +60                              |
| Functional safety                                                         |                          | ✓                                                                           | –                                       |

1) Due to the stiffness of the torque bracket, you have to take into account an automatically resetting ±0.6° twist (depending on the direction of rotation) of the encoder housing compared to the encoder shaft.

2) The encoder has a self-diagnostic function. If a fault is detected, the sensor reports it to the encoder evaluation unit by deactivating the output signals.

3) Observe possible speed and temperature limitations of the motor in atmospheres at risk of explosion.

## ES7S, EV7S

| Encoder                                                                   |                          | Size, unit        | ES7S                                                                        | EV7S                                                                    |
|---------------------------------------------------------------------------|--------------------------|-------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------|
| Motor series and size                                                     |                          |                   | DRN../DRU../DR2.71 – 315                                                    |                                                                         |
| Pulse output                                                              |                          |                   | Sin/cos                                                                     |                                                                         |
| Supply voltage                                                            |                          | V <sub>B</sub>    | DC 7 V – 30 V                                                               | DC 7 V – 30 V                                                           |
| Maximum current consumption, effective value                              |                          | I <sub>in</sub>   | 140 mA                                                                      |                                                                         |
| Maximum pulse frequency                                                   |                          | f <sub>max</sub>  | 150 kHz                                                                     | 150 kHz                                                                 |
| Incremental tracks; periods per revolution                                |                          | A, B              | 1024 (10 bits)                                                              |                                                                         |
|                                                                           |                          | C                 | 1                                                                           |                                                                         |
| Position resolution, increments per revolution                            |                          | A, B              | 4096 (12 bits)                                                              |                                                                         |
| Output amplitude per track (peak-to-peak)                                 |                          | V <sub>high</sub> | 1 V                                                                         |                                                                         |
|                                                                           |                          | V <sub>low</sub>  |                                                                             |                                                                         |
| Output current per track, effective value                                 |                          | I <sub>out</sub>  | 10 mA                                                                       |                                                                         |
| Pulse duty factor in accordance with IEC 60469-1, n = constant            |                          |                   | –                                                                           |                                                                         |
| Phase offset A : B<br>n = constant                                        |                          |                   | 90° ±2°                                                                     | 90° ±2°                                                                 |
| Accuracy <sup>1)</sup>                                                    |                          |                   | 0.0194°                                                                     | 0.0194°                                                                 |
| Vibration resistance in accordance with EN 60068-2-6                      |                          |                   | ≤ 100 m/s <sup>2</sup> (at 10 Hz to 2 kHz)                                  |                                                                         |
| Shock resistance in accordance with EN 60068-2-27                         |                          |                   | ≤ 1000 m/s <sup>2</sup>                                                     | ≤ 1000 m/s <sup>2</sup>                                                 |
| Maximum speed                                                             |                          | n <sub>max</sub>  | 6000 min <sup>-1</sup>                                                      |                                                                         |
| Maximum cable length                                                      |                          |                   | 100 m                                                                       |                                                                         |
| Duration until fault message (deactivated outputs) <sup>2)</sup>          |                          |                   | 25 ms                                                                       | 25 ms                                                                   |
| Activation time of rotary encoder internal diagnostics after switching on |                          |                   | –                                                                           |                                                                         |
| Storage temperature                                                       |                          | °C                | -15 to +70                                                                  |                                                                         |
| Maximum angular acceleration                                              |                          |                   | 10 <sup>4</sup> rad/s <sup>2</sup>                                          |                                                                         |
| Degree of protection according to EN 60529                                |                          |                   | IP66                                                                        | IP66                                                                    |
| Explosion protection mark ATEX/IECEx                                      |                          |                   | ATEX equipment category 3 (3G, 3D, 3GD)<br>IECEx EPL .c (3G-c, 3D-c, 3GD-c) | ATEX equipment category 3 (3G, 3D, 3GD)IECEx EPL .c (3G-c, 3D-c, 3GD-c) |
| IECEx certificate of conformity                                           |                          |                   | IECEx IBE 13.0015X                                                          | IECEx IBE 13.0015X                                                      |
| Connection                                                                |                          |                   | Terminal box on the encoder                                                 | Terminal box on the encoder                                             |
| Maximum degree of pollution during installation work                      |                          |                   | Degree of pollution 2 (IEC 61010-1, EN 60664-1, VDE 0110-1)                 |                                                                         |
| Ambient temperature of motor <sup>3)</sup>                                | DRN../DR2../DRU71 – 132S | °C                | -30 to +80<br>With FS encoder: -30 to +60                                   | –                                                                       |
|                                                                           | DRN../DR2../DRU71 – 225  | °C                | –                                                                           | -30 to +80                                                              |
|                                                                           | DRN../DR2../DRU250/280   | °C                | –                                                                           | -30 to +60                                                              |
|                                                                           | EDRN..                   | °C                | -30 to +60                                                                  | -30 to +60                                                              |
| Functional safety                                                         |                          |                   | ✓                                                                           | –                                                                       |

1) Due to the stiffness of the torque bracket, you have to take into account an automatically resetting ±0.6° twist (depending on the direction of rotation) of the encoder housing compared to the encoder shaft.

2) The encoder has a self-diagnostic function. If a fault is detected, the sensor reports it to the encoder evaluation unit by deactivating the output signals.

3) Observe possible speed and temperature limitations of the motor in atmospheres at risk of explosion.

#### 6.4.4 E.7R

##### EG7R, EH7R

| Encoder                                                        |                           | Size, unit        | EG7R                                                                        | EH7R                                    |
|----------------------------------------------------------------|---------------------------|-------------------|-----------------------------------------------------------------------------|-----------------------------------------|
| Motor series and size                                          |                           |                   | DRN../DRU../DR2.71 – 315                                                    |                                         |
| Pulse output                                                   |                           |                   | TTL (RS422)                                                                 |                                         |
| Supply voltage                                                 |                           | V <sub>B</sub>    | DC 7 V – 30 V                                                               | DC 10 V – 30 V                          |
| Maximum current consumption, effective value                   |                           | I <sub>in</sub>   | 160 mA                                                                      | 140 mA                                  |
| Maximum pulse frequency                                        |                           | f <sub>max</sub>  | 120 kHz                                                                     | 300 kHz                                 |
| Incremental tracks; periods per revolution                     |                           | A, B              | 1024 (10 bits)                                                              |                                         |
|                                                                |                           | C                 | 1                                                                           |                                         |
| Position resolution, increments per revolution                 |                           | A, B              | 4096 (12 bits)                                                              |                                         |
| Output amplitude per track                                     |                           | V <sub>high</sub> | ≥ DC 2.5 V                                                                  |                                         |
|                                                                |                           | V <sub>low</sub>  | ≤ DC 0.5 V                                                                  |                                         |
| Output current per track, effective value                      |                           | I <sub>out</sub>  | 25 mA                                                                       | 20 mA                                   |
| Pulse duty factor in accordance with IEC 60469-1, n = constant |                           |                   | 50% ± 10%                                                                   | 50% ± 20%                               |
| Phase offset A : B<br>n = constant                             |                           |                   | 90° ±20°                                                                    |                                         |
| Vibration resistance in accordance with EN 60068-2-6           |                           |                   | ≤ 100 m/s <sup>2</sup>                                                      |                                         |
| Shock resistance in accordance with EN 60068-2-27              |                           |                   | ≤ 2000 m/s <sup>2</sup>                                                     | ≤ 2000 m/s <sup>2</sup>                 |
| Maximum speed                                                  |                           | n <sub>max</sub>  | 6000 min <sup>-1</sup>                                                      |                                         |
| Maximum cable length                                           |                           |                   | 100 m                                                                       |                                         |
| Storage temperature                                            |                           | °C                | -15 to +70                                                                  |                                         |
| Maximum angular acceleration                                   |                           |                   | 10 <sup>4</sup> rad/s <sup>2</sup>                                          |                                         |
| Degree of protection according to EN 60529                     |                           |                   | IP66                                                                        | IP65                                    |
| Explosion protection mark ATEX/IECEX                           |                           |                   | ATEX equipment category 3 (3G, 3D, 3GD)<br>IECEX EPL .c (3G-c, 3D-c, 3GD-c) | ATEX equipment category 3 (3G, 3D, 3GD) |
| IECEX certificate of conformity                                |                           |                   | IECEX IBE 13.0015X                                                          | –                                       |
| Connection                                                     |                           |                   | Terminal box on incremental encoder                                         | M23, 12-pin connector                   |
| Ambient temperature of motor                                   | DRN../DR2../DRU132M – 280 | °C                | -30 to +60                                                                  | –                                       |
|                                                                | DRN../DR2../DRU315        | °C                | –                                                                           | -40 to +60                              |
|                                                                | EDRN80MS – 132S           | °C                | –                                                                           | -40 to +60                              |
|                                                                | EDRN132M – 200L           | °C                | -30 to +60                                                                  | -40 to +60                              |
|                                                                | EDRN225                   | °C                | -30 to +60                                                                  | -40 to +60                              |
|                                                                | EDRN250 – 280             | °C                | -30 to +60                                                                  | -40 to +60                              |
| Functional safety                                              |                           |                   | –                                                                           | –                                       |



## ES7R, EV7R

| Encoder                                                                 |                          | Size, unit       | ES7R                                                                        | EV7R       |
|-------------------------------------------------------------------------|--------------------------|------------------|-----------------------------------------------------------------------------|------------|
| Motor series and size                                                   |                          |                  | DRN../DRU../DR2.71 – 315                                                    |            |
| Pulse output                                                            |                          |                  | TTL (RS422)                                                                 |            |
| Supply voltage                                                          |                          | $V_B$            | DC 7 V – 30 V                                                               |            |
| Maximum current consumption, effective value                            |                          | $I_{in}$         | 160 mA                                                                      |            |
| Maximum pulse frequency                                                 |                          | $f_{max}$        | 120 kHz                                                                     |            |
| Incremental tracks; periods per revolution                              |                          | A, B             | 1024 (10 bits)                                                              |            |
|                                                                         |                          | C                | 1                                                                           |            |
| Position resolution, increments per revolution                          |                          | A, B             | 4096 (12 bits)                                                              |            |
| Output amplitude per track                                              |                          | $V_{high}$       | $\geq$ DC 2.5 V                                                             |            |
|                                                                         |                          | $V_{low}$        | $\leq$ DC 0.5 V                                                             |            |
| Output current per track, effective value                               |                          | $I_{out}$        | 25 mA                                                                       |            |
| Pulse duty factor in accordance with IEC 60469-1, $n = \text{constant}$ |                          |                  | $50\% \pm 10\%$                                                             |            |
| Phase offset A : B<br>$n = \text{constant}$                             |                          |                  | $90^\circ \pm 20^\circ$                                                     |            |
| Vibration resistance in accordance with EN 60068-2-6                    |                          |                  | $\leq 100 \text{ m/s}^2$                                                    |            |
| Shock resistance in accordance with EN 60068-2-27                       |                          |                  | $\leq 1000 \text{ m/s}^2$                                                   |            |
| Maximum speed                                                           |                          | $n_{max}$        | $6000 \text{ min}^{-1}$                                                     |            |
| Maximum cable length                                                    |                          |                  | 100 m                                                                       |            |
| Storage temperature                                                     |                          | $^\circ\text{C}$ | -15 to +70                                                                  |            |
| Maximum angular acceleration                                            |                          |                  | $10^4 \text{ rad/s}^2$                                                      |            |
| Degree of protection according to EN 60529                              |                          |                  | IP66                                                                        |            |
| Explosion protection mark ATEX/IECEx                                    |                          |                  | ATEX equipment category 3 (3G, 3D, 3GD)<br>IECEx EPL .c (3G-c, 3D-c, 3GD-c) |            |
| IECEx certificate of conformity                                         |                          |                  | IECEx IBE 13.0015X                                                          |            |
| Connection                                                              |                          |                  | Terminal box on incremental encoder                                         |            |
| Ambient temperature of motor                                            | DRN../DR2../DRU71 – 250  | $^\circ\text{C}$ | –                                                                           | -30 to +60 |
|                                                                         | DRN../DR2../DRU71 – 132S | $^\circ\text{C}$ | -30 to +60                                                                  | –          |
|                                                                         | DRN../DR2../DRU280       | $^\circ\text{C}$ | –                                                                           | -30 to +40 |
|                                                                         | EDRN80MS – 132S          | $^\circ\text{C}$ | -30 to +60                                                                  | –          |
|                                                                         | EDRN132M – 200L          | $^\circ\text{C}$ | –                                                                           | -30 to +50 |
|                                                                         | EDRN225                  | $^\circ\text{C}$ | –                                                                           | -30 to +60 |
|                                                                         | EDRN250 – 280            | $^\circ\text{C}$ | –                                                                           | -30 to +40 |
| Functional safety                                                       |                          |                  | –                                                                           | –          |

### 6.4.5 E.7C

#### EG7C, EH7C

| Encoder                                                        |                           | Size, unit        | EG7C                                                                                                                                                                                                                                                                                                                                                      | EH7C                                    |
|----------------------------------------------------------------|---------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Motor series and size                                          |                           |                   | DRN../DRU../DR2.71 – 315                                                                                                                                                                                                                                                                                                                                  |                                         |
| Pulse output                                                   |                           |                   | HTL/TTL (RS422)                                                                                                                                                                                                                                                                                                                                           | HTL                                     |
| Supply voltage                                                 |                           | V <sub>B</sub>    | DC 4.75 V – 30 V                                                                                                                                                                                                                                                                                                                                          | DC 10 V – 30 V                          |
| Maximum current consumption, effective value                   |                           | I <sub>in</sub>   | 240 mA                                                                                                                                                                                                                                                                                                                                                    | 225 mA                                  |
| Maximum pulse frequency                                        |                           | f <sub>max</sub>  | 120 kHz                                                                                                                                                                                                                                                                                                                                                   | 300 kHz                                 |
| Incremental tracks; periods per revolution                     |                           | A, B              | 1024 (10 bits)                                                                                                                                                                                                                                                                                                                                            |                                         |
|                                                                |                           | C                 | 1                                                                                                                                                                                                                                                                                                                                                         |                                         |
| Position resolution, increments per revolution                 |                           | A, B              | 4096 (12 bits)                                                                                                                                                                                                                                                                                                                                            |                                         |
| Output amplitude per track                                     |                           | V <sub>high</sub> | V <sub>B</sub> -2.5 V                                                                                                                                                                                                                                                                                                                                     | V <sub>B</sub> -2 V                     |
|                                                                |                           | V <sub>low</sub>  | ≤ DC 1.1 V                                                                                                                                                                                                                                                                                                                                                | ≤ DC 2.5 V                              |
| Output current per track, effective value                      |                           | I <sub>out</sub>  | 60 mA                                                                                                                                                                                                                                                                                                                                                     | 30 mA                                   |
| Pulse duty factor in accordance with IEC 60469-1, n = constant |                           |                   | 50% ± 10%                                                                                                                                                                                                                                                                                                                                                 | 50% ± 20%                               |
| Phase offset A : B<br>n = constant                             |                           |                   | 90° ±20°                                                                                                                                                                                                                                                                                                                                                  |                                         |
| Vibration resistance in accordance with EN 60068-2-6           |                           |                   | ≤ 100 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                    |                                         |
| Shock resistance in accordance with EN 60068-2-27              |                           |                   | ≤ 2000 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                   |                                         |
| Maximum speed                                                  |                           | n <sub>max</sub>  | 6000 min <sup>-1</sup>                                                                                                                                                                                                                                                                                                                                    |                                         |
| Maximum cable length                                           |                           |                   | 50 – 100 m<br>50 m: MOVI-C® MOVITRAC® advanced inverters from SEW-EURODRIVE with connection to the binary input terminals and 24 V supply;<br>300 m: Inverters from the MOVI-C® modular automation system from SEW-EURODRIVE or generation B inverters with DEU21B encoder cards, or if the maximum encoder supply is 12 V;<br>100 m: in all other cases. | 100 m                                   |
| Storage temperature                                            |                           | °C                | -15 to +70                                                                                                                                                                                                                                                                                                                                                |                                         |
| Maximum angular acceleration                                   |                           |                   | 10 <sup>4</sup> rad/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                        |                                         |
| Degree of protection according to EN 60529                     |                           |                   | IP66                                                                                                                                                                                                                                                                                                                                                      | IP65                                    |
| Explosion protection mark ATEX/IECEx                           |                           |                   | ATEX equipment category 3 (3G, 3D, 3GD)<br>IECEx EPL .c (3G-c, 3D-c, 3GD-c)                                                                                                                                                                                                                                                                               | ATEX equipment category 3 (3G, 3D, 3GD) |
| IECEx certificate of conformity                                |                           |                   | IECEx IBE 13.0015X                                                                                                                                                                                                                                                                                                                                        | –                                       |
| Connection                                                     |                           |                   | Terminal box on incremental encoder                                                                                                                                                                                                                                                                                                                       | M23, 12-pin connector                   |
| Ambient temperature of motor                                   | DRN../DR2../DRU132M – 280 | °C                | -30 to +60                                                                                                                                                                                                                                                                                                                                                | –                                       |
|                                                                | DRN../DR2../DRU315        | °C                | –                                                                                                                                                                                                                                                                                                                                                         | -40 to +60                              |
|                                                                | EDRN132M – 200L           | °C                | -30 to +60                                                                                                                                                                                                                                                                                                                                                | –                                       |
|                                                                | EDRN225                   | °C                | -30 to +60                                                                                                                                                                                                                                                                                                                                                | –                                       |
|                                                                | EDRN250 – 280             | °C                | -30 to +60                                                                                                                                                                                                                                                                                                                                                | –                                       |
| Functional safety                                              |                           |                   | –                                                                                                                                                                                                                                                                                                                                                         | –                                       |

## ES7C, EV7C

| Encoder                                                        |                              | Size, unit | ES7C                                                                                                                                                                                                                                                                                                                                       | EV7C       |
|----------------------------------------------------------------|------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Motor series and size                                          |                              |            | DRN../DRU../DR2.71 – 315                                                                                                                                                                                                                                                                                                                   |            |
| Pulse output                                                   |                              |            | HTL/TTL (RS422)                                                                                                                                                                                                                                                                                                                            |            |
| Supply voltage                                                 |                              | $V_B$      | DC 4.75 V – 30 V                                                                                                                                                                                                                                                                                                                           |            |
| Maximum current consumption, effective value                   |                              | $I_{in}$   | 240 mA                                                                                                                                                                                                                                                                                                                                     |            |
| Maximum pulse frequency                                        |                              | $f_{max}$  | 120 kHz                                                                                                                                                                                                                                                                                                                                    |            |
| Incremental tracks; periods per revolution                     |                              | A, B       | 1024 (10 bits)                                                                                                                                                                                                                                                                                                                             |            |
|                                                                |                              | C          | 1                                                                                                                                                                                                                                                                                                                                          |            |
| Position resolution, increments per revolution                 |                              | A, B       | 4096 (12 bits)                                                                                                                                                                                                                                                                                                                             |            |
| Output amplitude per track                                     |                              | $V_{high}$ | $V_B - 2.5$ V                                                                                                                                                                                                                                                                                                                              |            |
|                                                                |                              | $V_{low}$  | ≤ DC 1.1 V                                                                                                                                                                                                                                                                                                                                 |            |
| Output current per track, effective value                      |                              | $I_{out}$  | 60 mA                                                                                                                                                                                                                                                                                                                                      |            |
| Pulse duty factor in accordance with IEC 60469-1, n = constant |                              |            | 50% ±10%                                                                                                                                                                                                                                                                                                                                   |            |
| Phase offset A : B<br>n = constant                             |                              |            | 90° ±20°                                                                                                                                                                                                                                                                                                                                   |            |
| Vibration resistance in accordance with EN 60068-2-6           |                              |            | ≤ 100 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                     |            |
| Shock resistance in accordance with EN 60068-2-27              |                              |            | ≤ 1000 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                    |            |
| Maximum speed                                                  |                              | $n_{max}$  | 6000 min <sup>-1</sup>                                                                                                                                                                                                                                                                                                                     |            |
| Maximum cable length                                           |                              |            | 50 m: MOVI-C® MOVITRAC® advanced inverters from SEW-EURODRIVE with connection to the binary input terminals and 24 V supply;<br>300 m: Inverters from the MOVI-C® modular automation system from SEW-EURODRIVE or generation B inverters with DEU21B encoder cards, or if the maximum encoder supply is 12 V;<br>100 m: in all other cases |            |
| Storage temperature                                            |                              | °C         | -15 to +70                                                                                                                                                                                                                                                                                                                                 |            |
| Maximum angular acceleration                                   |                              |            | 10 <sup>4</sup> rad/s <sup>2</sup>                                                                                                                                                                                                                                                                                                         |            |
| Degree of protection according to EN 60529                     |                              |            | IP66                                                                                                                                                                                                                                                                                                                                       |            |
| Explosion protection mark ATEX/IECEX                           |                              |            | ATEX equipment category 3 (3G, 3D, 3GD)<br>IECEX EPL .c (3G-c, 3D-c, 3GD-c)                                                                                                                                                                                                                                                                |            |
| IECEX certificate of conformity                                |                              |            | IECEX IBE 13.0015X                                                                                                                                                                                                                                                                                                                         |            |
| Connection                                                     |                              |            | Terminal box on incremental encoder                                                                                                                                                                                                                                                                                                        |            |
| Ambient temperature of motor                                   | DRN../DR2../DRU71 – 250      | °C         | –                                                                                                                                                                                                                                                                                                                                          | -30 to +60 |
|                                                                | DRN../DR2../DRU80MS/M – 132S | °C         | -30 to +60                                                                                                                                                                                                                                                                                                                                 | –          |
|                                                                | DRN../DR2../DRU280           | °C         | –                                                                                                                                                                                                                                                                                                                                          | -30 to +40 |
|                                                                | EDRN80MS – 132S              | °C         | -30 to +60                                                                                                                                                                                                                                                                                                                                 | -30 to +60 |
|                                                                | EDRN132M – 200L              | °C         | –                                                                                                                                                                                                                                                                                                                                          | -30 to +50 |
|                                                                | EDRN225                      | °C         | –                                                                                                                                                                                                                                                                                                                                          | -30 to +60 |
|                                                                | EDRN250 – 280                | °C         | –                                                                                                                                                                                                                                                                                                                                          | -30 to +40 |
| Functional safety                                              |                              |            | –                                                                                                                                                                                                                                                                                                                                          | –          |

#### 6.4.6 E.7T

| Encoder                                                                 |            | Size, unit | EH7T                                    |
|-------------------------------------------------------------------------|------------|------------|-----------------------------------------|
| Motor series and size                                                   |            |            | DRN315                                  |
| Pulse output                                                            |            |            | TTL (RS422)                             |
| Supply voltage                                                          |            | $V_B$      | DC 5 V                                  |
| Maximum current consumption                                             |            | $I_{in}$   | 140 mA                                  |
| Maximum pulse frequency $f_{max}$                                       |            | kHz        | 300                                     |
| Incremental tracks; periods per revolution                              | A, B       |            | 1024 (10 bits)                          |
|                                                                         | C          |            | 1                                       |
| Position resolution, increments per revolution                          |            | A, B       | 4096 (12 bits)                          |
| Output amplitude                                                        | $V_{high}$ |            | $\geq$ DC 2.5 V                         |
|                                                                         | $V_{low}$  |            | $\leq$ DC 0.5 V                         |
| Output current per track                                                |            | $I_{out}$  | 20 mA                                   |
| Pulse duty factor in accordance with IEC 60469-1, $n = \text{constant}$ |            |            | 50% $\pm$ 20%                           |
| Phase offset A : B<br>$n = \text{constant}$                             |            |            | 90° $\pm$ 20°                           |
| Vibration resistance in accordance with EN 60068-2-6 at 10 Hz – 2 kHz   |            |            | $\leq$ 100 m/s <sup>2</sup>             |
| Shock resistance in accordance with EN 60068-2-27                       |            |            | $\leq$ 2000 m/s <sup>2</sup>            |
| Maximum speed                                                           |            | $n_{max}$  | 6000 min <sup>-1</sup>                  |
| Storage temperature                                                     |            | °C         | -15 to +70                              |
| Maximum angular acceleration                                            |            |            | 10 <sup>4</sup> rad/s <sup>2</sup>      |
| Degree of protection in accordance with EN 60529                        |            |            | IP65                                    |
| Explosion protection mark ATEX/IECEx                                    |            |            | ATEX equipment category 3 (3G, 3D, 3GD) |
| IECEx certificate of conformity                                         |            |            | –                                       |
| Connection                                                              |            |            | M23, 12-pin connector                   |
| Ambient temperature of motor                                            | DRN315     | °C         | -40 to +60                              |
|                                                                         | EDRN315    | °C         | -20 to +60                              |
| Functional safety                                                       |            |            | –                                       |

## 6.4.7 AK8. AV8.

## AK8.

AK8H, AK8W

Note the following regarding the encoder interfaces:

The electrical specifications of encoders with the ...W interface (sin/cos + RS485) correspond to the sin/cos signal definitions of the HIPERFACE® interface. However, in the digital interface RS485, they deviate from the HIPERFACE® standard and are only suitable for operation on inverters from SEW-EURODRIVE.

| Encoder                                                                                       | Size, unit       | AK8H                                                                    | AK8W                              |
|-----------------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------|-----------------------------------|
| Motor series and size                                                                         |                  | DRN../DRU../DR2.63 – 355                                                |                                   |
| Pulse output                                                                                  |                  | HIPERFACE®                                                              | sin/cos + RS485                   |
| Supply voltage                                                                                | $V_B$            | DC 7 V – 12 V                                                           | DC 7 V – 30 V                     |
| Supply voltage for design as safety encoder                                                   | $V_{B\_FS}$      | DC 7 V – 12 V                                                           | DC 7 V – 30 V                     |
| Maximum current consumption, free of load                                                     | $I_{in}$         | 80 mA                                                                   | 100 mA (at $U_B = 7$ V)           |
| Maximum pulse frequency                                                                       | $f_{pulse\ max}$ | 200 kHz                                                                 |                                   |
| Direction of rotation                                                                         |                  | A before B when looking at the motor output shaft in clockwise rotation |                                   |
| Incremental tracks; periods per revolution                                                    | A, B             | 1024 (10 bits)                                                          | 2048 (11 bits)                    |
|                                                                                               | C                | –                                                                       |                                   |
| Position resolution, increments per revolution                                                | A, B             | 32768 (15 bits)<br>HIPERFACE®                                           | 65536 (16 bits)<br>(RS485)        |
| Accuracy of the incremental section <sup>1)</sup>                                             |                  | $\pm 0.0125^\circ$ ( $\pm 45''$ )                                       | $\pm 0.0194^\circ$ ( $\pm 70''$ ) |
| Accuracy of the absolute section                                                              |                  | $\pm 0.014^\circ$ ( $\pm 52''$ )                                        | $\pm 3$ LSB                       |
| Voltage output signal differential (peak-to-peak) ( $A' = A - \bar{A}$ ; $B' = B - \bar{B}$ ) | $V_{t\_diff}$    | 1 V $\pm$ 10%                                                           |                                   |
| Voltage output signal non-differential (peak-to-peak)                                         | $V_t$            | 0.5 V $\pm$ 10%                                                         |                                   |
| Signal level output, offset nominal against 0 V ( $A, B, C, \bar{A}, \bar{B}, \bar{C}$ ) V    | $V_{t\_o}$       | 2.5 V $\pm$ 0.3 V                                                       |                                   |
| Total harmonic distortion (THD)                                                               |                  | 40 dB (1%), 60 dB (0.1%) from 7th harmonic                              |                                   |
| Load resistance/load current differential                                                     | $R_L/I_L$        | 120 $\Omega \pm$ 10%                                                    |                                   |
| Resistance between track and reference ground                                                 | $R_{gnd}$        | $\geq 1$ k $\Omega$                                                     |                                   |
| Load capacitance, output                                                                      |                  | $\leq 20$ nF                                                            |                                   |
| Voltage output signal, differential ( $C' = C - \bar{C}$ ) (peak-to-peak)                     | $V_{t\_diff\ e}$ | –                                                                       |                                   |
| C track offset                                                                                | g                | –                                                                       |                                   |
| Voltage output signal, non-differential ( $C, \bar{C}$ ) (peak-to-peak)                       | $V_{t\_C}$       | –                                                                       |                                   |
| Phase angle track $C'$ , $n = \text{constant}$                                                | k, l             | See "Phase relationships" (→ 136)                                       |                                   |
| Signal width track C                                                                          | $W_C$            | See "Phase relationships" (→ 136)                                       |                                   |
| Signal logic track C                                                                          |                  | –                                                                       |                                   |
| Voltage output signal differential (peak-to-peak) ( $D' = D - \bar{D}$ )                      | $V_{t\_diff}$    | Typical: 6.6 V to 10 V ( $\pm$ 10%)                                     |                                   |
| Voltage output signal non-differential (peak-to-peak) ( $D, \bar{D}$ )                        | $V_t$            | Typical: 3.3 V to 5 V ( $\pm$ 10%)                                      |                                   |

| Encoder                                                                        | Size, unit    | AK8H                                                                  | AK8W                                                                                                                                                                        |
|--------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Signal level output, offset nominal against 0 V (D, /D) V                      | $V_{t_o}$     | Typical: 0 V                                                          |                                                                                                                                                                             |
| Voltage input signal differential (peak-to-peak) (D' = D- $\bar{D}$ )          | $V_{t\_diff}$ | Typical: 6.6 V to 10 V ( $\pm 10\%$ )                                 |                                                                                                                                                                             |
| Voltage input signal non-differential (peak-to-peak) (D, /D)                   | $V_t$         | Typical: 3.3 V to 5 V ( $\pm 10\%$ )                                  |                                                                                                                                                                             |
| Signal level input, offset nominal against 0 V (D, /D) V                       | $V_{t_o}$     | Typical: 0 V                                                          |                                                                                                                                                                             |
| Pulse duty factor in accordance with IEC 60469-1, n = constant                 |               | –                                                                     |                                                                                                                                                                             |
| Phase offset A : B; $\bar{A}$ : $\bar{B}$ n = constant                         |               | $90^\circ \pm 2^\circ$                                                |                                                                                                                                                                             |
| Safety-related accuracy                                                        |               | $\pm 0.09^\circ$ , for quadrant count <sup>2)</sup>                   | –                                                                                                                                                                           |
| Safety-related measuring step                                                  |               | $0.09^\circ$ , for quadrant count                                     | –                                                                                                                                                                           |
| Scanning code/counting direction                                               |               | Binary code, ascending with the direction of rotation specified above | Binary code, ascending with the direction of rotation specified above                                                                                                       |
| Multi-turn resolution                                                          |               | 4096 revolutions (12 bits)                                            | 65536 revolutions (16 bits)                                                                                                                                                 |
| Communication, interface                                                       |               | HIPERFACE®                                                            | RS485 (asynchronous, serial)                                                                                                                                                |
| Communication, modules                                                         |               | Driver to EIA RS485                                                   | Driver to EIA RS485                                                                                                                                                         |
| Clock frequency/bandwidth                                                      |               | 9600 baud                                                             |                                                                                                                                                                             |
| Clock-pulse space period                                                       |               | –                                                                     |                                                                                                                                                                             |
| Vibration resistance in accordance with EN 60068-2-6                           |               | $\leq 10$ g (f > 18.5 Hz)                                             |                                                                                                                                                                             |
| Shock resistance in accordance with EN 60068-2-27                              |               | $\leq 100$ g (t = 6 ms, 18 pulses)                                    |                                                                                                                                                                             |
| Maximum permissible magnetic field external to the motor (outer motor contour) |               | 25 mT / 20 kA/m (on the encoder housing: 10 mT / 8 kA/m)              |                                                                                                                                                                             |
| Maximum speed                                                                  | $n_{max}$     | 6000 min <sup>-1</sup>                                                |                                                                                                                                                                             |
| Service life of the ball bearings                                              |               | $3.6 \times 10^9$ revolutions                                         | –                                                                                                                                                                           |
| Maximum cable length <sup>3)</sup>                                             |               | 100 m                                                                 |                                                                                                                                                                             |
| Duration until fault message (deactivated outputs) <sup>4)</sup>               |               | HIPERFACE®                                                            | $\leq 25$ ms + 3/4 revolution                                                                                                                                               |
| Activation time of the encoder-internal diagnostics after switching on         |               | HIPERFACE®                                                            | 200 ms                                                                                                                                                                      |
| Degree of protection according to EN 60529                                     |               | IP66 in assembled state<br>FS encoder: IP65 in assembled state        | IP66                                                                                                                                                                        |
| Installation altitude                                                          | h             | $\leq 2000$ m above sea level                                         | $\leq 4000$ m above sea level                                                                                                                                               |
| Explosion protection mark ATEX/IECEx                                           |               | –                                                                     | ATEX equipment category 3 (3G, 3D, 3GD)<br>II3G Ex ec IIC T4 Gc<br>II3D Ex tc IIIC T120°C Dc<br>IECEx EPL .c (3G-c, 3D-c, 3GD-c)<br>Ex ec IIC T4 Gc<br>Ex tc IIIC T120°C Dc |
| IECEx certificate of conformity depending on encoder                           |               | –                                                                     | IECEx IBE 18.0032X<br>IECEx CSA 21.0010X                                                                                                                                    |
| Corrosion protection; surface protection                                       |               | KS, OS1 – OS4, OSG                                                    | KS, OS1 – OS4, OSG                                                                                                                                                          |

| Encoder                                              |                          | Size, unit | AK8H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | AK8W                                     |
|------------------------------------------------------|--------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| Connection                                           |                          |            | <ul style="list-style-type: none"> <li>M23 signal connector on the terminal box (optionally with or without temperature sensor)</li> <li>Terminal strip in the terminal box (optionally with or without temperature sensor)</li> <li>M23 with 0.36 m cable directly on the encoder (without temperature sensor)</li> <li>Integrated encoder connector on the fan guard side (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor</li> <li>Integrated encoder connector at the rear of the fan guard (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor<sup>5)</sup></li> </ul> |                                          |
| Storage temperature                                  |                          | °C         | -40 to +90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                          |
| Maximum angular acceleration                         |                          |            | $2 \times 10^4 \text{ rad/s}^2$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | $2 \times 10^4 \text{ rad/s}^2$          |
| Electronic nameplate                                 |                          |            | HIPERFACE®; 1792 bytes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | RS485 (serial, asynchronous); 1920 bytes |
| Maximum degree of pollution during installation work |                          |            | Degree of pollution 1 (IEC 61010-1, EN 60664-1, VDE 0110-1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                          |
| Ambient temperature of motor                         | DRN../DR2../DRU63 – 132  | °C         | -40 to +80<br>With FS encoder: -40 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | -30 to +60                               |
|                                                      | DRN../DR2../DRU160 – 315 | °C         | -40 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -30 to +60                               |
|                                                      | DRN355/DRU355            | °C         | -30 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -30 to +60                               |
|                                                      | EDRN71 – 315             | °C         | -40 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -30 to +60                               |
|                                                      | DR2C71 – 180             | °C         | -40 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -30 to +60                               |
| Functional safety                                    |                          |            | ✓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ✓                                        |

- 1) Due to the stiffness of the torque bracket, you have to take into account an automatically resetting twist of  $\pm 0.6^\circ$  (depending on the direction of rotation) of the encoder housing compared to the encoder shaft.
- 2) The specified values refer to a diagnostic coverage of 90% that must be achieved by the external drive system. In the event of resonances, suitable tests of the entire drive system must be performed.
- 3) Observe the requirements for the cables.
- 4) The encoder has a self-diagnostic function. If a fault is detected, the sensor reports it to the encoder evaluation unit by deactivating the output signals.
- 5) Note that the permissible ambient temperature of the motor is limited with this connection variant. Contact SEW-EURODRIVE with regard to this.

# AK8Y

| Encoder                                                                                         | Size, unit                     | AK8Y <sup>1)</sup>                                                      |
|-------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------|
| Motor series and size                                                                           |                                | DRN../DRU../DR2.63 – 355                                                |
| Pulse output                                                                                    |                                | sin/cos + SSI, RS422                                                    |
| Supply voltage                                                                                  | V <sub>B</sub>                 | DC 7 V – 30 V                                                           |
| Supply voltage for design as safety encoder                                                     | V <sub>B,FS</sub>              | DC 7 V – 30 V                                                           |
| Maximum current consumption, free of load                                                       | I <sub>in</sub>                | 100 mA (at V <sub>B</sub> = 7 V)                                        |
| Maximum pulse frequency                                                                         | f <sub>pulse_max</sub>         | 200 kHz                                                                 |
| Direction of rotation                                                                           |                                | A before B when looking at the motor output shaft in clockwise rotation |
| Incremental tracks; periods per revolution                                                      | A, B                           | 2048 (11 bits)                                                          |
|                                                                                                 | C                              | –                                                                       |
| Position resolution, increments per revolution                                                  | A, B                           | 4096 (12 bits)<br>(SSI, RS422)                                          |
| Accuracy of the incremental section <sup>2)</sup>                                               |                                | ±0.0194° (±70")                                                         |
| Accuracy of the absolute section                                                                |                                | ±1 LSB (Least Significant Bit)                                          |
| Voltage output signal differential (peak-to-peak) (A' = A - $\bar{A}$ ; B' = B - $\bar{B}$ )    | V <sub>t_diff</sub>            | 1 V ± 10%                                                               |
| Voltage output signal non-differential (peak-to-peak)                                           | V <sub>t</sub>                 | 0.5 V ± 10%                                                             |
| Signal level output, offset nominal against 0 V (A, B, C, $\bar{A}$ , $\bar{B}$ , $\bar{C}$ ) V | V <sub>t_o</sub>               | 2.5 V ± 0.3 V                                                           |
| Total harmonic distortion (THD)                                                                 |                                | 40 dB (1%), 60 dB (0.1%) from 7th harmonic                              |
| Load resistance/load current differential                                                       | R <sub>L</sub> /I <sub>L</sub> | 120 Ω ± 10%                                                             |
| Resistance between track and reference ground                                                   | R <sub>gnd</sub>               | ≥ 1 kΩ                                                                  |
| Load capacitance, output                                                                        |                                | ≤ 20 nF                                                                 |
| Voltage output signal differential (peak-to-peak) (D' = D - $\bar{D}$ )                         | V <sub>t_diff</sub>            | Typical: 6.6 V to 10 V (± 10%)                                          |
| Voltage output signal non-differential (peak-to-peak) (D, /D)                                   | V <sub>t</sub>                 | Typical: 3.3 V to 5 V (± 10%)                                           |
| Signal level output, offset nominal against 0 V (D, /D) V                                       | V <sub>t_o</sub>               | Typical: 0 V                                                            |
| Voltage input signal differential (peak-to-peak) (D' = D - $\bar{D}$ )                          | V <sub>t_diff</sub>            | Typical: 6.6 V to 10 V (± 10%)                                          |
| Voltage input signal non-differential (peak-to-peak) (D, /D)                                    | V <sub>t</sub>                 | Typical: 3.3 V to 5 V (± 10%)                                           |
| Signal level input, offset nominal against 0 V (D, /D) V                                        | V <sub>t_o</sub>               | Typical: 0 V                                                            |
| Voltage output signal, differential (C' = C - $\bar{C}$ ) (peak-to-peak)                        | V <sub>t_diff_e</sub>          | –                                                                       |
| C track offset                                                                                  | g                              | –                                                                       |
| Voltage output signal, non-differential (C, $\bar{C}$ ) (peak-to-peak)                          | V <sub>t_C</sub>               | –                                                                       |
| Phase angle track C', n = constant                                                              | k, l                           | –                                                                       |

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| Encoder                                                                        |                          | Size, unit       | AK8Y <sup>1)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------|--------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Signal width track C                                                           |                          | W <sub>C</sub>   | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Signal logic track C                                                           |                          |                  | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Pulse duty factor in accordance with IEC 60469-1, n = constant                 |                          |                  | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Phase offset A : B; $\bar{A}$ : $\bar{B}$<br>n = constant                      |                          |                  | 90° ±2°                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Scanning code/counting direction                                               |                          |                  | Gray code, ascending with the direction of rotation specified above                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Multi-turn resolution                                                          |                          |                  | 4096 revolutions (12 bits)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Communication, interface                                                       |                          |                  | SSI (synchronous, serial)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Communication, modules                                                         |                          |                  | Driver to EIA RS422                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Clock frequency/bandwidth                                                      |                          |                  | 100 – 800 kHz (100 m cable length with maximum 300 kHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Clock-pulse space period                                                       |                          |                  | > 30 µs <sup>3)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Vibration resistance in accordance with EN 60068-2-6                           |                          |                  | ≤ 10 g (f > 18.5 Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Shock resistance in accordance with EN 60068-2-27                              |                          |                  | ≤ 100 g (t = 6 ms, 18 pulses)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Maximum permissible magnetic field external to the motor (outer motor contour) |                          |                  | 25 mT / 20 kA/m (on the encoder housing: 10 mT / 8 kA/m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Maximum speed                                                                  |                          | n <sub>max</sub> | 6000 min <sup>-1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Maximum cable length <sup>4)</sup>                                             |                          |                  | 100 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Duration until fault message (deactivated outputs) <sup>5)</sup>               |                          |                  | ≤ 25 ms + 3/4 revolution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Activation time of the encoder-internal diagnostics after switching on         |                          |                  | 200 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Degree of protection according to EN 60529                                     |                          |                  | IP66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Installation altitude                                                          |                          | h                | ≤ 4000 m above sea level                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                |                          |                  | In areas at risk of explosion: Permitted external pressure 0.8 – 1.1 bar (at typical height ≤ 1800 m above sea level)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Explosion protection marking ATEX/IECEx                                        |                          |                  | ATEX equipment category 3 (3G, 3D, 3GD)<br>II3G Ex ec IIC T4 Gc<br>II3D Ex tc IIIC T120°C Dc<br>IECEx EPL c (3G-c, 3D-c, 3GD-c)<br>Ex ec IIC T4 Gc<br>Ex tc IIIC T120°C Dc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| IECEx certificate of conformity depending on encoder                           |                          |                  | IECEx IBE 18.0032X<br>IECEx CSA 21.0010X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Corrosion protection; surface protection                                       |                          |                  | KS, OS1 – OS4, OSG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Connection                                                                     |                          |                  | <ul style="list-style-type: none"> <li>• M23 signal connector on the terminal box (optionally with or without temperature sensor)</li> <li>• Terminal strip in the terminal box (optionally with or without temperature sensor)</li> <li>• M23 with 0.36 m cable directly on the encoder (without temperature sensor)</li> <li>• Integrated encoder connector on the fan guard side (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor</li> <li>• Integrated encoder connector at the rear of the fan guard (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor<sup>6)</sup></li> </ul> |
| Storage temperature                                                            |                          | °C               | -15 to +70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Maximum angular acceleration                                                   |                          |                  | 2×10 <sup>4</sup> rad/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Electronic nameplate                                                           |                          |                  | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Maximum degree of pollution during installation work                           |                          |                  | Degree of pollution 1 (IEC 61010-1, EN 60664-1, VDE 0110-1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Ambient temperature of motor                                                   | DRN../DR2../DRU63 – 132  | °C               | -30 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                                | DRN../DR2../DRU160 – 355 | °C               | -30 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                                | EDRN71 – 355             | °C               | -30 to +60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

| Encoder           | Size, unit | AK8Y <sup>1)</sup> |
|-------------------|------------|--------------------|
| Functional safety |            | ✓                  |

- 1) See figure "Sin/cos signals and phase relationship".
- 2) Due to the stiffness of the torque bracket, you have to take into account an automatically resetting twist of  $\pm 0.6^\circ$  (depending on the direction of rotation) of the encoder housing compared to the encoder shaft.
- 3) Double query in preparation.
- 4) Observe the requirements for the cables.
- 5) The encoder has a self-diagnostic function. If a fault is detected, the sensor reports it to the encoder evaluation unit by deactivating the output signals.
- 6) Note that the permissible ambient temperature of the motor is limited with this connection variant. Contact SEW-EURODRIVE with regard to this.

## AK8Z

|                                                                                 | Size, unit       | AK8Z                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Capability class                                                                |                  | High class                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Motor series and size                                                           |                  | DRN../DRU../DR2.71 – 180 (200/225 in preparation)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Combination of brake/brake control                                              |                  | With motor-integrated BG1Z brake control: BE.. brake<br>With motor-external brake control: BE.. brake, BE.. safety brake                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Combination of motor protection/temperature                                     |                  | Motor protection: TF (in winding)<br>Motor protection/motor temperature: PI (Pt1000 in stator housing and motor temperature model with MOVI-C® inverters)                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Combination of forced cooling fans                                              |                  | ✓                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Encoder type                                                                    |                  | Multi-turn absolute encoder                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Encoder sensors                                                                 |                  | Optical                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Interface                                                                       |                  | MOVILINK® DDI, coaxial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| MOVILINK® DDI type code                                                         |                  | DI.E..                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Electronic nameplate                                                            |                  | ET2000 (MOVILINK® DDI, integrated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Voltage supply                                                                  |                  | DC 24 V (MOVILINK® DDI, integrated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Current requirement                                                             | mA               | 107 mA (without encoder: 60 mA)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Run-up time after switching on                                                  | ms               | < 3000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Duration until fault message <sup>1)</sup> (deactivated outputs)                | ms               | 26 ms + 3/4 revolution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Response time <sup>2)</sup> (Position, speed, acceleration)                     | ms               | 1 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Incremental resolution<br>(Position increments per motor revolution)            |                  | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Single-turn resolution<br>(Position resolution per motor revolution)            |                  | 65536 inc (16 bits)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Multi-turn resolution<br>(maximum counter value for complete motor revolutions) |                  | 65536 inc (16 bits)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Accuracy of the incremental section <sup>3)</sup>                               |                  | ±0.0194° (±70")                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Accuracy of the absolute section                                                |                  | 13 bits (± 3 LSB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Maximum permitted magnetic field external to the motor                          |                  | Outer contour of the motor: 25 mT / 20 kA/m<br>On the encoder housing: 10 mT / 8 kA/m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Vibration resistance in accordance with EN 60068-2-6                            |                  | ≤ 10 g (f > 18.5 Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Shock resistance in accordance with EN 60068-2-27                               |                  | ≤ 100 g (t = 6 ms, 18 pulses)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Maximum speed                                                                   | n <sub>max</sub> | 6000 min <sup>-1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Maximum angular acceleration                                                    |                  | 2 × 10 <sup>4</sup> rad/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Degree of protection in accordance with EN 60529                                |                  | IP66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Corrosion and surface protection                                                |                  | KS, OS1 – OS4, OSG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Installation altitude <sup>4)</sup>                                             | h                | ≤ 3800 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Ambient temperature of motor <sup>4)</sup>                                      | °C               | With MOVI-C® control cabinet inverters and MOVIMOT® flexible decentralized inverter: -40 to +60<br>With MOVIMOT® advanced decentralized inverters: See the MOVIMOT® advanced operating instructions/manual                                                                                                                                                                                                                                                                                                                                                                          |
| Cable length, maximum <sup>5)</sup>                                             | l                | 200 m<br>AK8Z safety encoder: 100 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Connection technology                                                           |                  | <ul style="list-style-type: none"> <li>KD1: M23 hybrid connector on the terminal box, 1.5 – 4.0 mm<sup>2</sup> motor connection, 1.0 mm<sup>2</sup> brake connection</li> <li>KDB: M40 hybrid connector on the terminal box, 6.0 – 10.0 mm<sup>2</sup> motor connection, 1.5 mm<sup>2</sup> brake connection</li> <li>KD: Cable gland on the terminal box for hybrid cables with 1.5 – 10 mm<sup>2</sup> motor connection and 1 – 1.5 mm<sup>2</sup> brake connection</li> <li>KDD: Motor and brake connection via cable gland; M23 signal connector on the terminal box</li> </ul> |
| Explosion protection                                                            |                  | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

|                   | Size, unit | AK8Z |
|-------------------|------------|------|
| Functional safety |            | ✓    |

- 1) The safety encoder has a self-diagnostic function. If a fault is detected, the sensor reports it to the evaluation electronics by deactivating the output signals (CS..A safety option).
- 2) In addition, observe the filter times set in the CS..A safety option.
- 3) Due to the stiffness of the torque bracket, you have to take into account an automatically resetting twist of  $\pm 0.6^\circ$  (depending on the direction of rotation) of the encoder housing compared to the encoder shaft.
- 4) Observe the restrictions of the ambient temperature and potential derating of the respective motor/inverter when used at an increased ambient temperature and/or depending on the installation altitude.
- 5) Also dependent on the selected inverter type and configured PWM frequency and/or brake type; see documentation of the respective inverters.

## AV8.

| Encoder                                                                                            | Size, unit                     | AV8Y                                                                    | AV8W <sup>1)</sup>                                                    | AV8H <sup>2)</sup>                                                    |
|----------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|
| Motor series and size                                                                              |                                | DRN../DRU../DR2.71 – 355                                                |                                                                       |                                                                       |
| Signal output                                                                                      |                                | sin/cos + SSI, RS422                                                    | sin/cos + RS485                                                       | HIPERFACE®                                                            |
| Supply voltage                                                                                     | V <sub>B</sub>                 | DC 7 V – 30 V                                                           | DC 7 V – 30 V                                                         | DC 7 V – 12 V                                                         |
| Supply voltage for design as safety encoder                                                        | V <sub>B,FS</sub>              | DC 7 V – 30 V                                                           | DC 7 V – 30 V                                                         | –                                                                     |
| Maximum current consumption, free of load                                                          | I <sub>in</sub>                | 100 mA (at V <sub>B</sub> = 7 V)                                        | 100 mA (at V <sub>B</sub> = 7 V)                                      | 80 mA                                                                 |
| Maximum pulse frequency                                                                            | f <sub>pulse_max</sub>         | 200 kHz                                                                 |                                                                       |                                                                       |
| Direction of rotation                                                                              |                                | A before B when looking at the motor output shaft in clockwise rotation |                                                                       |                                                                       |
| Incremental tracks; periods per revolution                                                         | A, B                           | 2048 (11 bits)                                                          | 2048 (11 bits)                                                        | 1024 (10 bits)                                                        |
|                                                                                                    | C                              | –                                                                       |                                                                       |                                                                       |
| Incremental tracks, increments per revolution                                                      | A, B                           | 8192 (13 bits)                                                          | 8192 (13 bits)                                                        | 4096 (12 bits)                                                        |
| Position resolution, positions per revolution, digital protocol                                    | digital                        | 4096 (12 bits)<br>(SSI, RS422)                                          | 65536 (16 bits)<br>(RS485)                                            | 32768 (15 bits)<br>HIPERFACE®                                         |
| Accuracy of the incremental section <sup>3)</sup>                                                  |                                | ±0.0194° (±70")                                                         | ±0.0194° (±70")                                                       | ±0.0125° (±45")                                                       |
| Accuracy of the absolute section                                                                   |                                | ±1 LSB (Least Significant Bit)                                          | ±3 LSB (Least Significant Bit)                                        | ±0.0144° (±52")                                                       |
| Voltage output signal differential (peak-to-peak)<br>(A' = A - $\bar{A}$ ; B' = B - $\bar{B}$ )    | V <sub>t,diff</sub>            | 1 V ± 10%                                                               | 1 V ± 10%                                                             | Typical: 6.6 V to 10 V<br>(± 10%)                                     |
| Voltage output signal non-differential (peak-to-peak)                                              | V <sub>t</sub>                 | 0.5 V ± 10%                                                             | 0.5 V ± 10%                                                           | Typical: 3.3 V to 5 V<br>(± 10%)                                      |
| Signal level output, offset nominal against 0 V<br>(A, B, C, $\bar{A}$ , $\bar{B}$ , $\bar{C}$ ) V | V <sub>t,o</sub>               | 2.5 V ± 0.3 V                                                           | 2.5 V ± 0.3 V                                                         | Typical: 0 V                                                          |
| Total harmonic distortion (THD)                                                                    |                                | 40 dB (1%), 60 dB (0.1%) from 7th harmonic                              |                                                                       |                                                                       |
| Load resistance/load current differential                                                          | R <sub>L</sub> /I <sub>L</sub> | 120 Ω ± 10%                                                             | 120 Ω ± 10%                                                           | 120 Ω ± 10%                                                           |
| Resistance between track and reference ground                                                      | R <sub>gnd</sub>               | ≥ 1 kΩ                                                                  | ≥ 1 kΩ                                                                | ≥ 1 kΩ                                                                |
| Load capacitance, output                                                                           |                                | ≤ 20 nF                                                                 | ≤ 20 nF                                                               | ≤ 20 nF                                                               |
| Voltage output signal, differential (C' = C - $\bar{C}$ ) (peak-to-peak)                           | V <sub>t,diff,e</sub>          | –                                                                       | –                                                                     | –                                                                     |
| C track offset                                                                                     | g                              | –                                                                       | –                                                                     | –                                                                     |
| Voltage output signal, non-differential (C, $\bar{C}$ ) (peak-to-peak)                             | V <sub>t,C</sub>               | –                                                                       | –                                                                     | –                                                                     |
| Phase angle track C', n = constant                                                                 | k, l                           | –                                                                       | –                                                                     | See "Phase relationships" (→ 136)                                     |
| Signal width track C                                                                               | W <sub>C</sub>                 | See "Phase relationships" (→ 136)                                       |                                                                       |                                                                       |
| Signal logic track C                                                                               |                                | –                                                                       |                                                                       |                                                                       |
| Pulse duty factor in accordance with IEC 60469-1, n = constant                                     |                                | –                                                                       |                                                                       |                                                                       |
| Phase offset A : B; $\bar{A}$ : $\bar{B}$<br>n = constant                                          |                                | 90° ± 2°                                                                |                                                                       |                                                                       |
| Scanning code/counting direction                                                                   |                                | Gray code, ascending with the direction of rotation specified above     | Binary code, ascending with the direction of rotation specified above | Binary code, ascending with the direction of rotation specified above |
| Multi-turn resolution                                                                              |                                | 4096 revolutions (12 bits)                                              | 65536 revolutions (16 bits)                                           | 4096 revolutions (12 bits)                                            |
| Communication, interface                                                                           |                                | SSI (synchronous, serial)                                               | RS485 (asynchronous, serial)                                          | HIPERFACE®                                                            |
| Communication, modules                                                                             |                                | Driver to EIA RS422                                                     | Driver to EIA RS485                                                   | Driver to EIA RS485                                                   |
| Clock frequency/bandwidth                                                                          |                                | 100 – 800 kHz (100 m cable length with maximum 300 kHz)                 | 9600 baud                                                             | HIPERFACE®                                                            |
| Clock-pulse space period                                                                           |                                | Typical: > 30 μs <sup>4)</sup>                                          | –                                                                     | –                                                                     |

| Encoder                                                                | Size, unit              | AV8Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | AV8W <sup>1)</sup>                                                          | AV8H <sup>2)</sup>                    |
|------------------------------------------------------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------|
| Vibration resistance in accordance with EN 60068-2-6                   |                         | $\leq 10 \text{ g (f > 18.5 Hz)}$                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                             |                                       |
| Shock resistance in accordance with EN 60068-2-27                      |                         | $\leq 100 \text{ g (t = 6 ms, 18 pulses)}$                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                             |                                       |
| Maximum speed                                                          | $n_{\max}$              | $6000 \text{ min}^{-1}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                             |                                       |
| Maximum cable length <sup>5)</sup>                                     |                         | 100 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                             |                                       |
| Duration until fault message (deactivated outputs) <sup>6)</sup>       |                         | $\leq 25 \text{ ms} + 3/4 \text{ revolution}$                                                                                                                                                                                                                                                                                                                                                                                                                                             | $\leq 25 \text{ ms} + 3/4 \text{ revolution}$                               | HIPERFACE®                            |
| Activation time of the encoder-internal diagnostics after switching on |                         | 200 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 200 ms                                                                      | HIPERFACE®                            |
| Degree of protection according to EN 60529                             |                         | IP66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                             | IP65                                  |
| Installation altitude                                                  | h                       | $\leq 4000 \text{ m above sea level}$<br>In areas at risk of explosion: Permitted external pressure 0.8 – 1.1 bar (at typical height $\leq 1800 \text{ m above sea level}$ )                                                                                                                                                                                                                                                                                                              | $\leq 4000 \text{ m above sea level}$                                       | $\leq 2000 \text{ m above sea level}$ |
| Explosion protection mark ATEX/IECEX                                   |                         | ATEX equipment category 3 (3G, 3D, 3GD)<br>IECEX EPL .c (3G-c, 3D-c, 3GD-c)                                                                                                                                                                                                                                                                                                                                                                                                               | ATEX equipment category 3 (3G, 3D, 3GD)<br>IECEX EPL .c (3G-c, 3D-c, 3GD-c) | –                                     |
| IECEX certificate of conformity                                        |                         | IECEX IBE 18.0032X                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | IECEX IBE 18.0032X                                                          | –                                     |
| Corrosion protection; surface protection                               |                         | KS, OS1 – OS4, OSG                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                             |                                       |
| Connection                                                             |                         | <ul style="list-style-type: none"> <li>M23 connector with 0.36 m cable directly on the encoder (without temperature sensor)</li> <li>Integrated encoder connector on the fan guard side (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor</li> <li>Integrated encoder connector at the rear of the fan guard (can be preassembled and plugged in the field); optionally with M23 connector, without temperature sensor</li> </ul> |                                                                             |                                       |
| Storage temperature                                                    | °C                      | -15 to +70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                             |                                       |
| Maximum angular acceleration                                           |                         | $2 \times 10^4 \text{ rad/s}^2$                                                                                                                                                                                                                                                                                                                                                                                                                                                           | $2 \times 10^4 \text{ rad/s}^2$                                             | $10^4 \text{ rad/s}^2$                |
| Electronic nameplate                                                   |                         | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | RS485 (serial, asynchronous); 1920 bytes                                    | HIPERFACE®; 1792 bytes                |
| Maximum degree of pollution during installation work                   |                         | Degree of pollution 1 (IEC 61010-1, EN 60664-1, VDE 0110-1)                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                             |                                       |
| Ambient temperature of motor                                           | DRN../DR2../DRU71 – 250 | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -30 to +60                                                                  | -30 to +60                            |
|                                                                        | DRN../DR2../DRU280      | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -30 to +40                                                                  | -30 to +40                            |
|                                                                        | EDRN71 – 280S           | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -30 to +60                                                                  | –                                     |
|                                                                        | EDRN280M                | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -30 to +40                                                                  | –                                     |
|                                                                        | DR2C71 – 180            | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | –                                                                           | -30 to +60                            |
| Functional safety                                                      |                         | –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                             |                                       |

- 1) See figure "Sin/cos signals and phase relationship".
- 2) Observe the specification for the HIPERFACE® interface, Sick AG.
- 3) Due to the stiffness of the torque bracket, you have to take into account an automatically resetting twist of  $\pm 0.6^\circ$  (depending on the direction of rotation) of the encoder housing compared to the encoder shaft.
- 4) Double query in preparation.
- 5) Observe the requirements for the cables.
- 6) The encoder has a self-diagnostic function. If a fault is detected, the sensor reports it to the encoder evaluation unit by deactivating the output signals.

## 6.4.8 A.7W

## AS7W, AV7W, AG7W

Note the following regarding the encoder interfaces:

The electrical specifications of encoders with the ...W interface (sin/cos + RS485) correspond to the sin/cos signal definitions of the HIPERFACE® interface. However, in the digital interface RS485, they deviate from the HIPERFACE® standard and are only suitable for operation on inverters from SEW-EURODRIVE.

| Encoder                                                                   | Size, unit        | AS7W                                                                                                                                | AV7W                    | AG7W                    |
|---------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|
| Motor series and size                                                     |                   | DRN../DRU../DR2.71 – 280                                                                                                            |                         |                         |
| Supply voltage                                                            | V <sub>B</sub>    | DC 7 V – 30 V                                                                                                                       |                         |                         |
| Maximum current consumption                                               | I <sub>in</sub>   | 150 mA                                                                                                                              |                         |                         |
| Maximum pulse frequency                                                   | f <sub>max</sub>  | 200 kHz                                                                                                                             |                         |                         |
| Incremental tracks; periods per revolution                                | A, B              | 2048 (11 bits)                                                                                                                      |                         |                         |
|                                                                           | C                 | –                                                                                                                                   |                         |                         |
| Output amplitude per track                                                | V <sub>high</sub> | 1 V <sub>pp</sub>                                                                                                                   |                         |                         |
|                                                                           | V <sub>low</sub>  |                                                                                                                                     |                         |                         |
| Signal output                                                             |                   | Sin/cos                                                                                                                             |                         |                         |
| Output current per track                                                  | I <sub>out</sub>  | 10 mA                                                                                                                               |                         |                         |
| Pulse duty factor in accordance with IEC 60469-1, n = constant            |                   | –                                                                                                                                   |                         |                         |
| Phase offset A : B<br>n = constant                                        |                   | 90° ± 2°                                                                                                                            |                         |                         |
| Accuracy of the incremental section <sup>1)</sup>                         |                   | ±0.0194° (±70")                                                                                                                     |                         |                         |
| Accuracy of the absolute section                                          |                   | ±1 LSB (Least Significant Bit)                                                                                                      |                         |                         |
| Scanning code                                                             |                   | Binary code                                                                                                                         |                         |                         |
| Position resolution, increments per revolution                            | A, B              | 8192 (13 bits)                                                                                                                      |                         |                         |
| Multi-turn resolution                                                     |                   | 65536 revolutions (16 bits)                                                                                                         |                         |                         |
| Data transmission                                                         |                   | RS485                                                                                                                               |                         |                         |
| Serial data output                                                        |                   | Driver to EIA RS485                                                                                                                 |                         |                         |
| Serial pulse input                                                        |                   | Recommended driver to EIA RS485                                                                                                     |                         |                         |
| Clock frequency                                                           |                   | 9600 baud                                                                                                                           |                         |                         |
| Clock-pulse space period                                                  |                   | –                                                                                                                                   |                         |                         |
| Vibration resistance in accordance with EN 60068-2-6                      |                   | ≤ 100 m/s <sup>2</sup>                                                                                                              |                         |                         |
| Shock resistance in accordance with EN 60068-2-27                         |                   | ≤ 1000 m/s <sup>2</sup>                                                                                                             | ≤ 1000 m/s <sup>2</sup> | ≤ 2000 m/s <sup>2</sup> |
| Maximum speed                                                             | n <sub>max</sub>  | 6000 min <sup>-1</sup>                                                                                                              |                         |                         |
|                                                                           |                   | In area at risk of explosion:<br>-30 to +40 °C at maximum<br>6000 min <sup>-1</sup><br>> 40 °C at maximum<br>4500 min <sup>-1</sup> |                         |                         |
| Duration until fault message (deactivated outputs) <sup>2)</sup>          |                   | 25 ms + 3/4 revolution                                                                                                              |                         |                         |
| Activation time of rotary encoder internal diagnostics after switching on |                   | –                                                                                                                                   |                         |                         |
| Degree of protection according to EN 60529                                |                   | IP66                                                                                                                                |                         |                         |
| Installation altitude                                                     | h                 | ≤ 4000 m above sea level                                                                                                            |                         |                         |
|                                                                           |                   | In areas at risk of explosion: Permitted external pressure 0.8 – 1.1 bar (at typical height ≤ 1800 m above sea level)               |                         |                         |
| Explosion protection mark ATEX/IECEx                                      |                   | ATEX equipment category 3 (3G, 3D, 3GD)<br>IECEx EPL .c (3G-c, 3D-c, 3GD-c)                                                         |                         |                         |
| IECEx certificate of conformity                                           |                   | IECEx IBE 18.0032X                                                                                                                  |                         |                         |
| Connection                                                                |                   | Terminal strip in pluggable connection cover                                                                                        |                         |                         |

| Encoder                                              |                           | Size,<br>unit | AS7W                                                        | AV7W       | AG7W       |
|------------------------------------------------------|---------------------------|---------------|-------------------------------------------------------------|------------|------------|
| Storage temperature                                  |                           | °C            | -15 to +70                                                  |            |            |
| Maximum angular acceleration                         |                           |               | 10 <sup>4</sup> rad/s <sup>2</sup>                          |            |            |
| Maximum degree of pollution during installation work |                           |               | Degree of pollution 2 (IEC 61010-1, EN 60664-1, VDE 0110-1) |            |            |
| Ambient temperature of motor                         | DRN../DR2../DRU71 – 132S  | °C            | -30 to +60                                                  | –          | –          |
|                                                      | DRN../DR2../DRU132M – 280 | °C            | –                                                           | –          | -30 to +60 |
|                                                      | DRN../DR2../DRU71 – 250   | °C            | –                                                           | -30 to +60 | –          |
|                                                      | DRN../DR2../DRU280        | °C            | –                                                           | -30 to +40 | –          |
|                                                      | EDRN80MS – 132S           | °C            | -30 to +60                                                  | -30 to +60 | -30 to +60 |
|                                                      | EDRN132M-200L             | °C            | -30 to +60                                                  | -30 to +50 | -30 to +60 |
|                                                      | EDRN225                   | °C            | -30 to +60                                                  | -30 to +60 | -30 to +60 |
|                                                      | EDRN250-280               | °C            | -30 to +60                                                  | -30 to +40 | -30 to +60 |
| Functional safety                                    |                           |               | ✓                                                           | –          | ✓          |

- 1) Due to the stiffness of the torque bracket, you have to take into account an automatically resetting twist of  $\pm 0.6^\circ$  (depending on the direction of rotation) of the encoder housing compared to the encoder shaft.
- 2) The encoder has a self-diagnostic function. If a fault is detected, the sensor reports it to the encoder evaluation unit by deactivating the output signals.



## 6.4.9 A.7Y

## AG7Y, AH7Y

| Encoder                                                                   | Size, unit         | AG7Y                                                                                                                          | AH7Y                                         |
|---------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| Motor series and size                                                     |                    | DRN../DRU../DR2.71 – 280                                                                                                      |                                              |
| Signal output                                                             |                    | Sin/cos                                                                                                                       | TTL (RS422)                                  |
| Supply voltage                                                            | V <sub>B</sub>     | DC 7 V – 30 V                                                                                                                 | DC 9 V – 30 V                                |
| Maximum current consumption                                               | I <sub>in</sub>    | 150 mA                                                                                                                        |                                              |
| Maximum pulse frequency                                                   | f <sub>limit</sub> | 200 kHz                                                                                                                       | 120 kHz                                      |
| Incremental tracks; periods per revolution                                | A, B               | 2048 (11 bits)                                                                                                                |                                              |
|                                                                           | C                  | –                                                                                                                             |                                              |
| Output amplitude per track                                                | V <sub>high</sub>  | 1 V <sub>pp</sub>                                                                                                             | ≥ DC 2.5 V <sub>pp</sub>                     |
|                                                                           | V <sub>low</sub>   | 1 V <sub>pp</sub>                                                                                                             | ≤ DC 0.5 V <sub>pp</sub>                     |
| Output current per track                                                  | I <sub>out</sub>   | 10 mA                                                                                                                         | 20 mA                                        |
| Pulse duty factor in accordance with IEC 60469-1, n = constant            |                    | Not available                                                                                                                 | 50 ±20%                                      |
| Phase offset A : B<br>n = constant                                        |                    | 90° ± 2°                                                                                                                      | 90° ± 20°                                    |
| Accuracy of the incremental section <sup>1)</sup>                         |                    | ±0.0194° (±70")                                                                                                               | –                                            |
| Accuracy of the absolute section                                          |                    | ±1 LSB (Least Significant Bit)                                                                                                | –                                            |
| Scanning code                                                             |                    | Gray code                                                                                                                     |                                              |
| Position resolution, increments per revolution                            | A, B               | 8192 (13 bits)                                                                                                                |                                              |
| Position resolution of the absolute section, increments per revolution    |                    | 4096 (12 bits)                                                                                                                |                                              |
| Multi-turn resolution                                                     |                    | 4096 revolutions (12 bits)                                                                                                    |                                              |
| Data transmission                                                         |                    | synchronous serial (SSI)                                                                                                      |                                              |
| Serial data output                                                        |                    | Driver to EIA RS422                                                                                                           | Driver to EIA RS485                          |
| Serial pulse input                                                        |                    | Recommended receiver to EIA RS422                                                                                             | Optocoupler, recommended driver to EIA RS485 |
| Clock frequency                                                           |                    | 100 – 800 kHz                                                                                                                 |                                              |
| Clock-pulse space period                                                  |                    | 12 – 30 µs                                                                                                                    |                                              |
| Vibration resistance in accordance with EN 60068-2-6                      |                    | ≤ 100 m/s <sup>2</sup>                                                                                                        |                                              |
| Shock resistance in accordance with EN 60068-2-27                         |                    | ≤ 2000 m/s <sup>2</sup>                                                                                                       | ≤ 2000 m/s <sup>2</sup>                      |
| Maximum speed                                                             | n <sub>max</sub>   | 6000 min <sup>-1</sup>                                                                                                        | 3500 min <sup>-1</sup>                       |
|                                                                           |                    | In area at risk of explosion:<br>-30 to +40 °C at maximum 6000 min <sup>-1</sup><br>> 40 °C at maximum 4500 min <sup>-1</sup> |                                              |
| Duration until fault message (deactivated outputs) <sup>2)</sup>          |                    | 25 ms + 3/4 revolution                                                                                                        | –                                            |
| Activation time of rotary encoder internal diagnostics after switching on |                    | –                                                                                                                             |                                              |
| Degree of protection according to EN 60529                                |                    | IP66                                                                                                                          | IP56                                         |
| Installation altitude                                                     | h                  | ≤ 4000 m above sea level                                                                                                      |                                              |
|                                                                           |                    | In areas at risk of explosion: Permitted external pressure 0.8 – 1.1 bar (at typical height ≤ 1800 m above sea level)         |                                              |
| Explosion protection mark ATEX/IECEx                                      |                    | ATEX equipment category 3 (3G, 3D, 3GD)<br>IECEx EPL .c (3G-c, 3D-c, 3GD-c)                                                   | ATEX equipment category 3 (3G, 3D, 3GD)      |
| IECEx certificate of conformity                                           |                    | IECEx IBE 18.0032X                                                                                                            | –                                            |
| Connection                                                                |                    | Terminal strip in pluggable connection cover                                                                                  | Terminal strip on encoder                    |
| Storage temperature                                                       | °C                 | -15 to +70                                                                                                                    |                                              |
| Maximum angular acceleration                                              |                    | 10 <sup>4</sup> rad/s <sup>2</sup>                                                                                            |                                              |

| Encoder                                              |                           | Size, unit | AG7Y                                                        | AH7Y       |
|------------------------------------------------------|---------------------------|------------|-------------------------------------------------------------|------------|
| Maximum degree of pollution during installation work |                           |            | Degree of pollution 2 (IEC 61010-1, EN 60664-1, VDE 0110-1) |            |
| Ambient temperature of motor                         | DRN../DR2../DRU71 – 250   | °C         | –                                                           | -20 to +40 |
|                                                      | DRN../DR2../DRU132M – 280 | °C         | -30 to +60                                                  | –          |
|                                                      | DRN../DR2../DRU315        | °C         | –                                                           | -20 to +60 |
|                                                      | EDRN80MS – 132S           | °C         | -30 to +60                                                  | -20 to +60 |
|                                                      | EDRN132M – 200L           | °C         | -30 to +60                                                  | -20 to +60 |
|                                                      | EDRN225                   | °C         | -30 to +60                                                  | -20 to +60 |
|                                                      | EDRN250 – 280             | °C         | -30 to +60                                                  | -20 to +60 |
| Functional safety                                    |                           |            | ✓                                                           | –          |

- 1) Due to the stiffness of the torque bracket, you have to take into account an automatically resetting twist of  $\pm 0.6^\circ$  (depending on the direction of rotation) of the encoder housing compared to the encoder shaft.
- 2) The encoder has a self-diagnostic function. If a fault is detected, the sensor reports it to the encoder evaluation unit by deactivating the output signals.

## AS7Y, AV7Y

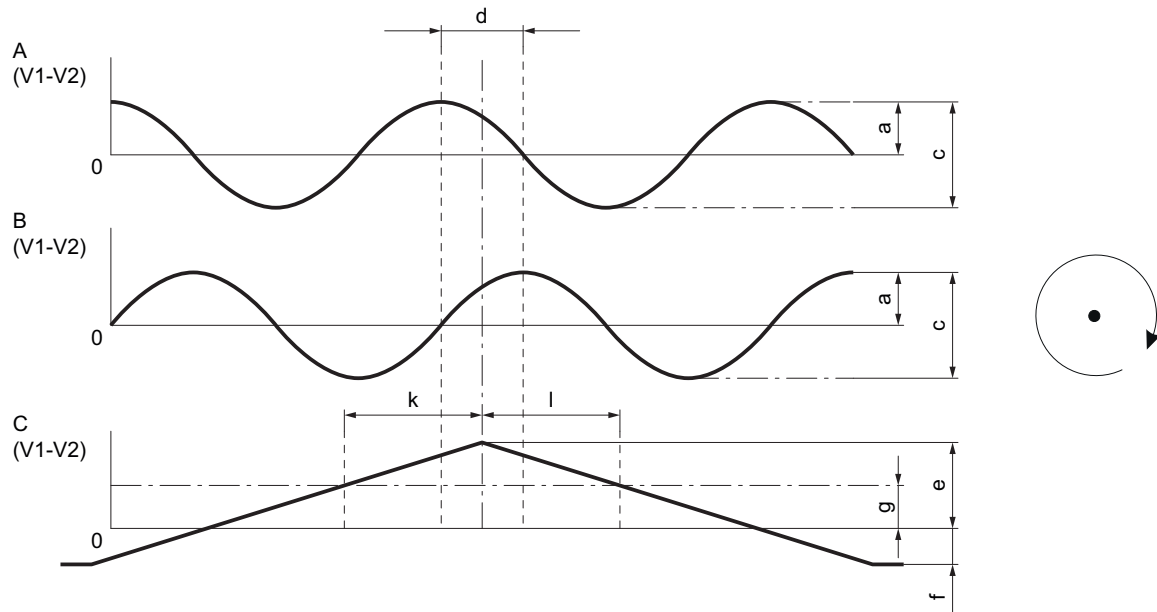
| Encoder                                                                   | Size, unit         | AS7Y                                                                                                                  | AV7Y                                                                        |
|---------------------------------------------------------------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Motor series and size                                                     |                    | DRN.../DRU.../DR2.71 – 315                                                                                            |                                                                             |
| Signal output                                                             |                    | Sin/cos                                                                                                               | Sin/cos                                                                     |
| Supply voltage                                                            | V <sub>B</sub>     | DC 7 V – 30 V                                                                                                         | DC 7 V – 30 V                                                               |
| Maximum current consumption                                               | I <sub>in</sub>    | 150 mA                                                                                                                |                                                                             |
| Maximum pulse frequency                                                   | f <sub>limit</sub> | 200 kHz                                                                                                               | 200 kHz                                                                     |
| Incremental tracks; periods per revolution                                | A, B               | 2048 (11 bits)                                                                                                        |                                                                             |
|                                                                           | C                  | –                                                                                                                     |                                                                             |
| Output amplitude per track                                                | V <sub>high</sub>  | 1 V <sub>pp</sub>                                                                                                     | 1 V <sub>pp</sub>                                                           |
|                                                                           | V <sub>low</sub>   | 1 V <sub>pp</sub>                                                                                                     | 1 V <sub>pp</sub>                                                           |
| Output current per track                                                  | I <sub>out</sub>   | 10 mA                                                                                                                 | 10 mA                                                                       |
| Pulse duty factor in accordance with IEC 60469-1, n = constant            |                    | –                                                                                                                     |                                                                             |
| Phase offset A : B<br>n = constant                                        |                    | 90° ± 2°                                                                                                              | 90° ± 2°                                                                    |
| Accuracy of the incremental section <sup>1)</sup>                         |                    | ±0.0194° (±70")                                                                                                       | ±0.0194° (±70")                                                             |
| Accuracy of the absolute section                                          |                    | ±1 LSB (Least Significant Bit)                                                                                        | ±1 LSB (Least Significant Bit)                                              |
| Scanning code                                                             |                    | Gray code                                                                                                             |                                                                             |
| Position resolution, increments per revolution                            | A, B               | 8192 (13 bits)                                                                                                        |                                                                             |
| Position resolution of the absolute section, increments per revolution    |                    | 4096 (12 bits)                                                                                                        |                                                                             |
| Multi-turn resolution                                                     |                    | 4096 revolutions (12 bits)                                                                                            |                                                                             |
| Data transmission                                                         |                    | synchronous serial (SSI)                                                                                              |                                                                             |
| Serial data output                                                        |                    | Driver to EIA RS422                                                                                                   | Driver to EIA RS422                                                         |
| Serial pulse input                                                        |                    | Recommended receiver to EIA RS422                                                                                     | Recommended receiver to EIA RS422                                           |
| Clock frequency                                                           |                    | 100 – 800 kHz                                                                                                         |                                                                             |
| Clock-pulse space period                                                  |                    | 12 – 30 µs                                                                                                            |                                                                             |
| Vibration resistance in accordance with EN 60068-2-6                      |                    | ≤ 100 m/s <sup>2</sup>                                                                                                |                                                                             |
| Shock resistance in accordance with EN 60068-2-27                         |                    | ≤ 1000 m/s <sup>2</sup>                                                                                               | ≤ 1000 m/s <sup>2</sup>                                                     |
| Maximum speed                                                             | n <sub>max</sub>   | 6000 min <sup>-1</sup>                                                                                                | 6000 min <sup>-1</sup>                                                      |
| Duration until fault message (deactivated outputs) <sup>2)</sup>          |                    | 25 ms + 3/4 revolution                                                                                                | 25 ms + 3/4 revolution                                                      |
| Activation time of rotary encoder internal diagnostics after switching on |                    | –                                                                                                                     |                                                                             |
| Degree of protection according to EN 60529                                |                    | IP66                                                                                                                  | IP66                                                                        |
| Installation altitude                                                     | h                  | ≤ 4000 m above sea level                                                                                              |                                                                             |
|                                                                           |                    | In areas at risk of explosion: Permitted external pressure 0.8 – 1.1 bar (at typical height ≤ 1800 m above sea level) |                                                                             |
| Explosion protection mark ATEX/IECEx                                      |                    | ATEX equipment category 3 (3G, 3D, 3GD)<br>IECEx EPL .c (3G-c, 3D-c, 3GD-c)                                           | ATEX equipment category 3 (3G, 3D, 3GD)<br>IECEx EPL .c (3G-c, 3D-c, 3GD-c) |
| IECEx certificate of conformity                                           |                    | IECEx IBE 18.0032X                                                                                                    | IECEx IBE 18.0032X                                                          |
| Connection                                                                |                    | Terminal strip in pluggable connection cover                                                                          | Terminal strip in pluggable connection cover                                |
| Storage temperature                                                       | °C                 | -15 to +70                                                                                                            |                                                                             |
| Maximum angular acceleration                                              |                    | 10 <sup>4</sup> rad/s <sup>2</sup>                                                                                    |                                                                             |
| Maximum degree of pollution during installation work                      |                    | Degree of pollution 2 (IEC 61010-1, EN 60664-1, VDE 0110-1)                                                           |                                                                             |

| Encoder                      |                          | Size, unit | AS7Y       | AV7Y       |
|------------------------------|--------------------------|------------|------------|------------|
| Ambient temperature of motor | DRN../DR2../DRU71 – 250  | °C         | –          | -30 to +60 |
|                              | DRN../DR2../DRU71 – 132S | °C         | -30 to +60 | –          |
|                              | DRN../DR2../DRU280       | °C         | –          | -30 to +40 |
|                              | EDRN80MS – 132S          | °C         | -30 to +60 | -30 to +60 |
|                              | EDRN132M – 200L          | °C         | -30 to +60 | -30 to +60 |
|                              | EDRN225                  | °C         | -30 to +60 | -30 to +60 |
|                              | EDRN250 – 280            | °C         | -30 to +60 | -30 to +40 |
| Functional safety            |                          |            | ✓          | –          |

- 1) Due to the stiffness of the torque bracket, you have to take into account an automatically resetting twist of  $\pm 0.6^\circ$  (depending on the direction of rotation) of the encoder housing compared to the encoder shaft.
- 2) The encoder has a self-diagnostic function. If a fault is detected, the sensor reports it to the encoder evaluation unit by deactivating the output signals.

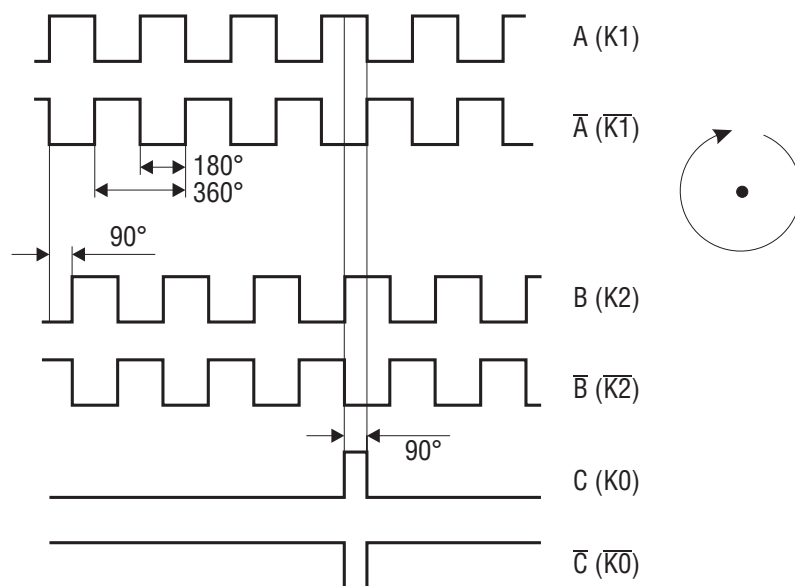
## 6.5 Phase relationships

### 6.5.1 sin/cos



28352869387

### 6.5.2 HTL/TTL



1369276939

## 6.6 Characteristic safety values for safety encoders

### INFORMATION



In addition to the documentation, you can also obtain the characteristic safety values of components by SEW-EURODRIVE in the SEW-EURODRIVE library for the "SIS-TEMA" software tool. The documentation and the library are available for download from [www.sew-eurodrive.com](http://www.sew-eurodrive.com).

#### 6.6.1 EI7C FS

|                                       | Characteristic safety values according to                                                 |                                                   |
|---------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------|
|                                       | EN 61800-5-2                                                                              | EN ISO 13849-1                                    |
| Classification                        | SIL 2                                                                                     | PL d                                              |
| System structure                      | HFT = 0                                                                                   | 1-channel (Cat. 2)                                |
| PFH <sub>D</sub> value <sup>1)</sup>  | $8.0 \times 10^{-8} \text{ 1/h} = 80 \text{ FIT}$ ( $T_{\text{amb}} \leq 60 \text{ °C}$ ) |                                                   |
| MTTF <sub>D</sub> value <sup>1)</sup> | –                                                                                         | 202 years ( $T_{\text{amb}} \leq 60 \text{ °C}$ ) |
| Service life/proof test interval      | 20 years                                                                                  |                                                   |
| Safe failure fraction (SFF)           | 95%                                                                                       |                                                   |

1) The specified values apply if the requirements for the evaluation electronics are adhered to.

## 6.6.2 EK8S

|                                                                                                                                           | Characteristic safety values according to                                                                                                                                              |                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
|                                                                                                                                           | EN 62061/EN 61508                                                                                                                                                                      | EN ISO 13849-1                                                                                          |
| Classification                                                                                                                            | SIL 2                                                                                                                                                                                  | PL d                                                                                                    |
| System structure                                                                                                                          | HFT = 1                                                                                                                                                                                | 2-channel (Cat. 3)                                                                                      |
| PFH <sub>D</sub> value <sup>1)</sup><br>( <b>without</b> mounting on the motor)                                                           | $1.53 \times 10^{-8} \text{ 1/h} = 15.3 \text{ FIT } (T_{\text{amb}} \leq 45 \text{ °C})$<br>$1.88 \times 10^{-8} \text{ 1/h} = 18.8 \text{ FIT } (T_{\text{amb}} \leq 60 \text{ °C})$ |                                                                                                         |
| MTTF <sub>D</sub> value <sup>1)</sup><br>( <b>without</b> mounting on the motor)                                                          | –                                                                                                                                                                                      | 1311 years ( $T_{\text{amb}} \leq 45 \text{ °C}$ )<br>934 years ( $T_{\text{amb}} \leq 60 \text{ °C}$ ) |
| PFH <sub>D</sub> value <sup>1)</sup><br>( <b>with</b> mounting on the motor;<br>takes into account a derating due<br>to motor reheating)  | $5.0 \times 10^{-8} \text{ 1/h} = 50 \text{ FIT } (T_{\text{amb}} \leq 60 \text{ °C})$                                                                                                 |                                                                                                         |
| MTTF <sub>D</sub> value <sup>1)</sup><br>( <b>with</b> mounting on the motor;<br>takes into account a derating due<br>to motor reheating) | –                                                                                                                                                                                      | 212 years ( $T_{\text{amb}} \leq 60 \text{ °C}$ )                                                       |
| Service life/proof test interval                                                                                                          | 20 years                                                                                                                                                                               |                                                                                                         |
| Motor/encoder connection<br>(only for drives <b>with</b> FS logo)                                                                         | Fault exclusion according to EN 61800-5-2                                                                                                                                              |                                                                                                         |

1) The specified values apply when the requirements for the encoder evaluation unit are met.

### 6.6.3 EK8W, AK8W, AK8Y

|                                                                                                                                           | Characteristic safety values according to                                                                                                                                              |                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
|                                                                                                                                           | EN 62061/EN 61508                                                                                                                                                                      | EN ISO 13849-1                                                                                           |
| Classification                                                                                                                            | SIL 2                                                                                                                                                                                  | PL d                                                                                                     |
| System structure                                                                                                                          | HFT = 1                                                                                                                                                                                | 2-channel (Cat. 3)                                                                                       |
| PFH <sub>D</sub> value <sup>1)</sup><br>( <b>without</b> mounting on the motor)                                                           | $1.42 \times 10^{-8} \text{ 1/h} = 14.2 \text{ FIT } (T_{\text{amb}} \leq 45 \text{ °C})$<br>$1.77 \times 10^{-8} \text{ 1/h} = 17.7 \text{ FIT } (T_{\text{amb}} \leq 60 \text{ °C})$ |                                                                                                          |
| MTTF <sub>D</sub> value <sup>1)</sup><br>( <b>without</b> mounting on the motor)                                                          | –                                                                                                                                                                                      | 1489 years ( $T_{\text{amb}} \leq 45 \text{ °C}$ )<br>1030 years ( $T_{\text{amb}} \leq 60 \text{ °C}$ ) |
| PFH <sub>D</sub> value <sup>1)</sup><br>( <b>with</b> mounting on the motor;<br>takes into account a derating due<br>to motor reheating)  | $5.0 \times 10^{-8} \text{ 1/h} = 50 \text{ FIT } (T_{\text{amb}} \leq 60 \text{ °C})$                                                                                                 |                                                                                                          |
| MTTF <sub>D</sub> value <sup>1)</sup><br>( <b>with</b> mounting on the motor;<br>takes into account a derating due<br>to motor reheating) | –                                                                                                                                                                                      | 212 years ( $T_{\text{amb}} \leq 60 \text{ °C}$ )                                                        |
| Service life/proof test interval                                                                                                          | 20 years                                                                                                                                                                               |                                                                                                          |
| Motor/encoder connection<br>(only for drives <b>with</b> FS logo)                                                                         | Fault exclusion according to EN 61800-5-2                                                                                                                                              |                                                                                                          |

1) The specified values apply when the requirements for the encoder evaluation unit are met.



## 6.6.4 AK8H

|                                                                                                                                          | Characteristic safety values according to                                               |                    |
|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|--------------------|
|                                                                                                                                          | EN 62061/EN 61508                                                                       | EN ISO 13849-1     |
| Classification                                                                                                                           | SIL 2                                                                                   | PL d               |
| System structure                                                                                                                         | HFT = 1                                                                                 | 2-channel (Cat. 3) |
| PFH <sub>D</sub> value <sup>1)</sup><br>( <b>without</b> mounting on the motor)                                                          | $1.7 \times 10^{-8} \text{ 1/h} = 17.0 \text{ FIT (T}_{\text{amb}} \leq 60 \text{ °C)}$ |                    |
| PFH <sub>D</sub> value <sup>1)</sup><br>( <b>with</b> mounting on the motor;<br>takes into account a derating due<br>to motor reheating) | $5.0 \times 10^{-8} \text{ 1/h} = 50 \text{ FIT (T}_{\text{amb}} \leq 60 \text{ °C)}$   |                    |
| Service life/proof test interval                                                                                                         | 20 years                                                                                |                    |
| Motor/encoder connection<br>(only for drives <b>with</b> FS logo)                                                                        | Fault exclusion according to EN 61800-5-2                                               |                    |

1) The specified values apply when the requirements for the encoder evaluation unit are met.

### 6.6.5 EK8Z, EK9Z, AK8Z

|                                                                                                                                  | Characteristic safety values according to                                             |                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                  | EN 61800-5-2                                                                          | EN ISO 13849-1                                                                                                    |
| Classification                                                                                                                   | SIL 2                                                                                 | PL d                                                                                                              |
| System structure                                                                                                                 | HFT = 1                                                                               | 2-channel (Cat. 3)                                                                                                |
| PFH <sub>D</sub> value <sup>1)</sup><br>(with mounting on the motor;<br>takes into account a derating due<br>to motor reheating) | $6.0 \times 10^{-8} \text{ 1/h} = 60 \text{ FIT (T}_{\text{amb}} \leq 60 \text{ °C)}$ |                                                                                                                   |
| Service life/proof test interval                                                                                                 | Motor without forced cooling fan:                                                     | 20 years (T <sub>amb</sub> ≤ 40 °C)<br>15 years (T <sub>amb</sub> ≤ 50 °C)<br>12 years (T <sub>amb</sub> ≤ 60 °C) |
|                                                                                                                                  | Motor with forced cooling fan:                                                        | 20 years (T <sub>amb</sub> ≤ 60 °C)                                                                               |
| Motor/encoder connection<br>(only for drives with FS logo)                                                                       | Fault exclusion according to EN 61800-5-2                                             |                                                                                                                   |

1) The specified values apply when the requirements for the encoder evaluation unit are met.

### Automatic determination of the service life of EK8Z, EK9Z, AK8Z safety encoders

The encoders continuously determine the remaining service life depending on the real operating temperature. For this purpose, an aging increment is calculated based on the measured temperature. The aging increments are added together and converted internally into a remaining service life.

When the maximum service life is reached, a warning is output via the safety option on the inverter.

When this warning is reached, the encoders must be deactivated and replaced.

## 6.6.6 ES7S, EG7S

|                                                                                                                                           | Characteristic safety values according to                                                                                                                                         |                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
|                                                                                                                                           | EN 62061/EN 61508                                                                                                                                                                 | EN ISO 13849-1                                                                                          |
| Classification                                                                                                                            | SIL 2                                                                                                                                                                             | PL d                                                                                                    |
| System structure                                                                                                                          | HFT = 1                                                                                                                                                                           | 2-channel (Cat. 3)                                                                                      |
| PFH <sub>D</sub> value <sup>1)</sup><br>( <b>without</b> mounting on the motor)                                                           | $8.5 \times 10^{-9} \text{ 1/h} = 8.5 \text{ FIT } (T_{\text{amb}} \leq 45 \text{ °C})$<br>$1.3 \times 10^{-8} \text{ 1/h} = 13 \text{ FIT } (T_{\text{amb}} \leq 60 \text{ °C})$ |                                                                                                         |
| MTTF <sub>D</sub> value <sup>1)</sup><br>( <b>without</b> mounting on the motor)                                                          | –                                                                                                                                                                                 | 1306 years ( $T_{\text{amb}} \leq 45 \text{ °C}$ )<br>895 years ( $T_{\text{amb}} \leq 60 \text{ °C}$ ) |
| PFH <sub>D</sub> value <sup>1)</sup><br>( <b>with</b> mounting on the motor;<br>takes into account a derating due<br>to motor reheating)  | $5.0 \times 10^{-8} \text{ 1/h} = 50 \text{ FIT } (T_{\text{amb}} \leq 60 \text{ °C})$                                                                                            |                                                                                                         |
| MTTF <sub>D</sub> value <sup>1)</sup><br>( <b>with</b> mounting on the motor;<br>takes into account a derating due<br>to motor reheating) | –                                                                                                                                                                                 | 212 years ( $T_{\text{amb}} \leq 60 \text{ °C}$ )                                                       |
| Service life/proof test interval                                                                                                          | 20 years                                                                                                                                                                          |                                                                                                         |
| Motor/encoder connection<br>(only for drives <b>with</b> FS logo)                                                                         | Fault exclusion according to EN 61800-5-2                                                                                                                                         |                                                                                                         |

1) The specified values apply when the requirements for the encoder evaluation unit are met.

### 6.6.7 AS7W, AG7W, AS7Y, AG7Y

|                                                                                                                                           | Characteristic safety values according to                                                                                                                                         |                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
|                                                                                                                                           | EN 62061/EN 61508                                                                                                                                                                 | EN ISO 13849-1                                                                                          |
| Classification                                                                                                                            | SIL 2                                                                                                                                                                             | PL d                                                                                                    |
| System structure                                                                                                                          | HFT = 1                                                                                                                                                                           | 2-channel (Cat. 3)                                                                                      |
| PFH <sub>D</sub> value <sup>1)</sup><br>( <b>without</b> mounting on the motor)                                                           | $9.3 \times 10^{-9} \text{ 1/h} = 9.3 \text{ FIT } (T_{\text{amb}} \leq 45 \text{ °C})$<br>$1.4 \times 10^{-8} \text{ 1/h} = 14 \text{ FIT } (T_{\text{amb}} \leq 60 \text{ °C})$ |                                                                                                         |
| MTTF <sub>D</sub> value <sup>1)</sup><br>( <b>without</b> mounting on the motor)                                                          | –                                                                                                                                                                                 | 1155 years ( $T_{\text{amb}} \leq 45 \text{ °C}$ )<br>753 years ( $T_{\text{amb}} \leq 60 \text{ °C}$ ) |
| PFH <sub>D</sub> value <sup>1)</sup><br>( <b>with</b> mounting on the motor;<br>takes into account a derating due<br>to motor reheating)  | $5.0 \times 10^{-8} \text{ 1/h} = 50 \text{ FIT } (T_{\text{amb}} \leq 60 \text{ °C})$                                                                                            |                                                                                                         |
| MTTF <sub>D</sub> value <sup>1)</sup><br>( <b>with</b> mounting on the motor;<br>takes into account a derating due<br>to motor reheating) | –                                                                                                                                                                                 | 212 years ( $T_{\text{amb}} \leq 60 \text{ °C}$ )                                                       |
| Service life/proof test interval                                                                                                          | 20 years                                                                                                                                                                          |                                                                                                         |
| Motor/encoder connection<br>(only for drives <b>with</b> FS logo)                                                                         | Fault exclusion according to EN 61800-5-2                                                                                                                                         |                                                                                                         |

1) The specified values apply when the requirements for the encoder evaluation unit are met.

## 6.7 Dimension sheets

The CAD data of the motor with encoder option can be found on SEW-EURODRIVE's website in the Online Support portal.

Dimension sheets of motors with encoders can be found in the catalog of the respective motor.

The following dimension sheets supplement the standard dimension sheets shown in the motor catalog.

### 6.7.1 Dimension sheets for DRN.., DR2.., DRU.., DR2C.. motors with encoders

# Maßblatt

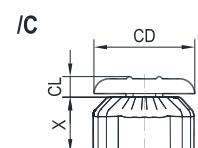
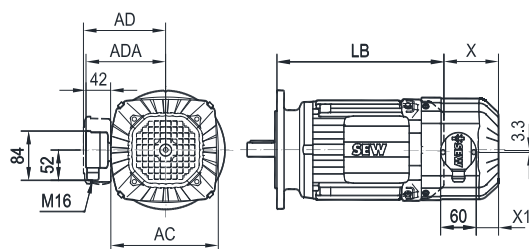
Drehstrommotor  
DR2G63-355 / .K8. / .K9.  
A1GA, A2GA; AIGA, AIGB; KIGA

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63374684.02

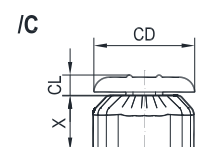
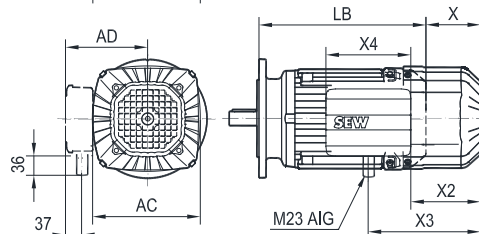
**SEW**  
EURODRIVE

## DR2.63 – 100

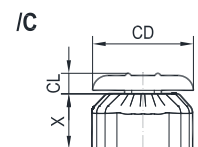
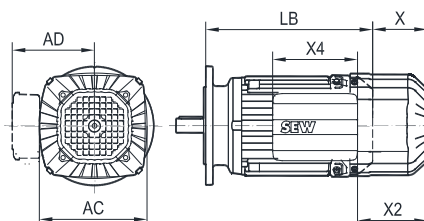
DR..63-100  
/.K8.  
A1GA  
A2GA  
radial



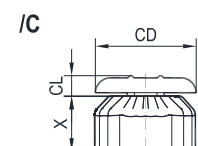
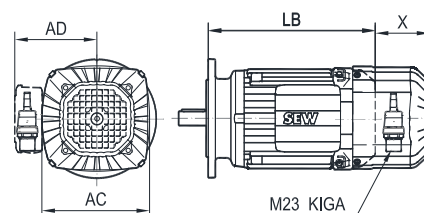
DR..71-100  
/.K8.  
AIGA  
AIGB



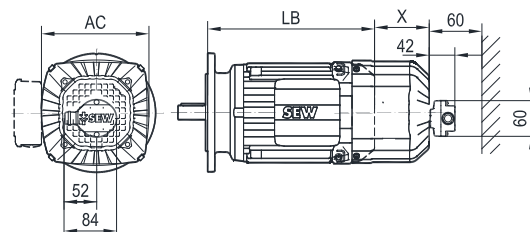
DR..71-100  
/.K8. / .K9.



DR..63-100  
/.K8.  
KIGA



DR..71-100  
/.K8.  
A1GA  
A2GA  
axial



**Maßblatt**

Drehstrommotor

DR2G63-355 / K8. / K9.

A1GA, A2GA; AIGA, AIGB; KIGA

08 388 02 23

63374684.02

**SEW**  
EURODRIVE**DR2.63 – 100**

| Motortyp                                                             | LB<br>(B5/<br>B14) | LB<br>(B3) | AD  | AC  | ADA | X  | X1 | X2  | X3  | X4  | CD   | CL   |
|----------------------------------------------------------------------|--------------------|------------|-----|-----|-----|----|----|-----|-----|-----|------|------|
| DRN63MS<br>DR2S63MS<br>DR2S63MSR                                     | 182                | 180        | 98  | 122 | 102 | 81 | 11 | -   | -   | -   | 112  | 35   |
| DRN63M<br>DRN63MR<br>DR2S63MR<br>DR2S63MQ                            | 196                | 194        |     |     |     |    |    |     |     |     |      |      |
| DRN71MS<br>DRN71MSR<br>DR2C71MSA<br>DR2S71MS<br>DR2L71MS<br>DR2M71MS | 200                | 198        | 118 | 139 | 110 | 92 | 18 | 105 | 171 | 143 | 131  | 33,5 |
| DRN71M<br>DR2S71MR<br>DR2S71M<br>DR2L71M<br>DR2M71M<br>DR2C71MA      | 220                | 218        |     |     |     |    |    |     |     |     |      |      |
| DRN80MK<br>DR2C80MKA<br>DR2S80MK<br>DR2L80MK                         | 239                | 237        | 128 | 156 | 118 | 93 | 16 | 112 | 178 | 143 | 147  | 33,5 |
| DRN80MS<br>DR2S80MS                                                  | 257                | 255        |     |     |     |    |    |     |     |     |      |      |
| DRN80M<br>DR2C80MA<br>DR2S80M<br>DR2L80M                             | 285                | 283        |     |     |     |    |    |     |     |     |      |      |
| DRN90S<br>DRN90SR<br>DR2S90S<br>DRU90S                               | 279                | 277        | 140 | 179 | 130 | 85 | 28 | 111 | 177 | 143 | 147  | 33,5 |
| DRN90L<br>DRU90L<br>DR2S90L                                          | 311                | 309        |     |     |     |    |    |     |     |     |      |      |
| DRN100LS<br>DR2S100LS<br>DRU100LS/R                                  | 309                | 307        | 157 | 197 | 139 | 88 | 34 | 111 | 177 | 143 | Ø170 | 34   |
| DRN100LM<br>DR2S100LM<br>DRN100L<br>DR2S100L<br>DRU100L              | 359                | 357        |     |     |     |    |    |     |     |     |      |      |

# Maßblatt

Drehstrommotor

DR2G63-355 / .K8. / .K9.

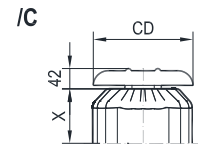
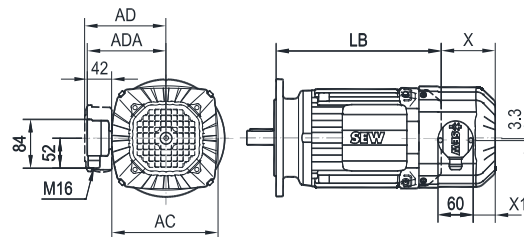
A1GA, A2GA; AIGA, AIGB; KIGA

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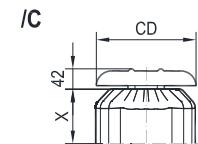
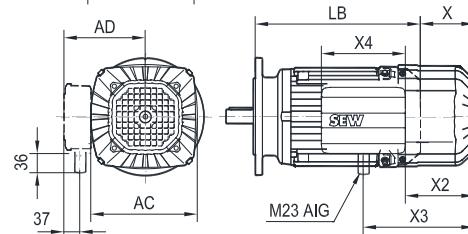
**SEW**  
EURODRIVE

## DR2.112 – 180

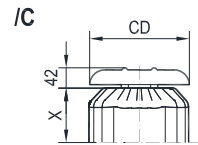
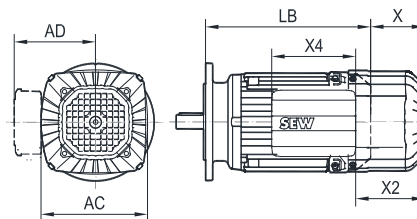
/ .K8.  
A1GA  
A2GA  
radial



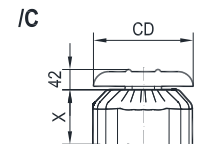
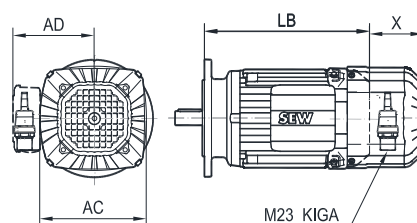
/ .K8.  
AIGA  
AIGB



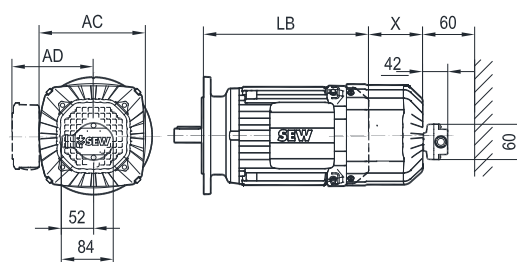
/ .K8.  
/ .K9.



/ .K8.  
KIGA



/ .K8.  
A1GA  
A2GA  
axial





**Maßblatt**

Drehstrommotor

DR2G63-355 / K8. / K9.

A1GA, A2GA; AIGA, AIGB; KIGA

08 388 02 23

63374684.02

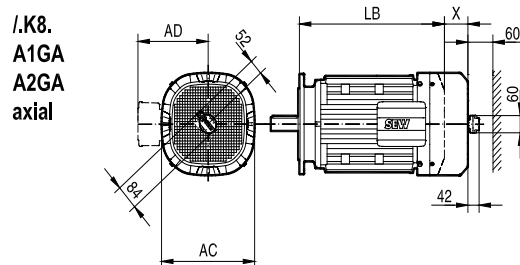
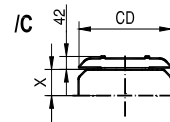
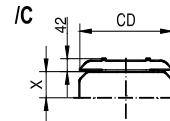
**DR2.112 – 180**

| Motortyp                                                                                                         | LB<br>(B5/<br>B14) | LB<br>(B3) | AD  | AC  | ADA | X   | X1 | X2  | X3  | X4  | CD   |
|------------------------------------------------------------------------------------------------------------------|--------------------|------------|-----|-----|-----|-----|----|-----|-----|-----|------|
| DRN112M<br>DR2S112M                                                                                              | 387                | 385        | 170 | 221 | 151 | 125 | 38 | 170 | 236 | 143 | Ø221 |
| DRN112M (6)                                                                                                      | 379                |            |     |     |     |     |    |     |     |     |      |
| DRN132S<br>DR2S132S<br>DR2S132SR<br>DRU132S                                                                      | 437                | 435        | 228 | 261 | 172 | 84  | 27 | 141 | 216 | 186 | Ø262 |
| DRN132M<br>DR2S132M<br>DRU132M                                                                                   | 439                | 437        |     |     |     |     |    |     |     |     |      |
| DRN132L (8)<br>DR2L132L                                                                                          | 462                | 462        |     |     |     |     |    |     |     |     |      |
| DRN132L (4,6)                                                                                                    | 464                | 462        |     |     |     |     |    |     |     |     |      |
| DRN160M<br>DR2S160M<br>DR2L160M<br>DRU160M<br>DRU160MP<br>DRN160L<br>DRU160LR<br>DRU160L<br>DR2S160L<br>DR2L160L | 532                | 529        | 253 | 316 | 199 | 84  | 38 | 159 | 234 | 186 | Ø309 |
| DRN180M<br>DR2S180M<br>DR2L180M<br>DRU180M<br>DRN180L<br>DRU180L<br>DR2S180L<br>DR2L180L                         | 555                | 554        | 268 | 357 | 220 | 84  | 38 | 159 | 234 | 186 | Ø354 |

**A1GA, A2GA; AIGA, AIGB; KIGA**

**SEW**  
**EURODRIVE**

## L



7

**Maßblatt**

Drehstrommotor

DR2G63-355 / K8. / K9.

A1GA, A2GA; AIGA, AIGB; KIGA

08 388 02 23

63374684.02

**DR2.200 – 280**

| Motortyp                                               | LB<br>(B5/<br>B14) | LB (B3) | AD  | AC   | ADA | X  | X1 | CD   |
|--------------------------------------------------------|--------------------|---------|-----|------|-----|----|----|------|
| DRN200L<br>DRU200L<br>DRU200LR<br>DR2S200L<br>DR2L200L | 649                | 646     | 283 | Ø394 | 237 | 84 | 35 | Ø415 |
| DRN225S<br>DR2S225S<br>DR2L225S<br>DRU225S<br>DRN225M  | 617                | 614     | 305 | Ø434 | 259 | 84 | 29 | Ø415 |
| DRN225ME<br>DRU225ME                                   | 697                | 694     |     |      |     |    |    |      |
| DRN250M<br>DRN250ME<br>DRU250M<br>DRU250ME             | 752                | 750     | 394 | Ø495 | 290 | 79 | 69 | Ø490 |
| DRN280S                                                | 752                | 750     | 394 | Ø495 | 290 | 79 | 69 | Ø490 |
| DRN280M<br>DRU280MR                                    | 847                | 845     |     |      |     |    |    |      |

# Maßblatt

Drehstrommotor

DR2G63-355 / .K8. / .K9.

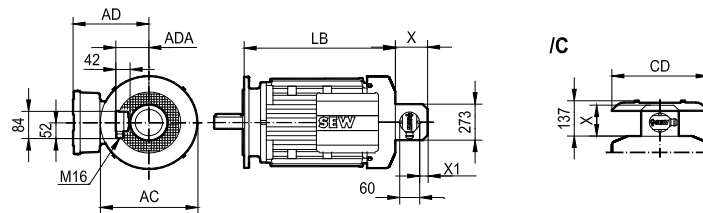
A1GA, A2GA; AIGA, AIGB; KIGA

08 388 02 23  
63374684.02

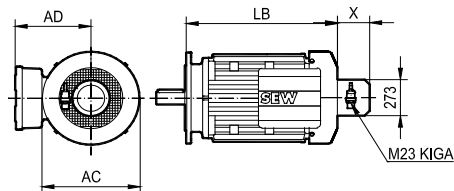
**SEW**  
EURODRIVE

## DR2.315 – 355

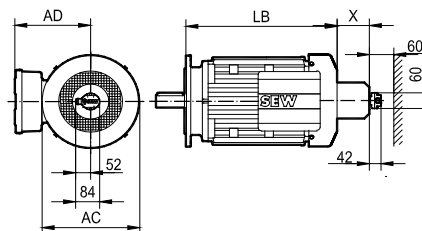
/ .K8.  
A1GA  
A2GA  
radial



/ .K8.  
KIGA



/ .K8.  
A1GA  
A2GA  
axial



**Maßblatt**

Drehstrommotor

DR2G63-355 / K8. / K9.

A1GA, A2GA; AIGA, AIGB; KIGA

08 388 02 23

63374684.02

**DR2.315 – 355**

| Motortyp                                                                                   | LB<br>(B5/<br>B14) | LB (B3) | AD  | AC   | ADA | X   | X1 | CD   |
|--------------------------------------------------------------------------------------------|--------------------|---------|-----|------|-----|-----|----|------|
| DRN315S<br>DRN315M<br>DRU315SR<br>DRU315S<br>DRU315M<br>DRU315L<br>DRU315LR                | 941                | 939     | 506 | Ø624 | 199 | 129 | 29 | Ø590 |
| DRN315ME                                                                                   | 1071               | 1069    |     |      |     |     |    |      |
| DRN315L<br>DRN315H<br>DRU315H<br>DRU315HB<br>DRU315HG<br>DRU315HR                          | 1071               | 1069    | 518 | Ø624 | 199 | 129 | 29 | Ø590 |
| DRN355MS<br>DRN355MR<br>DRN355M<br>DRN355ML<br>DRU355ML<br>DRU355MS<br>DRU355M<br>DRU355ML | 1367               | 1352    | 600 | Ø700 | 178 | 129 | 29 | Ø697 |

**6.7.2 Dimension sheets for DRN..., DR2..., DRU..., DR2C.. brakemotors with encoders**

31974473/EN – 03/2025

## Maßblatt

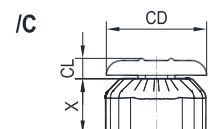
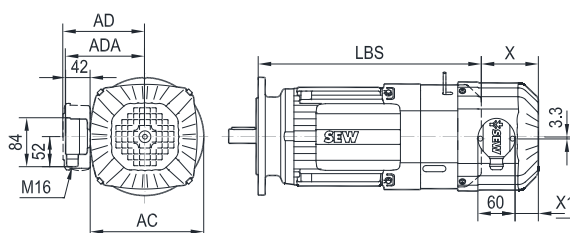
Drehstrombremsmotor  
DR2G63-315 / .K8. / .K9.  
A1GA, A2GA; AIGA, AIGB; KIGA

09 265 02 23  
63411431.02

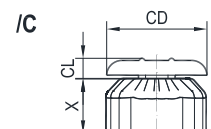
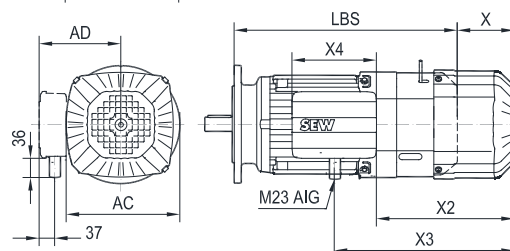
**SEW**  
EURODRIVE

### DR2.63 – 100/BE

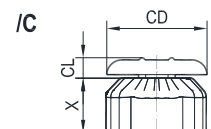
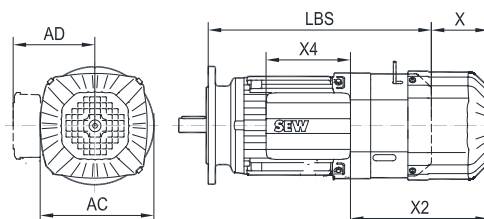
DR..63-100  
/.K8./BE  
A1GA  
A2GA  
radial



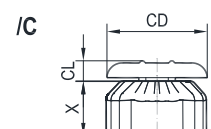
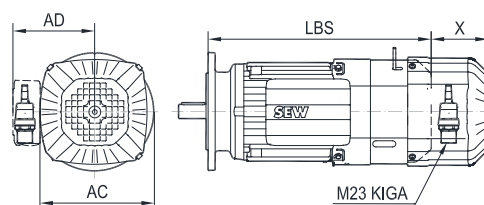
DR..71-100  
/.K8./BE  
AIGA  
AIGB



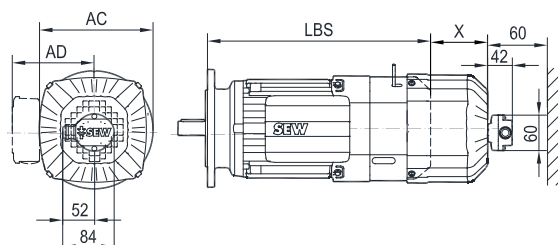
DR..71-100  
/.K8./K9./BE



DR..63-100  
/.K8./BE  
KIGA



DR..71-100  
/.K8./BE  
A1GA  
A2GA  
axial



**Maßblatt**

Drehstrombremsmotor

DR2G63-315 / K8. / K9.

A1GA, A2GA; AIGA, AIGB; KIGA

09 265 02 23

63411431.02

**SEW**  
EURODRIVE**DR2.63 – 100/BE**

| Motortyp                                                             | LBS<br>(B5/B14) | LBS<br>(B3) | AD  | AC  | ADA | X  | X1 | X2  | X3  | X4  | CD   | CL   |
|----------------------------------------------------------------------|-----------------|-------------|-----|-----|-----|----|----|-----|-----|-----|------|------|
| DRN63MS<br>DR2S63MS<br>DR2S63MSR                                     | 238             | 236         | 98  | 122 | 102 | 75 | 11 | -   | -   | -   | 112  | 35   |
| DRN63M<br>DRN63MR<br>DR2S63MR<br>DR2S63MQ                            | 252             | 250         |     |     |     |    |    |     |     |     |      |      |
| DRN71MS<br>DRN71MSR<br>DR2C71MSA<br>DR2S71MS<br>DR2L71MS<br>DR2M71MS | 268             | 266         | 129 | 139 | 110 | 92 | 18 | 173 | 239 | 143 | 131  | 33,5 |
| DRN71M<br>DR2S71MR<br>DR2S71M<br>DR2L71M<br>DR2M71M<br>DR2C71MA      | 288             | 286         |     |     |     |    |    |     |     |     |      |      |
| DRN80MK<br>DR2C80MKA<br>DR2S80MK<br>DR2L80MK                         | 320             | 318         | 139 | 156 | 118 | 93 | 16 | 193 | 259 | 143 | 147  | 33,5 |
| DRN80MS<br>DR2S80MS                                                  | 338             | 336         |     |     |     |    |    |     |     |     |      |      |
| DRN80M<br>DR2C80MA<br>DR2S80M<br>DR2L80M                             | 366             | 364         |     |     |     |    |    |     |     |     |      |      |
| DRN90S<br>DRN90SR<br>DR2S90S<br>DRU90S                               | 373             | 371         | 150 | 179 | 130 | 83 | 28 | 202 | 268 | 143 | 147  | 33,5 |
| DRN90L<br>DRU90L<br>DR2S90L                                          | 405             | 403         |     |     |     |    |    |     |     |     |      |      |
| DRN100LS<br>DR2S100LS<br>DRU100LS/R                                  | 402             | 400         | 158 | 197 | 139 | 86 | 34 | 203 | 269 | 143 | Ø170 | 33,5 |
| DRN100LM<br>DR2S100LM<br>DRN100L<br>DR2S100L<br>DRU100L              | 452             | 450         |     |     |     |    |    |     |     |     |      |      |

Maßblatt

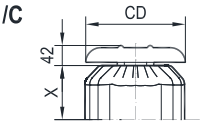
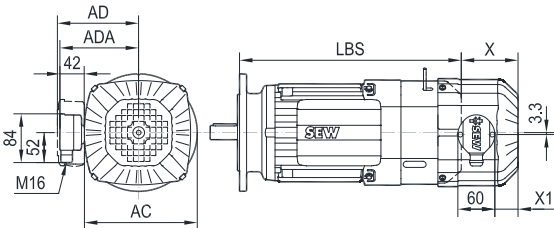
Drehstrombremsmotor  
DR2G63-315 / .K8. / .K9.  
A1GA, A2GA; AIGA, AIGB; KIGA

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63411431.02

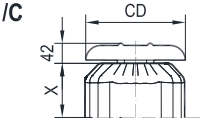
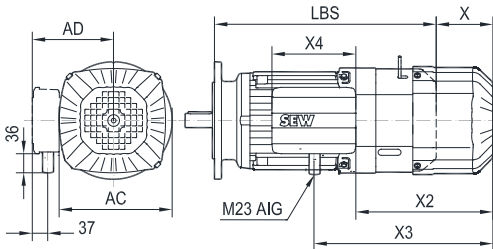


DR2.112 – 180/BE

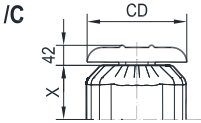
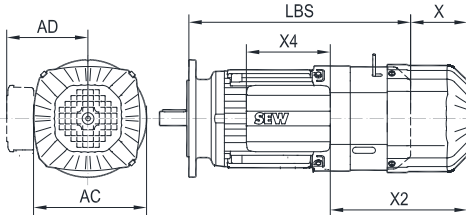
/.K8./BE  
A1GA  
A2GA  
radial



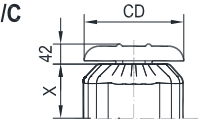
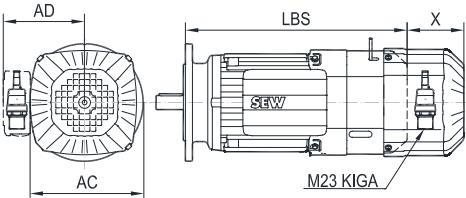
/.K8./BE  
AIGA  
AIGB



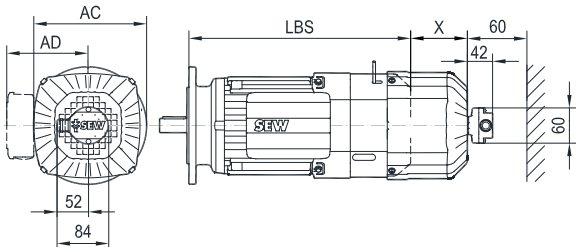
/.K8./K9./BE



/.K8./BE  
KIGA



/.K8./BE  
A1GA  
A2GA  
axial



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**Maßblatt**

Drehstrombremsmotor

DR2G63-315 / K8. / K9.

A1GA, A2GA; AIGA, AIGB; KIGA

09 265 02 23

63411431.02

**DR2.112 – 180/BE**

| Motortyp                                                                                                         | LBS<br>(B5/B14) | LBS<br>(B3) | AD  | AC  | ADA | X   | X1 | X2  | X3  | X4  | CD   |
|------------------------------------------------------------------------------------------------------------------|-----------------|-------------|-----|-----|-----|-----|----|-----|-----|-----|------|
| DRN112M<br>DR2S112M                                                                                              | 499             | 497         | 172 | 221 | 151 | 121 | 38 | 278 | 344 | 143 | Ø221 |
| DRN112M (6)                                                                                                      | 491             |             |     |     |     |     |    |     |     |     |      |
| DRN132S<br>DR2S132S<br>DR2S132SR<br>DRU132S                                                                      | 549             | 547         |     |     |     |     |    |     |     |     |      |
| DRN132M<br>DR2S132M<br>DRU132M                                                                                   | 576             | 574         | 228 | 261 | 172 | 84  | 27 | 278 | 353 | 186 | Ø262 |
| DRN132L (8)<br>DR2L132L                                                                                          | 599             | 597         |     |     |     |     |    |     |     |     |      |
| DRN132L (4,6)                                                                                                    | 601             | 599         |     |     |     |     |    |     |     |     |      |
| DRN160M<br>DR2S160M<br>DR2L160M<br>DRU160M<br>DRU160MP<br>DRN160L<br>DRU160LR<br>DRU160L<br>DR2S160L<br>DR2L160L | 721             | 718         | 253 | 316 | 199 | 84  | 38 | 348 | 423 | 186 | Ø309 |
| DRN180M<br>DR2S180M<br>DR2L180M<br>DRU180M<br>DRN180L<br>DRU180L<br>DR2S180L<br>DR2L180L                         | 748             | 745         | 268 | 357 | 220 | 84  | 38 | 348 | 423 | 186 | Ø354 |

# Maßblatt

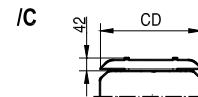
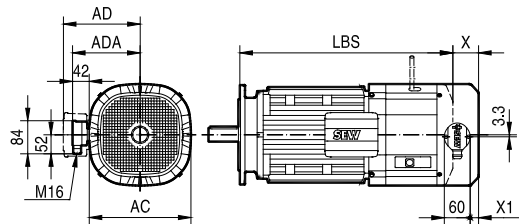
Drehstrombremsmotor  
DR2G63-315 / .K8. / .K9.  
A1GA, A2GA; AIGA, AIGB; KIGA

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63411431.02

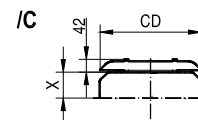
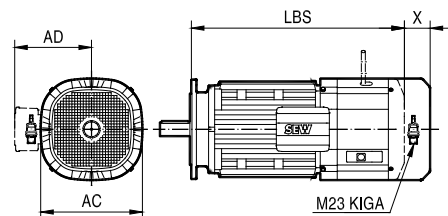
**SEW**  
EURODRIVE

## DR2.200 – 280/BE

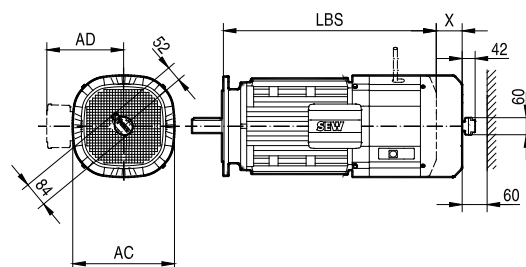
/ .K8.BE  
A1GA  
A2GA  
radial



/ .K8.BE  
KIGA



/ .K8.BE  
A1GA  
A2GA  
axial



**Maßblatt**

Drehstrombremsmotor

DR2G63-315 / .K8. / .K9.

A1GA, A2GA; AIGA, AIGB; KIGA

09 265 02 23

63411431.02

**DR2.200 – 280/BE**

| Motortyp                                               | LBS<br>(B5/B14) | LBS<br>(B3) | AD  | AC   | ADA | X  | X1 | CD   |
|--------------------------------------------------------|-----------------|-------------|-----|------|-----|----|----|------|
| DRN200L<br>DRU200L<br>DRU200LR<br>DR2S200L<br>DR2L200L | 854             | 851         | 283 | Ø394 | 237 | 84 | 35 | Ø415 |
| DRN225S<br>DR2S225S<br>DR2L225S<br>DRU225S<br>DRN225M  | 822             | 819         | 305 | Ø434 | 259 | 84 | 29 | Ø415 |
| DRN225ME<br>DRU225ME                                   | 902             | 899         |     |      |     |    |    |      |
| DRN250M<br>DRN250ME<br>DRU250M<br>DRU250ME             | 992             | 990         | 394 | Ø495 | 290 | 79 | 69 | Ø490 |
| DRN280S                                                | 992             | 990         | 394 | Ø495 | 290 | 79 | 69 | Ø490 |
| DRN280M<br>DRU280MR                                    | 1087            | 1085        |     |      |     |    |    |      |

**SEW**  
**EURODRIVE**

## L



**Maßblatt**

Drehstrombremsmotor

DR2G63-315 / .K8. / .K9.

A1GA, A2GA; AIGA, AIGB; KIGA

09 265 02 23

63411431.02

**DR2.315/BE**

| Motortype                                                                   | LBS<br>(B5/B14) | LBS<br>(B3) | AD  | AC   | ADA | X   | X1 | CD   |
|-----------------------------------------------------------------------------|-----------------|-------------|-----|------|-----|-----|----|------|
| DRN315S<br>DRN315M<br>DRU315SR<br>DRU315S<br>DRU315M<br>DRU315L<br>DRU315LR | 1192            | 1190        | 506 | Ø624 | 199 | 129 | 29 | Ø590 |
| DRN315ME                                                                    | 1322            | 1320        |     |      |     |     |    |      |
| DRN315L<br>DRN315H<br>DRU315H<br>DRU315HB<br>DRU315HG<br>DRU315HR           | 1322            | 1320        | 518 | Ø624 | 199 | 129 | 29 | Ø590 |

### 6.7.3 Dimension sheets for encoder mounting adapters

The listed documents can be downloaded from the Online Support portal on SEW-EURODRIVE's website by specifying the document number.

| Encoder mounting adapters | Motors                                     | Document number |
|---------------------------|--------------------------------------------|-----------------|
| AV1A                      | DR71 – 225                                 | 63139375        |
|                           | DRN71 – 225                                | 63089378        |
| AV7A                      | DR71 – 225                                 | 63139375        |
|                           | DRN71 – 225                                | 63089378        |
| AV8A                      | DRN71 – 225                                | 63089378        |
| EG7A                      | DRN80 – 280                                | 63155036        |
| EH7A                      | DR../EDR315<br>DRN../EDRN315               | 099480214       |
| EK8A                      | DRN63 – 355<br>EDRN71 – 315                | 080920118       |
| ES7A                      | DRN80 – 280                                | 63155036        |
| EV1A                      | DR71 – 225                                 | 63139375        |
|                           | DRN71 – 225                                | 63089378        |
| EV2A                      | DR71 – 225                                 | 63139375        |
|                           | DRN71 – 225                                | 63089378        |
| EV7A                      | DR71 – 225                                 | 63139375        |
|                           | DRN71 – 225                                | 63089378        |
| EV8A                      | DRN71 – 225                                | 63089378        |
| XV1A                      | DR../EDR 250 – 315<br>DRN../EDRN 250 – 315 | 63115379        |
|                           | DR71 – 225                                 | 63139375        |
|                           | DRN71 – 225                                | 63089378        |
| XV2A                      | DR../EDR 250 – 315<br>DRN../EDRN 250 – 315 | 63115379        |
|                           | DR71 – 225                                 | 63060647        |
|                           | DRN71 – 225                                | 63008653        |
| XV3A                      | DR../EDR 250 – 315<br>DRN../EDRN 250 – 315 | 63115379        |
|                           | DR71 – 225                                 | 63060647        |
|                           | DRN71 – 225                                | 63008653        |
| XV4A                      | DR../EDR 250 – 315<br>DRN../EDRN 250 – 315 | 63115379        |
|                           | DR71 – 225                                 | 63060647        |
|                           | DRN71 – 225                                | 63008653        |

| Encoder mounting adapters | Motors                                     | Document number |
|---------------------------|--------------------------------------------|-----------------|
| XV5A                      | DR../EDR 250 – 315<br>DRN../EDRN 250 – 315 | 63115379        |
|                           | DR71 – 225                                 | 63060647        |
|                           | DRN71 – 225                                | 63008653        |
| XV6A                      | DRN71 – 225                                | 63008653        |
| XV7A                      | DR../EDR 250 – 315<br>DRN../EDRN 250 – 315 | 63115379        |
|                           | DR71 – 225                                 | 63139375        |
|                           | DRN71 – 225                                | 63089378        |
| XV8A                      | DR../EDR 250 – 315<br>DRN../EDRN 250 – 315 | 63115379        |
|                           | DRN71 – 225                                | 63089378        |

## 7 Mechanical installation

### 7.1 Required tools



#### **⚠ WARNING**

Loss of the safety function due to a faulty mechanical connection between the motor and the safety encoder.

Severe or fatal injuries.

- ✓ To ensure the exclusion of any faults in the mechanical connection between the motor and the safety encoder, comply with the following points in accordance with EN 61800-5-2:
  - Perform a proper disassembly/assembly procedure according to this documentation.
  - Replace worn or damaged components.
  - Adhere to the tightening torques specified in this documentation.

You need the following tools to assemble and disassemble the encoders. Make sure that all the tools are available before you remove/install an encoder.

#### **Generally required tools and aids:**

- Allen wrench in different sizes
- Hexagonal socket wrench in different sizes
- Flat tip screwdriver 04/05 and Torx TX20 and TX25
- Torque wrench for tightening torques of 1.6 Nm – 8.0 Nm

#### **For .K8. / .K9. / .V8.:**

- Allen wrench: S2.5, S3, S4, S5
- Hexagonal socket wrench: SW8, SW10, SW13, SW30
- M6 screw with a min. length of 70 mm (AK8H only)
- Lubricant, e.g. Lub-L 3M

#### **For EI7. / EI8.:**

- Allen wrench: S2.5, S3, S4, S5
- Warming plate (130 °C)
- Lubricant, e.g. Lub-L 3M
- Assembly paste, e.g. MOLYCOTE®

#### **For encoders .S7. / .G7.**

- NOCO-Paste

#### **Additionally required tools and aids for safety encoders:**

- For ES7S, AS7W, AS7Y safety encoders: Sensor for measuring the wobble with a measuring range in the 1/100 mm range
- For ES7S, AS7W, AS7Y safety encoders: New expansion anchor (part number: 13617311)
- For EK8S, EK8W, AK8W, AK8Y, AK8H, EK8Z, EK9Z, AK8Z safety encoders: LOCTITE® 241



#### 7.2 Tightening torques

Unless otherwise described, a tolerance of  $\pm 15\%$  applies for all the specified tightening torques.

## 7.3 Safety encoders

### 7.3.1 General information for the installation of safety encoders

#### NOTICE

Improperly carried out work on drives with functionally safe motor options.

Loss of the safety function.

- Improperly carried out work on drives with functionally safe motor options can result in loss of the safety functions. This can cause injuries and damage.
- Only qualified specialists are allowed to carry out work on drives with functionally safe motor options.
- For EK8Z, EK9Z, AK8Z safety encoders, work on the MOVILINK® DDI communication unit is not permitted. Place an order with SEW-EURODRIVE Service to have any necessary work on the encoder performed.
- With the EI7C FS built-in encoder, no work may be performed on the encoder. Place an order with SEW-EURODRIVE Service to have any necessary work on the encoder performed.
- When using an encoder mounting adapter to retrofit a safety encoder, the retrofitting of the FS motor option is not identifiable on the motor, e.g. by the FS logo on the motor nameplate. If retrofitting of a safety encoder is performed by the user, the user accepts responsibility and liability. Retrofitting by SEW-EURODRIVE Service is recommended.

When used in a safety function, safety encoders have to meet increased requirements in terms of the mechanical mounting and the connection between the encoder shaft and motor shaft. Note that greases and oils must not be allowed on the mechanical connections of the safety encoders during assembly or operation.

SEW-EURODRIVE meets the requirements of functional safety for the safety encoders in terms of the unwanted loosening of the encoder mounting and the connection between the encoder shaft and the motor shaft. Fault exclusion in compliance with EN 61800-5-2 is assumed. Safety-relevant connecting elements are marked in the delivery state, for example using a locking compound or an adhesive label.

The following options are available for performing work on safety encoders or on the motor when the marked, safety-relevant connections need to be opened:

- Place an order with SEW-EURODRIVE Service to perform the work.
- Perform the work yourself.

#### When performing the work yourself:

Note that all work on the safety encoder and its mechanical coupling is carried out at your own risk. The user is responsible and liable for proper fulfillment of the work. The user has to ensure the traceability of the performed changes regarding functional safety.

Where applicable, pay particular attention to differing tightening torques or additional work steps that are described in this documentation.

In case of proven compliance with the activities described in this documentation for the safety encoder, the characteristics regarding functional safety described by the manufacturer are maintained.

| Type of work                                                            | Work permitted? | Comment                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Replacing the safety encoder                                            | ✓               | Replacement with a structurally identical safety encoder (same encoder type).<br><br>EI7C FS: Replacing the safety encoder is not permitted.<br><br>EK8Z, EK9Z, AK8Z: Replacing the MOVILINK® DDI communication unit is not permitted. |
| Replacing the existing encoder with a safety encoder                    | –               | The subsequent replacement of an encoder with a safety encoder is only permitted if performed by SEW-EURODRIVE Service.                                                                                                                |
| Changes to the safety encoder                                           | –               | The safety certification and any right to claim under limited warranty of SEW-EURODRIVE become void if the user modifies the safety encoder.                                                                                           |
| Loosening the central retaining screw of the insulation coupling [1891] | ✓               | In case of service, loosen only the central retaining screw. If other screws are loosened, the insulation coupling is damaged [1891].                                                                                                  |
| Retrofitting a safety encoder using an encoder mounting adapter         | ✓               | If retrofitting of a safety encoder is performed by the user, the user accepts responsibility and liability. Retrofitting by SEW-EURODRIVE Service is recommended.                                                                     |

✓ Yes  
– No

### 7.3.2 Drive with encoder/safety encoder

If an encoder/safety encoder is mounted onto the drive, then this must be disassembled before performing motor and brake maintenance.



#### ▲ WARNING

Loss of the safety functions due to a faulty mechanical connection between the motor and the safety encoder.

Severe or fatal injuries.

- To ensure the exclusion of any faults in the mechanical connection between the motor and the safety encoder, comply with the following points in accordance with EN 61800-5-2:
  - Perform a proper disassembly/assembly according to the corresponding documentation.
  - Replace worn or damaged components.
  - Adhere to the tightening torques specified in the corresponding documentation.

Note that the work steps for a safety encoder differ from an encoder without safety technology (standard encoder).

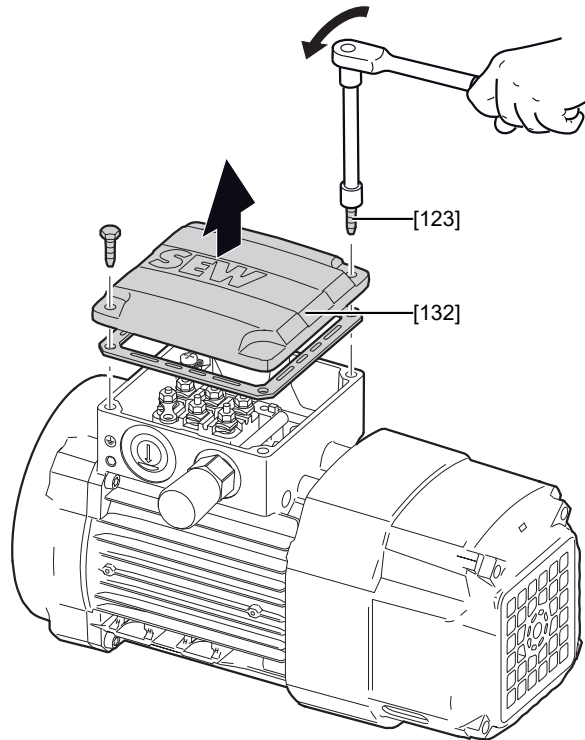
First, check the FS logo on the motor nameplate to ascertain whether a safety encoder is installed (see chapter "FS mark").

## 7.4 Removing/installing built-in encoders and encoder mounting adapters for built-in encoders

### 7.4.1 EI7. built-in encoders and EI7A encoder mounting adapters – DRN63 motors

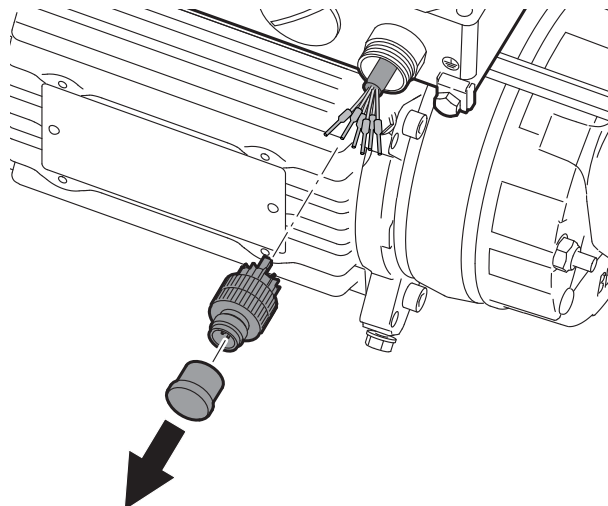
#### Removing EI7. – DRN63 motors

1. Unscrew the screws [123] to remove the terminal box cover [132].



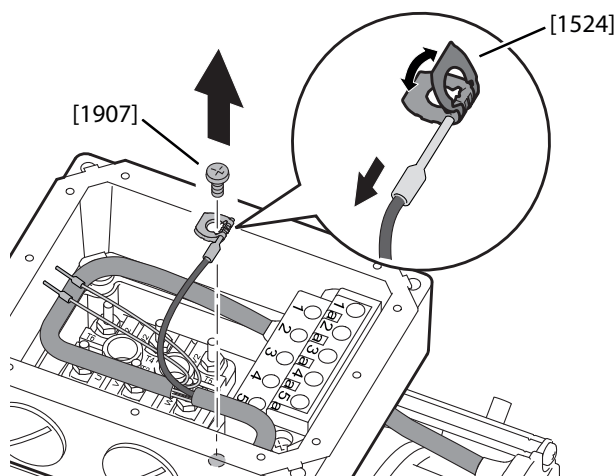
29491623563

2. Unscrew the M12 connector and disconnect the cores.



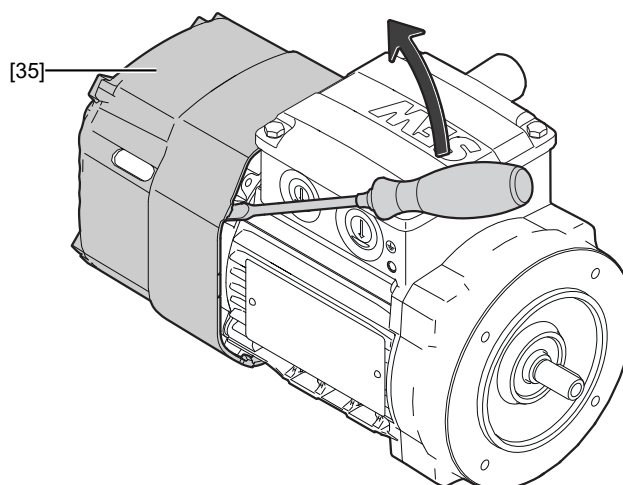
18014408102446347

3. Loosen the screw [1907] used for fastening the shielding to the terminal box.



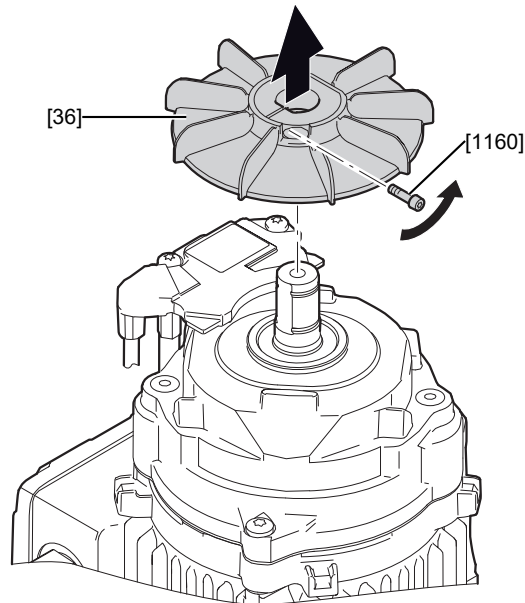
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4. Bend open the terminal washer [1524] and pull out the shielding of the encoder cable.  
⇒ Dispose of the terminal washer [1524].
5. In order to remove the fan guard [35] lever out the 2 detents opposite of the terminal box. Then pull the detents over the latching cams of the endshield.



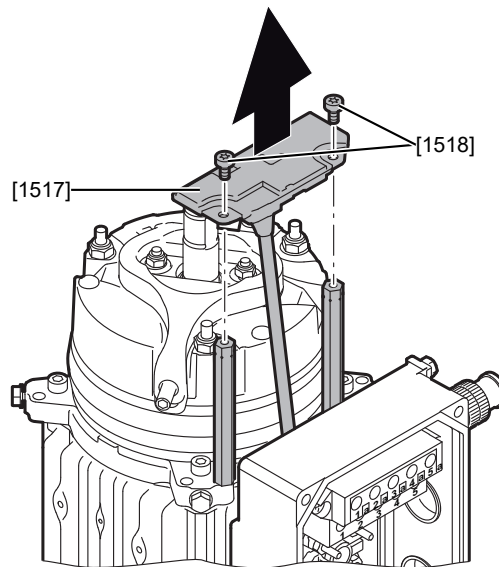
30062320139

6. Loosen the clamping screws [1160] and remove the fan [36]. If necessary, remove the retaining rings prior to this step.



29495711627

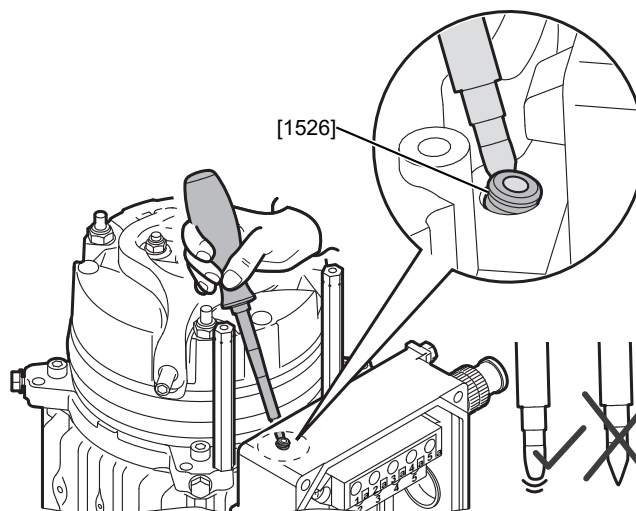
7. Loosen the screws [1518] and pull the encoder module [1517] out of the knock-out and the grommet.



30064499851

⇒ Dispose of the screws.

8. Remove the grommet [1526] from the knock-out.



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- ⇒ Dispose of the grommet.

**Installing EI7. – DRN63 motors**

Before installation, the grommet [1526] with part number 13637339 must be obtained from SEW-EURODRIVE.

The grommet [1526] is also included in the respective retrofit sets and service kits.

Before installation, the flat-head screws for the brake [1518] with part number 19103387 must be obtained from SEW-EURODRIVE.

The screws [1518] are also included in the respective retrofit sets and service kits.

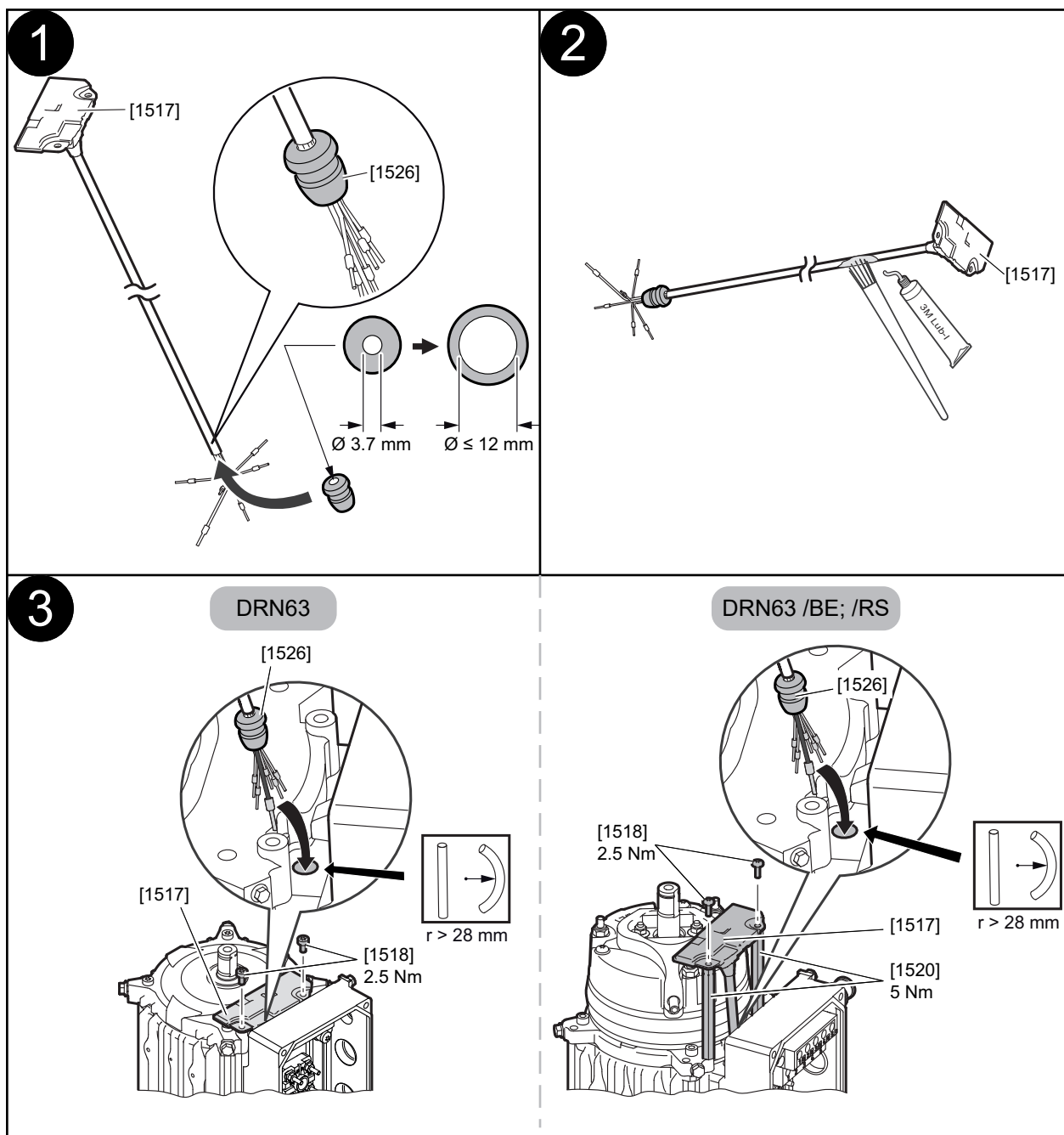
Before installation, a terminal washer [1524] with part number 13262130 must be obtained from SEW-EURODRIVE.



# 7 Mechanical installation

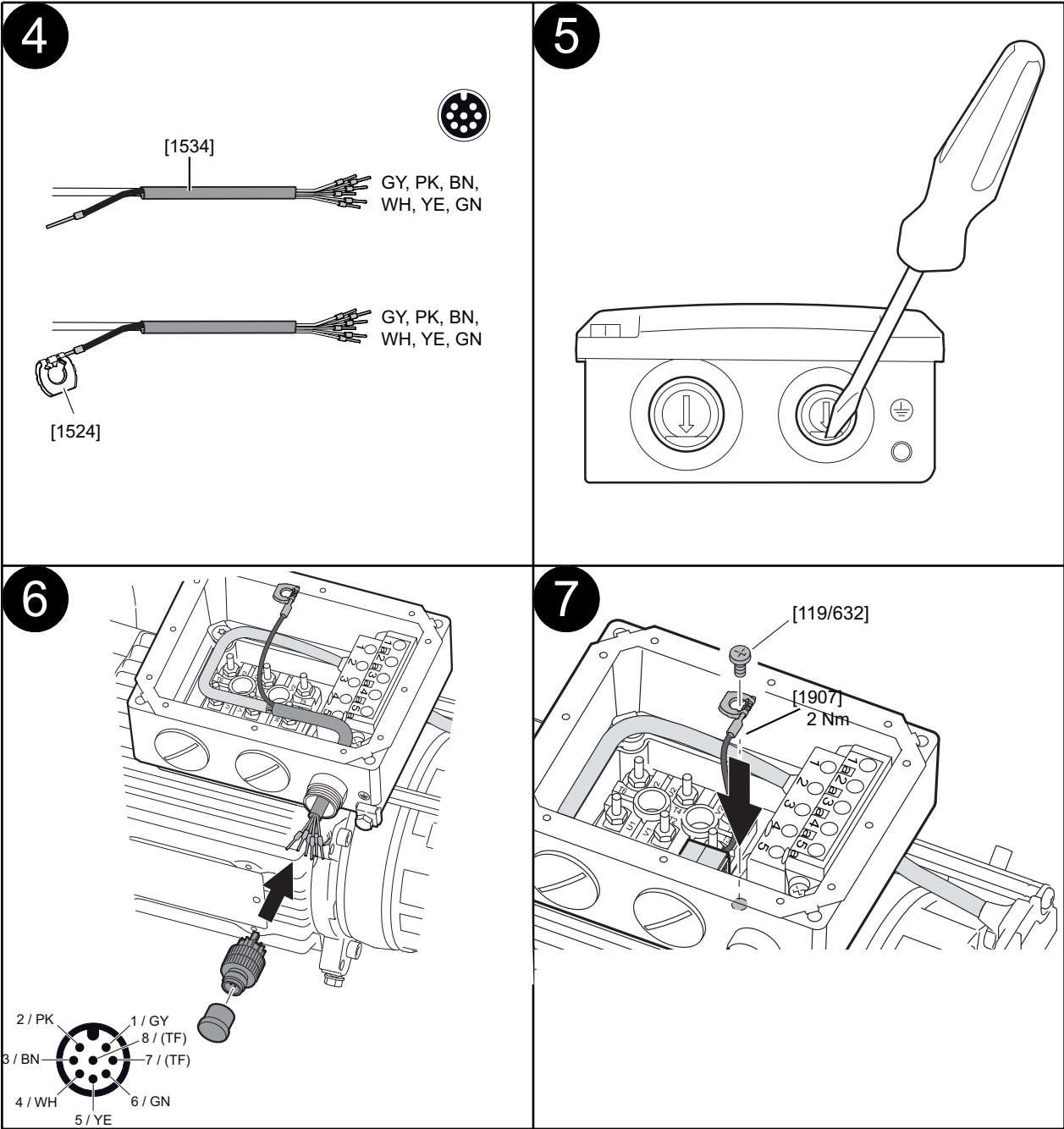
Removing/installing built-in encoders and encoder mounting adapters for built-in encoders

The terminal washer [1524] is also included in the respective retrofit sets and service kits.



9007235746432011

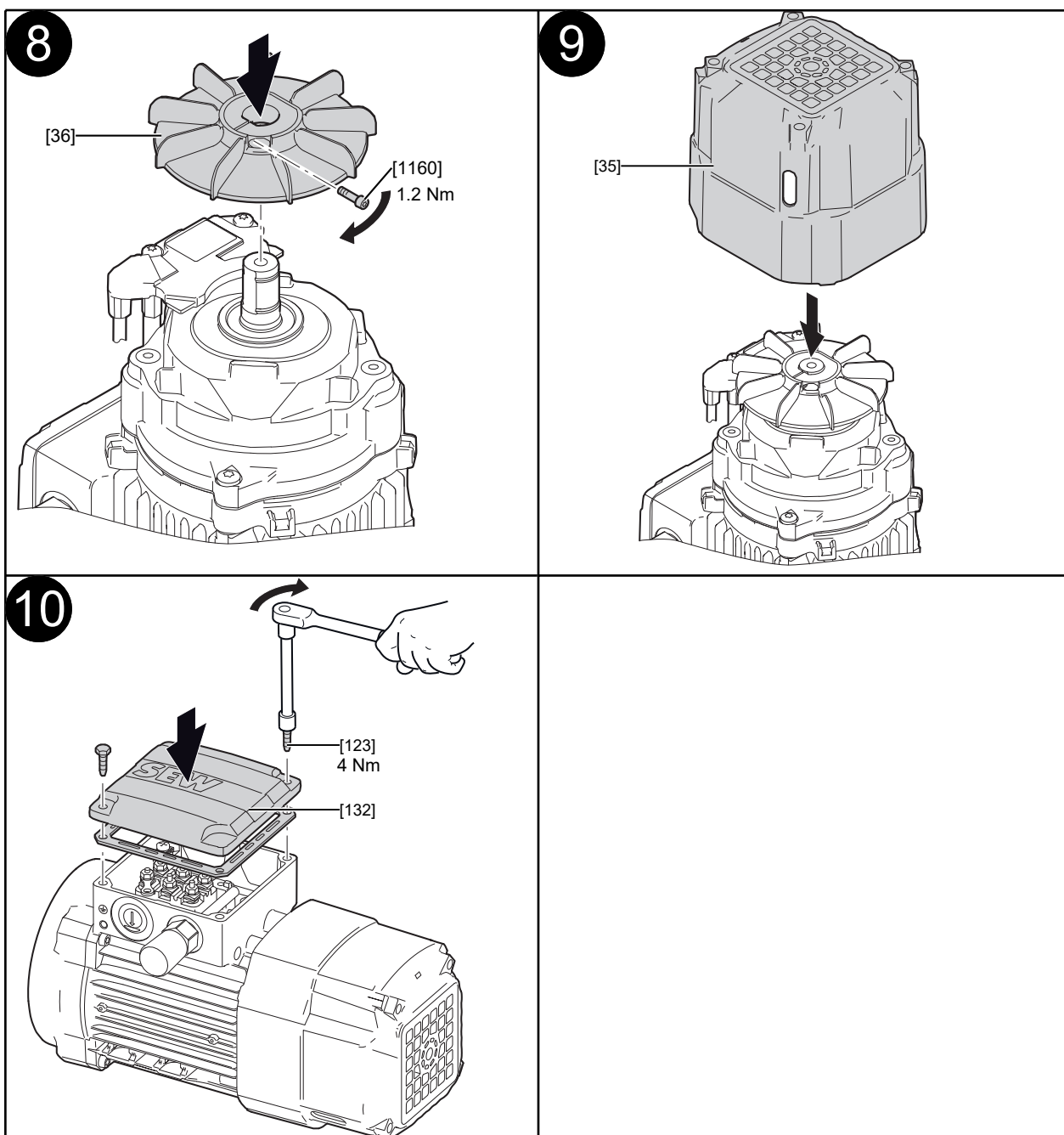
31974473/EN – 03/2025



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# 7 Mechanical installation

Removing/installing built-in encoders and encoder mounting adapters for built-in encoders



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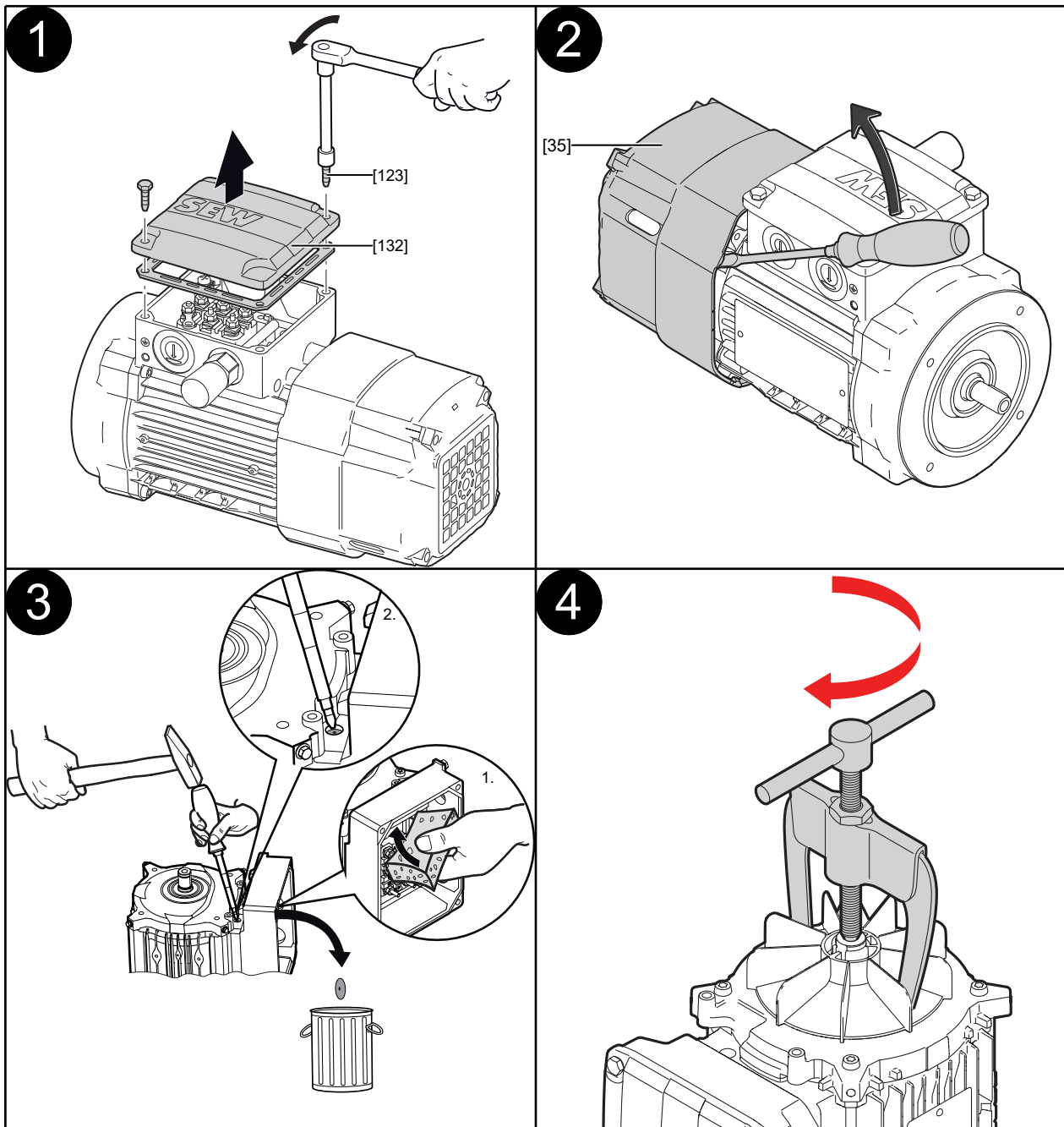
31974473/EN – 03/2025

## Retrofitting EI7. – DRN63 motors

## INFORMATION



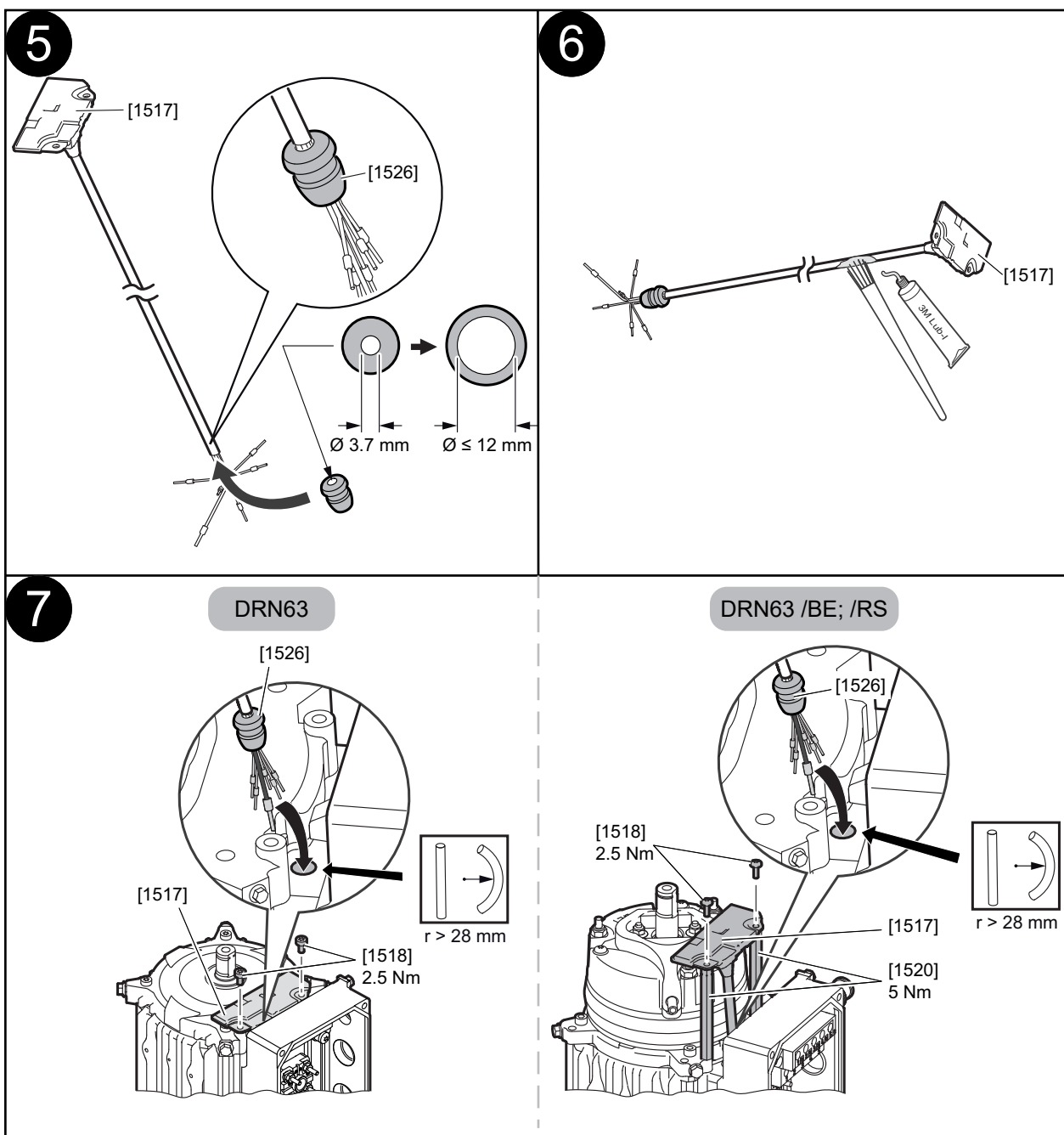
The required small parts are included in the retrofit set.



9007228161643019

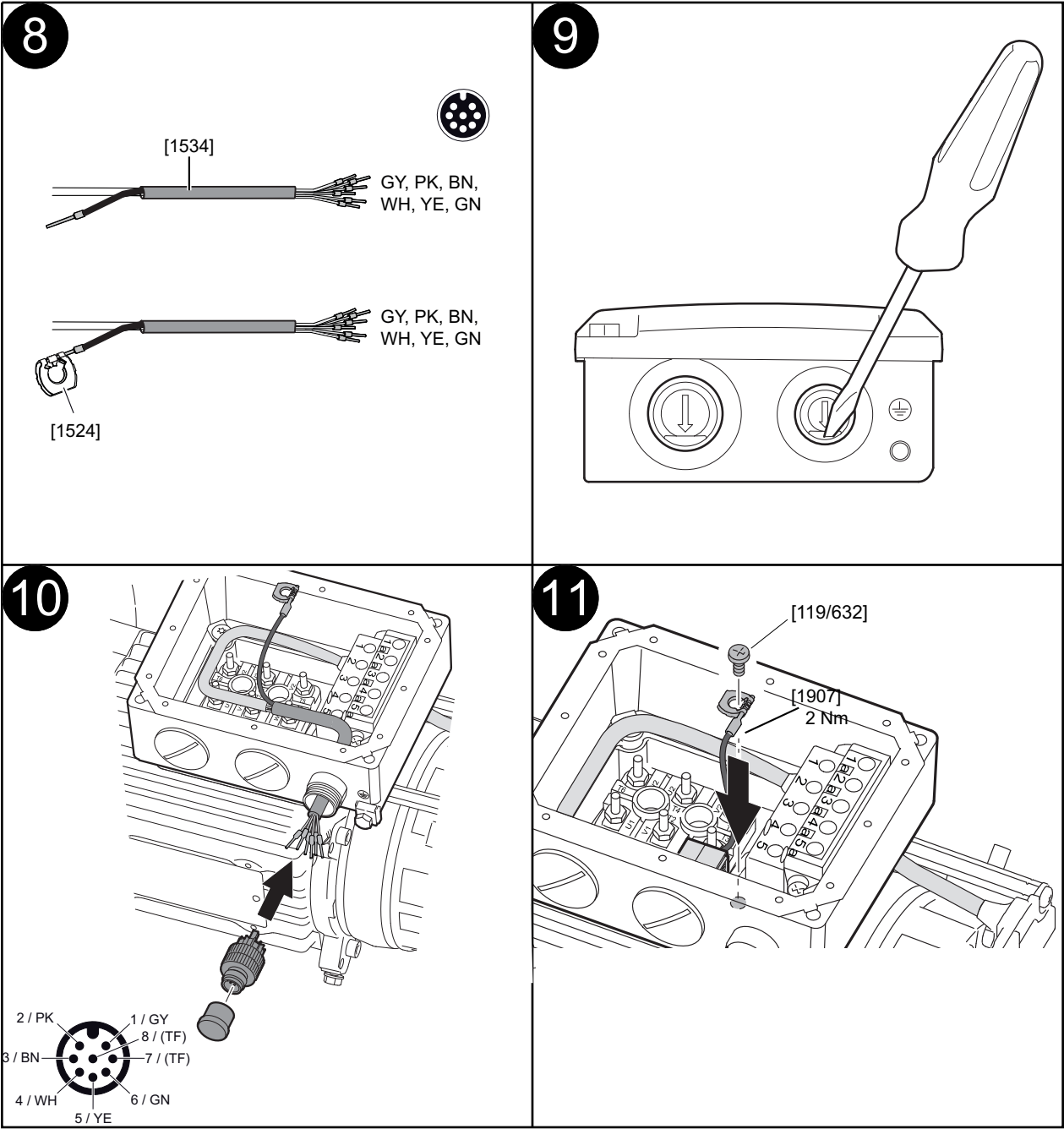
# 7 Mechanical installation

Removing/installing built-in encoders and encoder mounting adapters for built-in encoders



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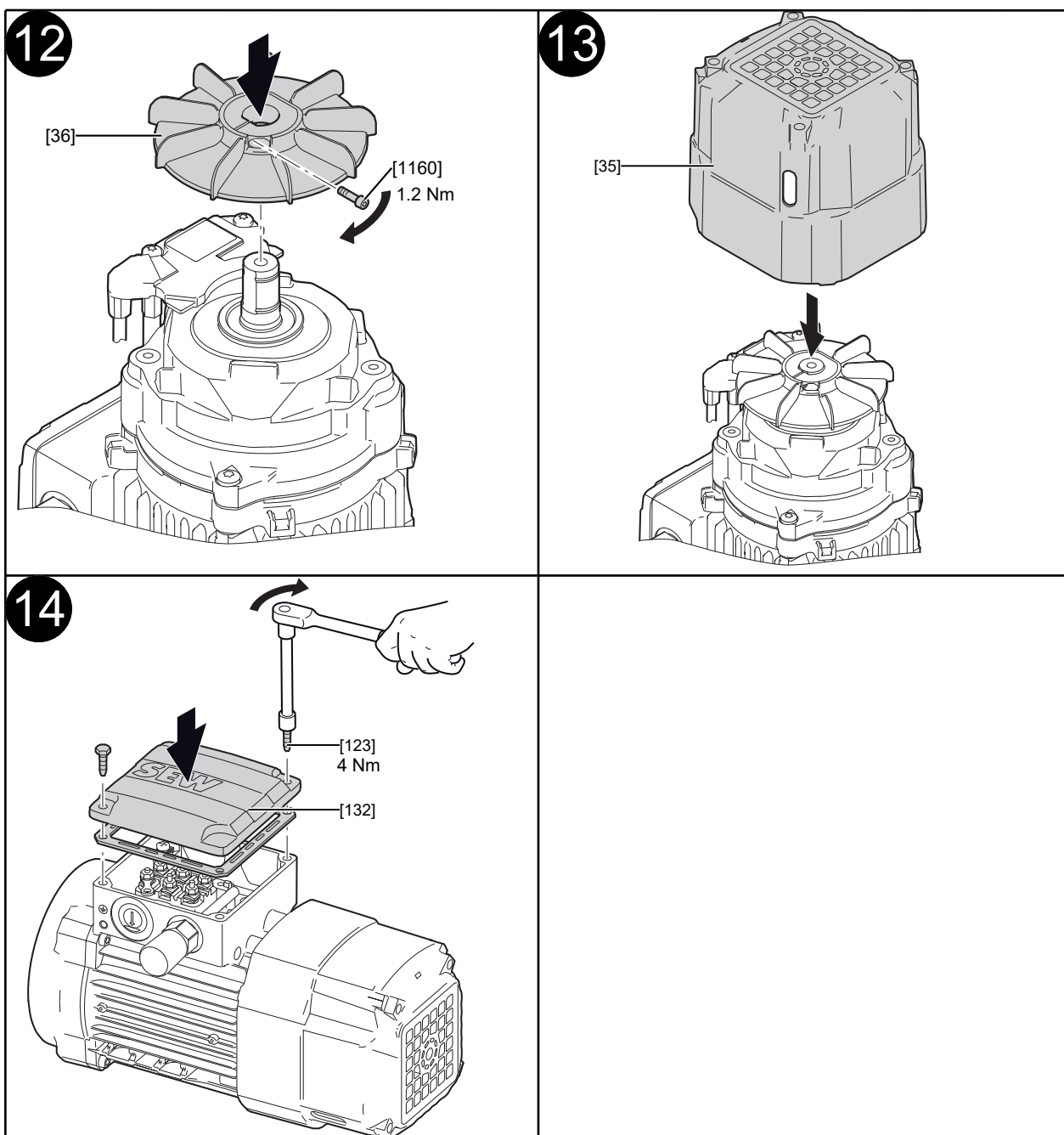
31974473/EN – 03/2025



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# 7 Mechanical installation

Removing/installing built-in encoders and encoder mounting adapters for built-in encoders

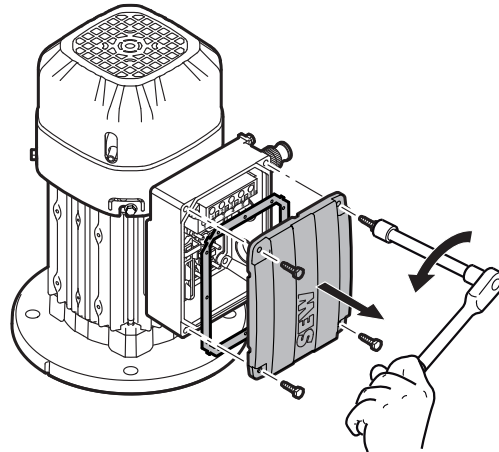


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31974473/EN – 03/2025

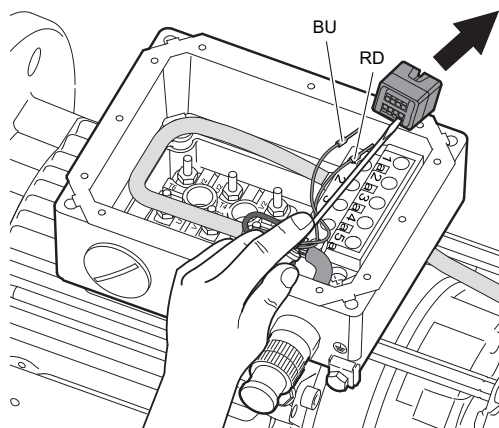
## 7.4.2 EI7. built-in encoders and EI7A encoder mounting adapters – DRN../DRU../DR2..71 – 132S motors

### Removing EI7. – DRN../DRU../DR2..71 – 132S motors



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- Loosen the screws on the terminal box and remove the terminal box cover.

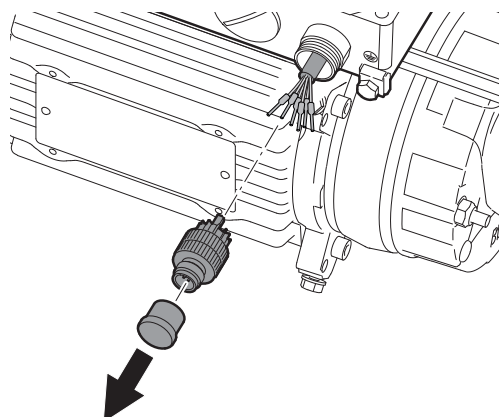


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If a connection unit with M12 connector is used:

- Disconnect the cores from the connection unit.

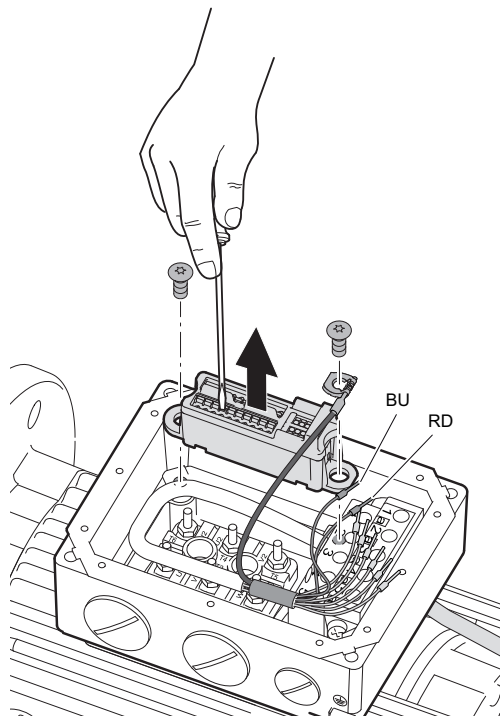
SEW-EURODRIVE recommends using the screwdriver 1205202 from Phoenix



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- Unscrew the M12 connector.
- Disconnect the cores of the encoder cable from the M12 connector.



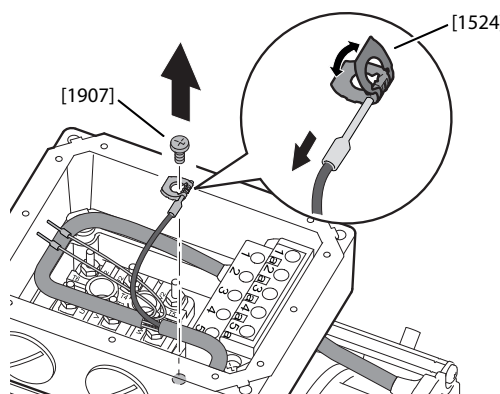


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If a connection unit without M12 connector is used:

- Disconnect the cores of the encoder cable from the connection unit.

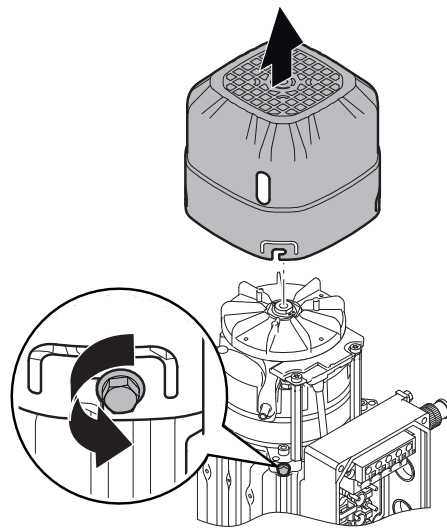
SEW-EURODRIVE recommends using the screwdriver 1205202 from Phoenix



9007208847714955

- Loosen the screw for fastening the shielding to the terminal box.
- Bend the terminal washer open and remove the encoder cable shielding together with the core end sleeve.
- Dispose of the terminal washer [1524].

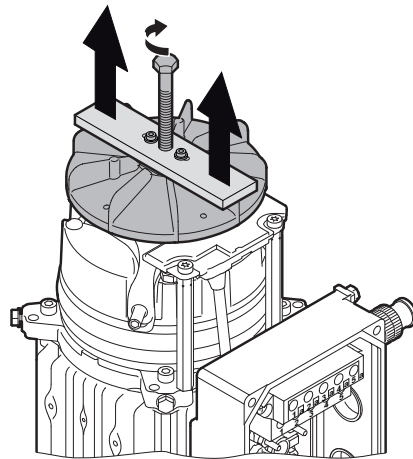
- Loosen the screws on the fan guard and remove the fan guard.



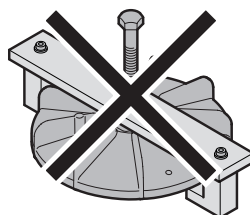
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- Apply a puller to the bushing of the plastic fan and remove the plastic fan.

Notice: Applying direct force to the plastic fan can damage it!



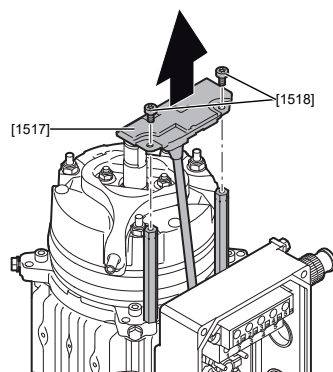
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9744815115

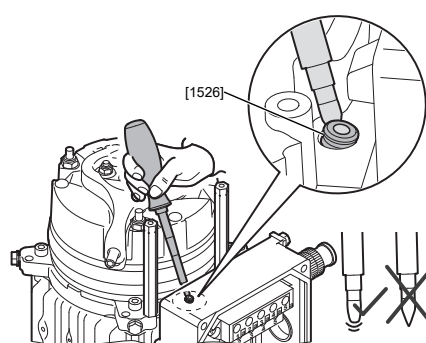
# 7 Mechanical installation

Removing/installing built-in encoders and encoder mounting adapters for built-in encoders



- Loosen the screws [1518] on the encoder module cover and remove the encoder module.
- Dispose of the screws.

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- Remove the grommet [1526] from the cable bushing of the terminal box.
- Dispose of the grommet.

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**Installing EI7. – DRN../DRU../DR2..71 – 132S motors**

Before installation, the grommet [1526] with part number 13637339 must be obtained from SEW-EURODRIVE.

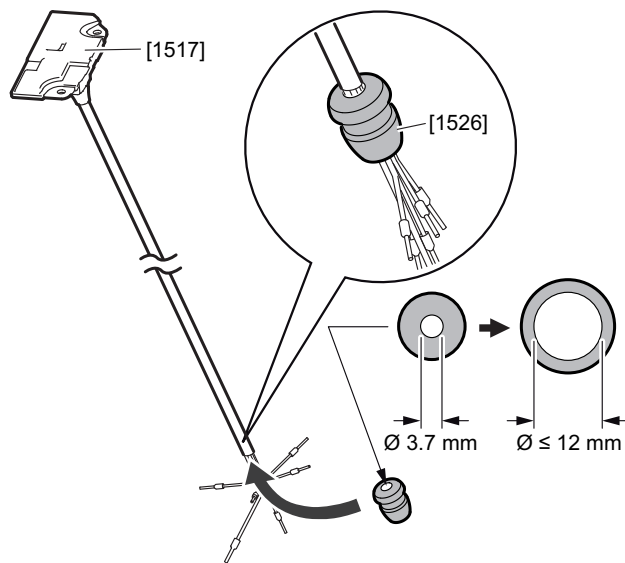
The grommet [1526] is also included in the respective retrofit sets and service kits.

Before installation, the flat-head screws for the brake [1518] with part number 19103387 must be obtained from SEW-EURODRIVE.

The screws [1518] are also included in the respective retrofit sets and service kits.

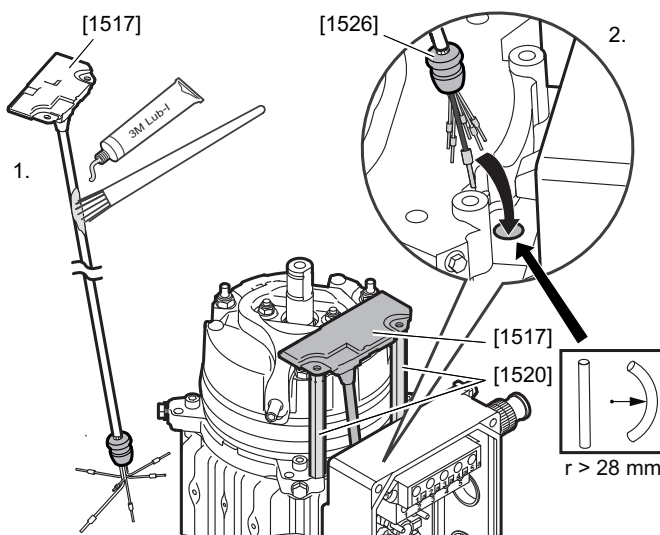
Before installation, a terminal washer [1524] with part number 13262130 must be obtained from SEW-EURODRIVE.

The terminal washer [1524] is also included in the respective retrofit sets and service kits.



- Push the grommet [1526] onto the cable end of the encoder module [1517]. The inside diameter of the grommet may not exceed the maximum inner diameter of 12 mm.

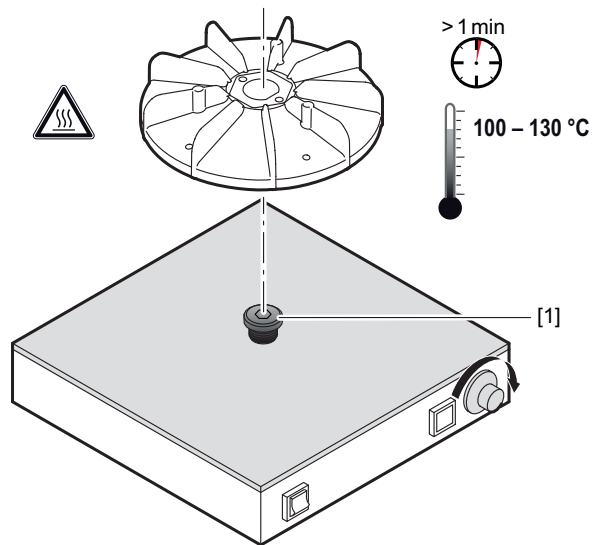
9446005259



- Cable jacket with cable lubricant, for example: Coat with LuB-I from 3M™. Using a rotating movement, carefully pull the cable through the grommet into the terminal box. While doing so, ensure that the grommet does not inadvertently slide through into the terminal box.

The minimum bending radius of 28 mm must be observed.

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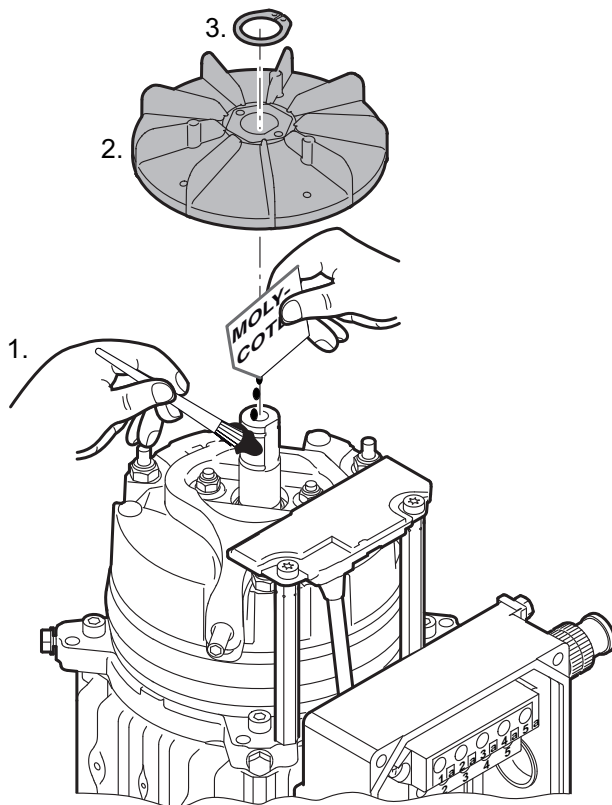


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- Prepare a warming plate.
- Place the bushing of the plastic fan on a warming plate and heat it up to a temperature of 100 to 130 °C.

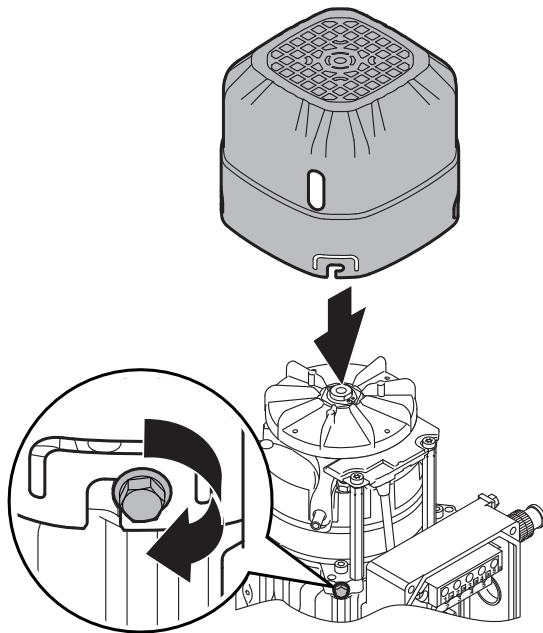
While doing so, ensure that the plastic fan does not come into direct contact with the warming plate.

Any thermally conductive component [1] (e.g. a metal ring) can be used as a contact surface.



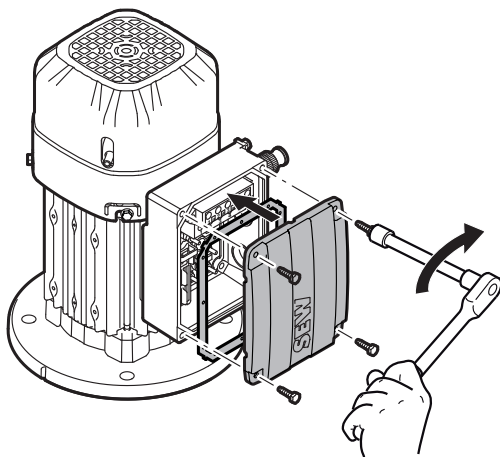
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- Apply assembly paste to the shaft/fan seat e.g.: MOLYCOTE®.
- Install the warmed fan.
- Fasten the fan using a retaining ring.



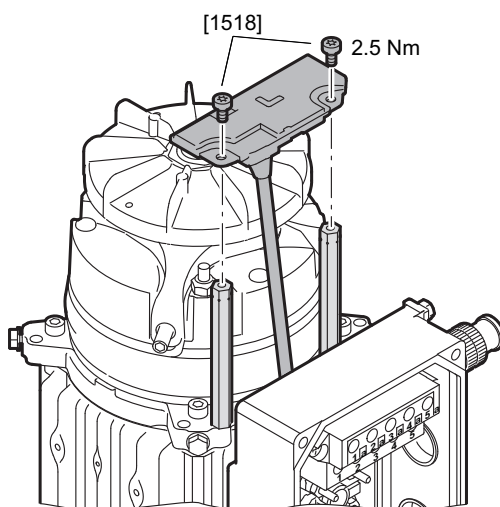
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- Mount the fan guard and fasten it with screws.
  - Tightening torque for metal fan guard: 3.3 Nm
  - Tightening torque for plastic fan guard: 2 Nm



9592987403

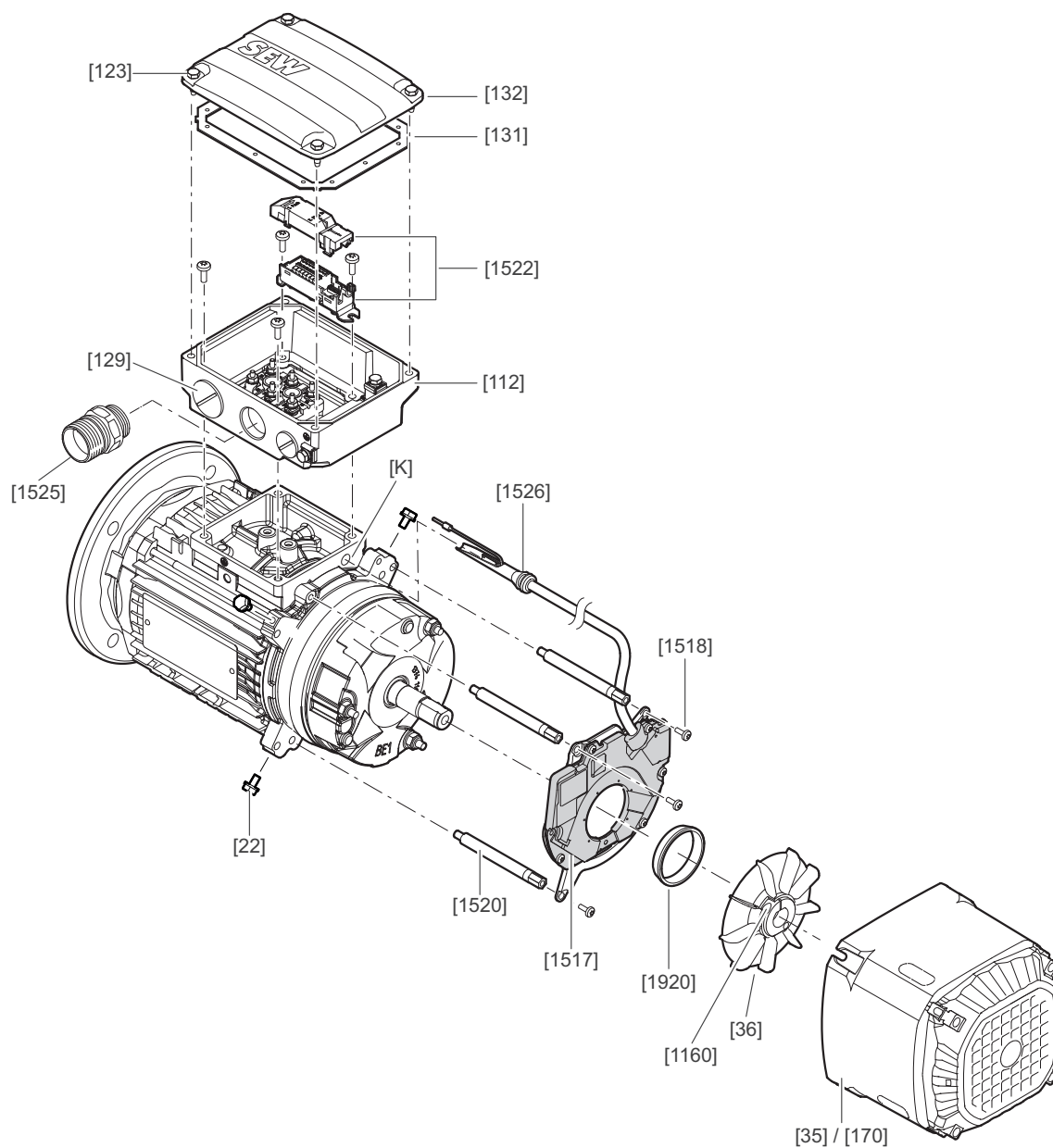
- Mount the terminal box cover and fasten it with screws.
  - Tightening torque: 4 Nm



9592979723

- Fasten the encoder module to the spacers using 2 screws [1518].
  - Tightening torque: 2.5 Nm

### 7.4.3 EI8. built-in encoders and EI8A encoder mounting adapters – DRN../DRU../DR2..71 – 132S motors, with connection unit



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|       |                         |        |                    |        |                      |
|-------|-------------------------|--------|--------------------|--------|----------------------|
| [22]  | Screw                   | [131]  | Gasket for cover   | [1522] | Connection unit      |
| [35]  | Fan guard               | [132]  | Terminal box cover | [1525] | M23 connector        |
| [36]  | Fan, complete           | [170]  | Forced cooling fan | [1526] | Grommet              |
| [112] | Terminal box lower part | [1160] | Cap screw          | [1920] | Centering ring (aid) |
| [119] | Screw                   | [1517] | Encoder module     | [K]    | Knock-out            |
| [123] | Screw                   | [1518] | Screw              |        |                      |
| [129] | Screw plug              | [1520] | Hexagonal spacer   |        |                      |

**Removing EI8. – DRN../DRU../DR2..71 – 132S motors, with connection unit**

- ✓ Required resources: Screwdrivers (SW7, SW8, TX20, TX25)
- 1. Disassemble the forced cooling fan [170] if applicable.
- 2. Remove the screws [22] to disassemble the fan guard [35].
- 3. Loosen the radial clamping screw [1160]:
  - ⇒ DR..71 – 100: M3 with cylinder head
  - ⇒ DR..112/132S: M4 with cylinder head
- 4. Remove the fan [36] with bushing and pole ring from the shaft end.
- 5. Remove the 3 x M4 screws [1518] of the encoder module [1517].
- 6. If present, remove the hexagonal spacers [1520] (SW7).
- 7. Unscrew the screws [123] to remove the terminal box cover [132].
- 8. Remove the cover of the connection unit [1522] by pressing the cover on both sides behind the cable bushing.
- 9. Disconnect the 10-pin board connector.
- 10. Pull the female contact of the encoder cable from the connector.
- 11. Unscrew the grounding element of the encoder cable.
- 12. **NOTICE!** Possible defect of the encoder module. Damage to property. Do not pull directly on the encoder module.  
To remove the encoder module [1517] from the motor, pull the encoder cable out of the grommet [1526] and the opening of the knock-out [K].

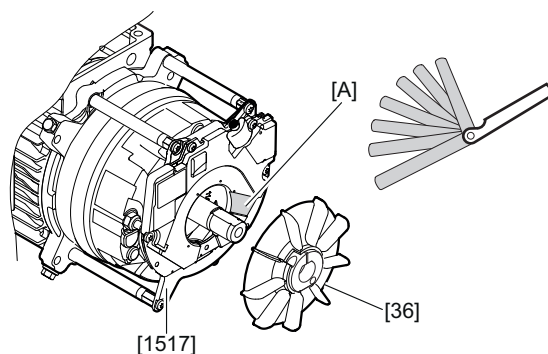


**Installing EI8. – DRN../DRU../DR2..71 – 132S motors, with connection unit**

Before installation, the centering ring [1920] with part number 22659129 must be obtained from SEW-EURODRIVE.

The centering ring [1920] is also included in the respective retrofit sets and service kits.

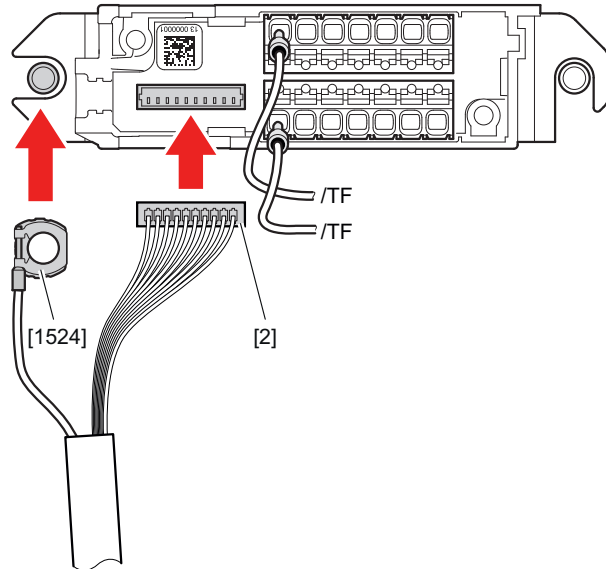
- ✓ Required resources: Feeler gauge (0.9 mm), screwdriver, centering ring [1920]
- 1. Unscrew the screws [123] to remove the terminal box cover [132].
- 2. **NOTICE!** Damage to the terminal box or fragments inside the motor. Possible damage to property. Carefully break the knockout open.  
Break open the knock-out [K] by using a chisel or screwdriver.
- 3. **NOTICE!** Damage to the connector. Possible damage to property. Do not subject the connector to excessive tension.  
Pull the grommet [1526] with encoder cable through the knockout [K].  
⇒ The grommet must engage into the opening of the knockout [K].
- 4. If necessary, screw the hexagonal spacers [1520] into the brake endshield.  
⇒ Tightening torque 5 Nm
- 5. Place the centering ring [1920] onto the pole ring.
- 6. Push the encoder module [1517] onto the shaft end.
- 7. Push the fan [36] with bushing and pole ring onto the shaft end.
- 8. Center the encoder module [1517] with the centering ring [1920] radially to the shaft.
- 9. Fasten the encoder module [1517] with 3 screws [1518] on the rear endshield or, if applicable, using 3 screws [1518] on the hexagonal spacers [1520] that are fastened to the brake endshield.  
⇒ Tightening torque 2.5 Nm
- 10. Remove the fan [36] with bushing and pole ring from the shaft end and remove the centering ring [1920].
- 11. Push the fan [36] with bushing and pole ring onto the shaft end.
- 12. To set a clear span of 0.9 mm between the pole ring surface and the base of the notch, insert a 0.9 mm feeler gauge into the notch [A].



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- 13. Tighten the clamping screw [1160].  
⇒ DR..71 – 100: Tightening torque 1.2 Nm  
⇒ DR..112 – 132S: Tightening torque 3.3 Nm
- 14. Route the encoder cable in the terminal box in such a way that it is not crushed or improperly subjected to stress.

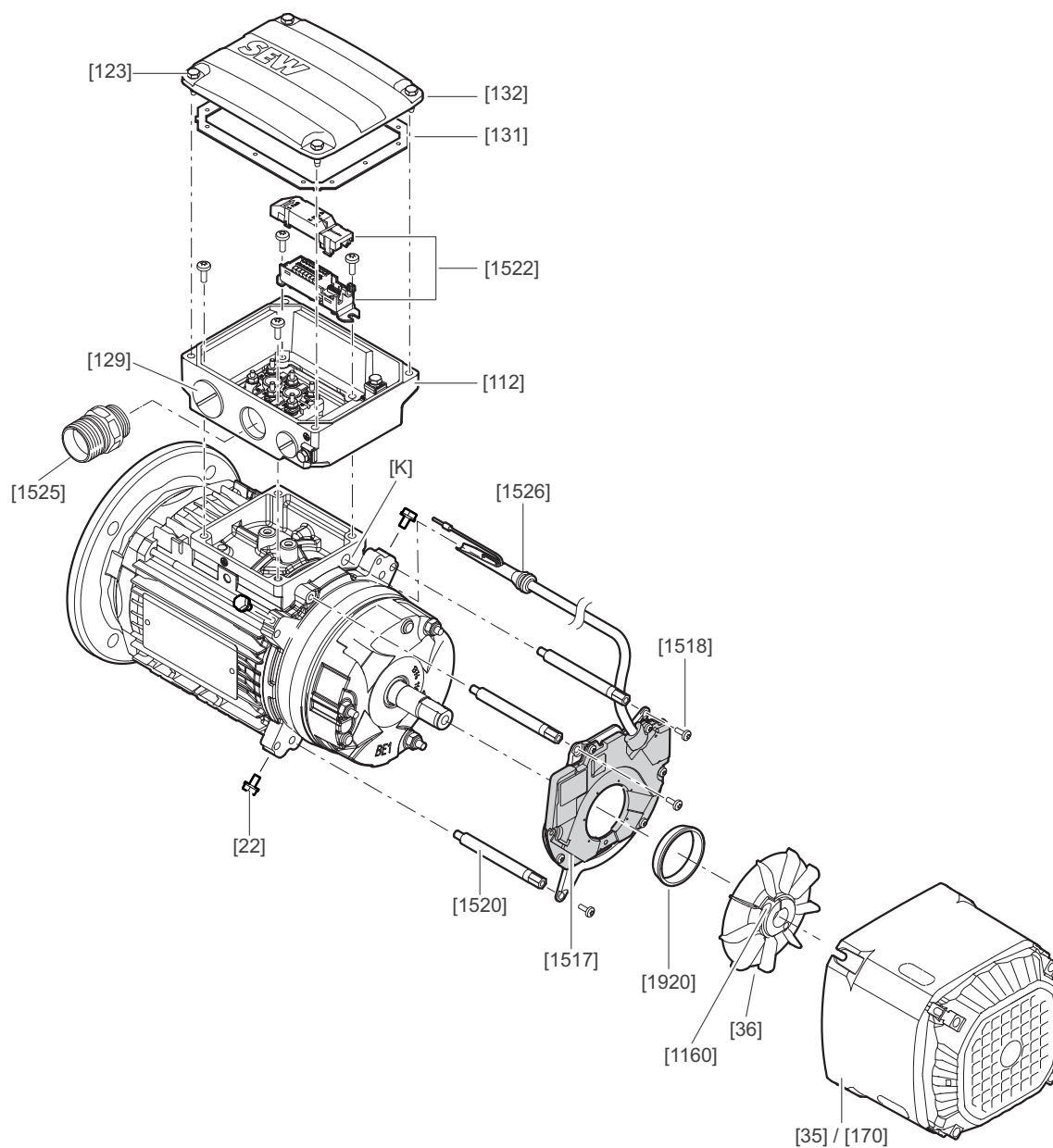
15. Remove the cover of the connection unit [1522] by pressing the cover on both sides behind the cable bushing.
16. Apply the shielding of the encoder cable onto the terminal washer.
17. Place the connection unit [1522] in the terminal box.
18. To secure the connection unit [1522] in place, screw the terminal washer [1524] and the shield plate tightly in the terminal box.
  - ⇒ For gray cast iron terminal boxes: Tightening torque 1.8 Nm
  - ⇒ For aluminum terminal boxes: Tightening torque 5 Nm



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19. Insert the socket contact of the encoder cable [2] onto the connector on the board and insert the encoder cable into the hollow of the connection unit [1522], which serves as strain relief. If applicable, connect the temperature probe /TF.
20. Connect the customer's evaluation unit for the encoder to the connection unit [1522] with a shield plate.
21. Connect the supply voltage and the signal cables of the encoder module [1517] to the connection unit [1522].
22. Attach the cover of the connection unit [1522].
23. Check the visual feedback of the status LED for the encoder module [1517].
  - ⇒ LED lights up green: The encoder module [1517] has been installed correctly and you can continue with the assembly process.
  - ⇒ LED lights up red: Switch off the supply voltage. Set the distance of 0.9 mm between the encoder module [1517] and the pole ring again. Switch the supply voltage back on. If the status LED still lights up red, contact the SEW-EURODRIVE Service department.
24. Mount the terminal box cover [132] using the screws [123] (4 × M5 SW8).
  - ⇒ Tightening torque 4 Nm
25. Mount the fan guard [35] with the screws [22].
  - ⇒ For plastic guard: Tightening torque 2 Nm
  - ⇒ For metal guard: Tightening torque 3.3 Nm
26. Mount the forced cooling fan [170] if applicable.

#### 7.4.4 EI8. built-in encoders and EI8A encoder mounting adapters – DRN../DRU../DR2..71 – 132S motors, with M23 connector



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|       |                         |        |                    |        |                      |
|-------|-------------------------|--------|--------------------|--------|----------------------|
| [22]  | Screw                   | [131]  | Gasket for cover   | [1522] | Connection unit      |
| [35]  | Fan guard               | [132]  | Terminal box cover | [1525] | M23 connector        |
| [36]  | Fan, complete           | [170]  | Forced cooling fan | [1526] | Grommet              |
| [112] | Terminal box lower part | [1160] | Cap screw          | [1920] | Centering ring (aid) |
| [119] | Screw                   | [1517] | Encoder module     | [K]    | Knock-out            |
| [123] | Screw                   | [1518] | Screw              |        |                      |
| [129] | Screw plug              | [1520] | Hexagonal spacer   |        |                      |

**Removing EI8. – DRN../DRU../DR2..71 – 132S motors, with M23 connector**

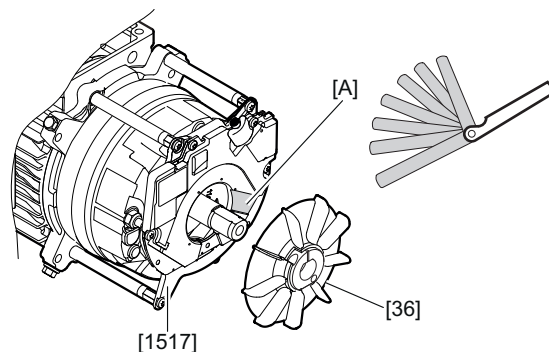
- ✓ Required resources: Screwdriver
- 1. Disassemble the forced cooling fan [170] if applicable.
- 2. Remove the screws [22] to disassemble the fan guard [35].
- 3. Loosen the radial clamping screw [1160]:
  - ⇒ DR..71 – 100: M3 with cylinder head
  - ⇒ DR..112/132S: M4 with cylinder head
- 4. Remove the fan [36] with bushing and pole ring from the shaft end.
- 5. Remove the 3 x M4 screws [1518] of the encoder module [1517].
- 6. If present, remove the hexagonal spacers [1520] (SW7).
- 7. Unscrew the screws [123] to remove the terminal box cover [132].
- 8. Remove the protective cover of the M23 connector [1525] on the inside of the terminal box.
- 9. Pull the female contact of the encoder cable from the connector.
- 10. Remove the grounding element of the encoder.
- 11. **NOTICE!** Possible defect of the encoder module. Damage to property. Do not pull directly on the encoder module.  
To remove the encoder module [1517] from the motor, pull the encoder cable out of the grommet [1526] and the opening of the knock-out [K].

## Installing EI8. – DRN../DRU../DR2..71 – 132S motors, with M23 connector

Before installation, the centering ring [1920] with part number 22659129 must be obtained from SEW-EURODRIVE.

The centering ring [1920] is also included in the respective retrofit sets and service kits.

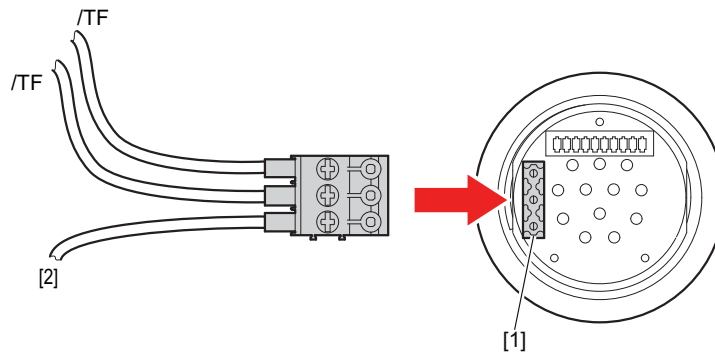
- ✓ Required resources: Feeler gauge (0.9 mm), screwdriver, centering ring [1920]
- 1. Unscrew the screws [123] to remove the terminal box cover [132].
- 2. **NOTICE!** Damage to the terminal box or fragments inside the motor. Possible damage to property. Carefully break the knockout open.  
Break open the knock-out [K] by using a chisel or screwdriver.
- 3. **NOTICE!** Damage to the connector. Possible damage to property. Do not subject the connector to excessive tension.  
Pull the grommet [1526] with encoder cable through the knockout [K].  
⇒ The grommet must engage into the opening of the knockout [K].
- 4. If necessary, screw the hexagonal spacers [1520] into the brake endshield.  
⇒ Tightening torque 5 Nm
- 5. Place the centering ring [1920] onto the pole ring.
- 6. Push the encoder module [1517] onto the shaft end.
- 7. Push the fan [36] with bushing and pole ring onto the shaft end.
- 8. Center the encoder module [1517] with the centering ring [1920] radially to the shaft.
- 9. Fasten the encoder module [1517] with 3 screws [1518] on the rear endshield or, if applicable, using 3 screws [1518] on the hexagonal spacers [1520] that are fastened to the brake endshield.  
⇒ Tightening torque 2.5 Nm
- 10. Remove the fan [36] with bushing and pole ring from the shaft end and remove the centering ring [1920].
- 11. Push the fan [36] with bushing and pole ring onto the shaft end.
- 12. To set a clear span of 0.9 mm between the pole ring surface and the base of the notch, insert a 0.9 mm feeler gauge into the notch [A].



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- 13. Tighten the clamping screw [1160].  
⇒ DR..71 – 100: Tightening torque 1.2 Nm  
⇒ DR..112 – 132S: Tightening torque 3.3 Nm
- 14. Route the encoder cable in the terminal box in such a way that it is not crushed or improperly subjected to stress.

15. Remove the protective cover of the M23 connector [1525] on the inside of the terminal box.
16. Plug the socket contact of the encoder cable onto the connector on the board.
17. Connect the shielding of the encoder cable [2] and, if applicable, the temperature probe /TF to the screw terminal.



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18. Insert the screw terminal with the connection side facing outwards into the connector [1] on the printed circuit board.
19. Install the protective cover of the M23 connector [1525] on the inside of the terminal box.
20. Connect the supply voltage and the signal cables of the encoder module [1517] to the connection unit [1522].
21. Check the visual feedback of the status LED for the encoder module [1517].
  - ⇒ LED lights up green: The encoder module [1517] has been installed correctly and you can continue with the assembly process.
  - ⇒ LED lights up red: Switch off the supply voltage. Set the distance of 0.9 mm between the encoder module [1517] and the pole ring again. Switch the supply voltage back on. If the status LED still lights up red, contact the SEW-EURODRIVE Service department.
22. Mount the terminal box cover [132] using the screws [123] (4 × M5 SW8).
  - ⇒ Tightening torque 4 Nm
23. Mount the fan guard [35] with the screws [22].
  - ⇒ For plastic guard: Tightening torque 2 Nm
  - ⇒ For metal guard: Tightening torque 3.3 Nm
24. Mount the forced cooling fan [170] if applicable.

## 7.5 Removing/installing conical encoders and encoder mounting adapters for conical encoders

### INFORMATION



For EK8Z, EK9Z, AK8Z encoders, work on the MOVILINK® DDI communication unit is not permitted. Place an order with SEW-EURODRIVE Service to have any necessary work on the encoder performed.

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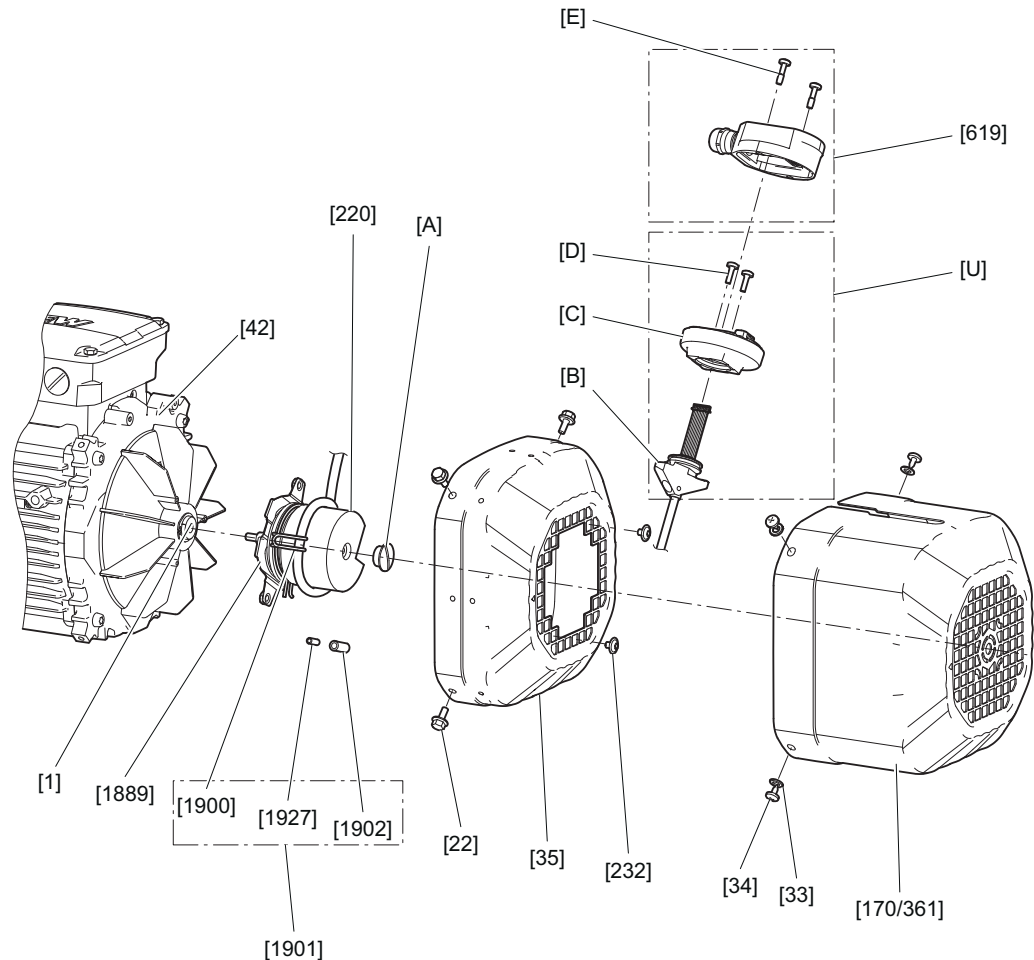
The integrated encoder connector (parts [U] and [619]) can be turned  $\pm 180$  degrees in steps of  $90^\circ$  to allow for a variable cable outlet of the connection cover [619]. To align, loosen the screws D in the lower part C.

In addition, the encoder cover [361] can be turned 360 degrees in steps of  $90^\circ$  for many motor configurations to allow for a variable connection side of the integrated encoder connector (parts [U] and [619]). Loosen the screws [34] and the washers [33]. The ability to turn parts can be restricted by the following design features of the motor:

- Size
- Position of the manual brake release
- Certain gear unit combinations
- Dimensions of the feet of the motor
- Connection technology of the motor (e.g. connectors)
- Combination with a forced cooling fan
- Applicative limits of the system

### 7.5.1 EK8./EK9./AK8./AK9./RK8M conical encoders and EK8A encoder mounting adapters – (E)DRN../DRU../DR2..63 – 355 motors

Structure of .K8./K9. conical encoder – (E)DRN../DRU../DR2..63 – 132S motors with integrated A1GA encoder connector with connection cover or A2GA without connection cover

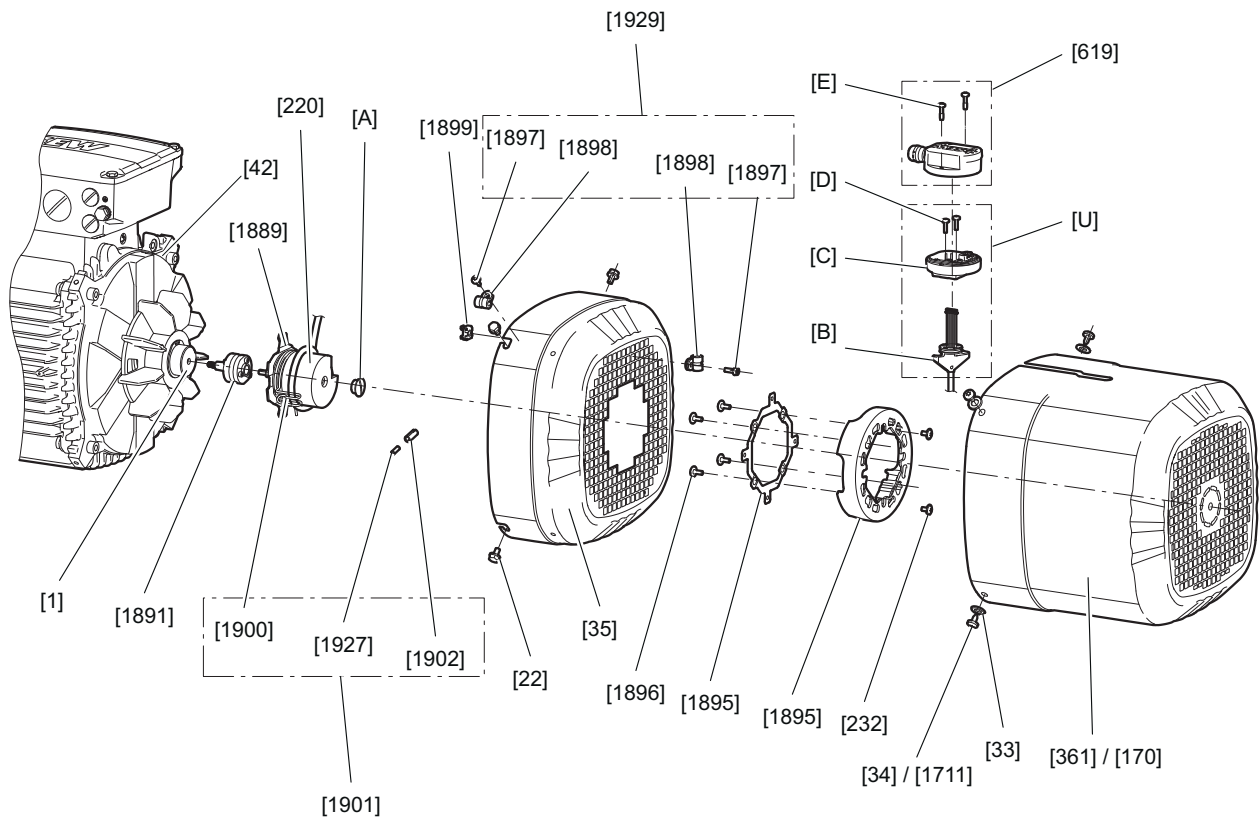


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|       |                      |        |                    |
|-------|----------------------|--------|--------------------|
| [1]   | Rotor                | [U]    | Connection adapter |
| [22]  | Screw (hexagonal)    | [1889] | Torque bracket     |
| [33]  | Washer               | [1900] | Cable retainer     |
| [34]  | Screw (cross recess) | [1901] | Accessory bag      |
| [35]  | Fan guard            | [1902] | Threaded sleeve    |
| [42]  | B-side endshield     | [1927] | Set screw          |
| [170] | Forced cooling fan   | [A]    | Screw plug         |
| [220] | Encoder              | [B]    | T-slot nut         |
| [232] | Screw (hexalobular)  | [C]    | Lower part         |
| [361] | Safety cover         | [D]    | Screw              |
| [619] | Connection cover     | [E]    | Screw              |



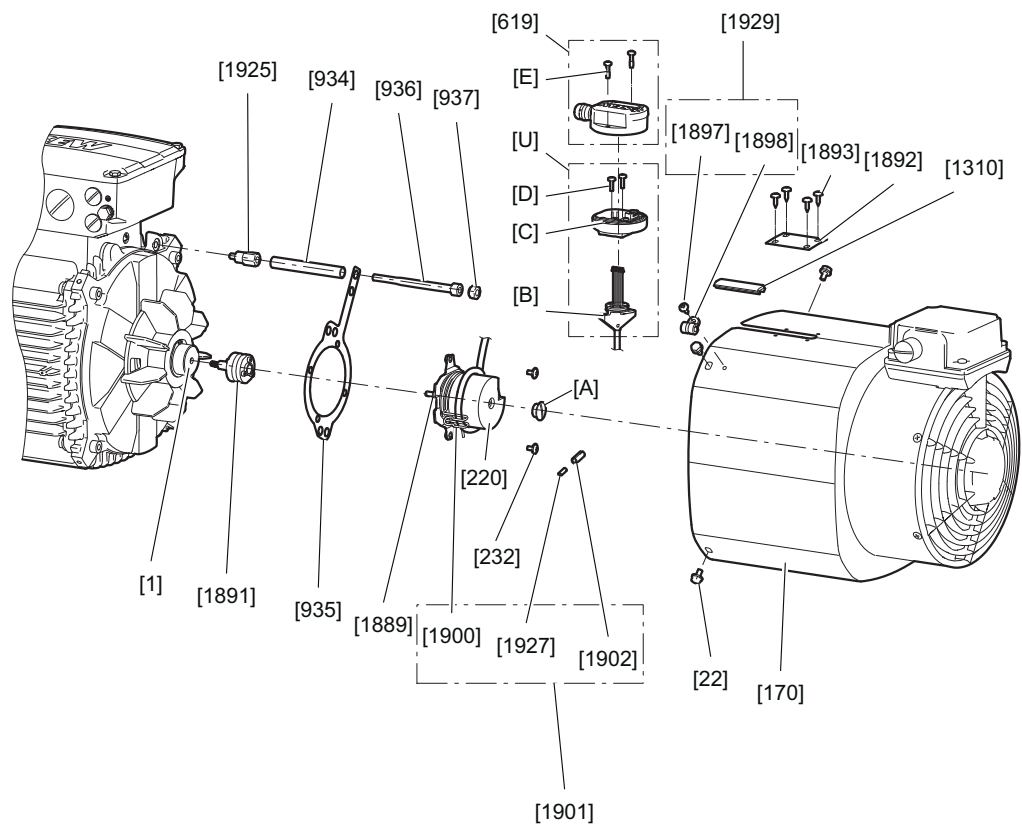
**Structure of .K8./.K9. conical encoder – (E)DRN../DRU../DR2..132M – 315 motors with integrated A1GA encoder connector with connection cover or A2GA without connection cover**



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|        |                          |        |                        |
|--------|--------------------------|--------|------------------------|
| [1]    | Rotor                    | [1896] | Screw (hexalobular)    |
| [22]   | Screw (hexagonal)        | [1897] | Screw (hexagon socket) |
| [33]   | Washer                   | [1898] | Clamp                  |
| [34]   | Screw (cross recess)     | [1899] | Cage nut               |
| [35]   | Fan guard                | [1900] | Cable retainer         |
| [42]   | B-side endshield         | [1901] | Accessory bag          |
| [170]  | Forced cooling fan       | [1902] | Threaded sleeve        |
| [220]  | Encoder                  | [1927] | Set screw              |
| [232]  | Screw (hexalobular)      | [1929] | Accessory bag          |
| [361]  | Safety cover             | [A]    | Screw plug             |
| [619]  | Connection cover         | [B]    | T-slot nut             |
| [U]    | Connection adapter       | [C]    | Lower part             |
| [1711] | Screw (hexagonal)        | [D]    | Screw                  |
| [1889] | Torque bracket           | [E]    | Screw                  |
| [1891] | Insulation coupling      |        |                        |
| [1895] | Support ring/spacer ring |        |                        |

**Structure of .K8./.K9. conical encoder – (E)DRN../DRU../DR2..132M – 355 motors with forced cooling fan and integrated A1GA encoder connector with connection cover or A2GA without connection cover**



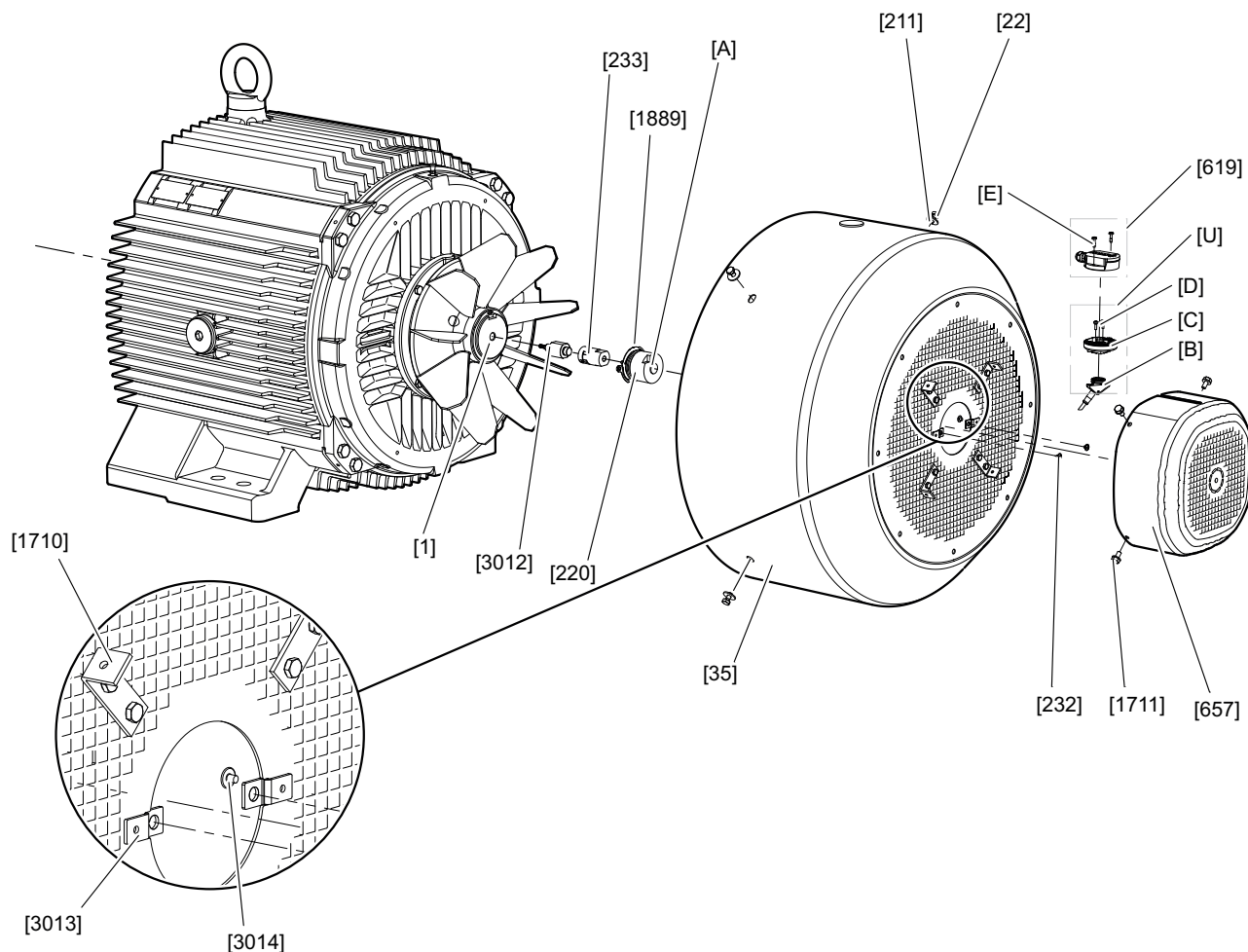
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|        |                      |        |                        |
|--------|----------------------|--------|------------------------|
| [1]    | Rotor                | [1892] | Support plate          |
| [22]   | Screw (hexagonal)    | [1893] | Screw (cross recess)   |
| [33]   | Washer               | [1897] | Screw (hexagon socket) |
| [34]   | Screw (cross recess) | [1898] | Clamp                  |
| [170]  | Forced cooling fan   | [1900] | Cable retainer         |
| [220]  | Encoder              | [1901] | Accessory bag          |
| [232]  | Screw (hexalobular)  | [1902] | Threaded sleeve        |
| [361]  | Safety cover         | [1925] | Spacer bolt            |
| [619]  | Connection cover     | [1927] | Set screw              |
| [934]  | Spacer bushing       | [1929] | Accessory bag          |
| [935]  | Torque bracket       | [A]    | Screw plug             |
| [936]  | Cap screw            | [B]    | T-slot nut             |
| [937]  | Hex nut              | [C]    | Lower part             |
| [1310] | Sealing profile      | [D]    | Screw                  |
| [1889] | Torque bracket       | [E]    | Screw                  |
| [1891] | Insulation coupling  | [U]    | Connection adapter     |

# 7 Mechanical installation

Removing/installing conical encoders and encoder mounting adapters for conical encoders

**Structure of .K8./.K9. conical encoder – DRN355 motors with integrated A1GA encoder connector with connection cover or A2GA without connection cover**



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|        |                     |        |                  |
|--------|---------------------|--------|------------------|
| [1]    | Rotor               | [1889] | Torque bracket   |
| [22]   | Screw (hexagonal)   | [1902] | Threaded sleeve  |
| [35]   | Fan guard           | [1927] | Set screw        |
| [211]  | Washer              | [3012] | Bolt             |
| [220]  | Encoder             | [3013] | Fastening plate  |
| [232]  | Screw (hexalobular) | [3014] | Round-head screw |
| [233]  | Coupling            |        |                  |
| [619]  | Connection cover    | [A]    | Screw plug       |
| [657]  | Safety cover        | [B]    | T-slot nut       |
| [U]    | Connection adapter  | [C]    | Lower part       |
| [1710] | Angle bracket       | [D]    | Screw            |
| [1711] | Screw (hexagonal)   | [E]    | Screw            |

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### Removing EK8./EK9./AK8./AK9./RK8M – Add-on encoder set with integrated A1GA encoder connector with connection cover or without A2GA connection cover

1. Unscrew the screws [E].
2. Remove the connection cover [619] from the connection adapter [U].
3. Loosen the screws [D] in the lower part [C].
  - ⇒ Only unscrew the screws [D] to such an extent that the connection adapter [U] can be moved in the recess of the safety cover [657]/forced cooling fan [170].
4. With forced cooling fan: Unscrew the screws [22].
5. Without forced cooling fan: Unscrew the screws [34]/[1711].
6. Remove the safety cover [361]/[657] or the forced cooling fan [170] from the motor. When doing this, slide the connection adapter [U] out of the recess.
7. With forced cooling fan: Remove the signal cable from the slot/3 wings of the cable retainer [1900].
8. Unscrew the screws [232].
9. Remove the fan guard [35] over the encoder [220]. Guide the connection adapter [U] with the signal cable through the cutout of the fan guard [35].
10. For size 132M – 355 with forced cooling fan: Remove the screw [936], the nuts [734]/[937], the spacer bushing [934], and the torque bracket [935].



#### NOTICE

In the case of encoders RK8M, EK8W, AK8H, AK8W, EK8Z, EK9Z, and AK8Z on DR2C.. motors, loosening the central retaining screw [A] of the encoder [220] or loosening the insulation coupling [1891] of the motor or encoder shaft desynchronizes the encoder and motor rotor.

Higher motor losses and lower torques.

- Perform a new adjustment.

11. Unscrew the screw plug [A] of the encoder [220].
12. Loosen the central retaining screw of the encoder [220]. Use a tool that is at least 45 mm long for this.
  - ⇒ If the central retaining screw of the encoder [220] cannot be loosened, counter-tighten the spanner flat SW10 of the encoder shaft.
13. Loosen the cone connection.
  - ⇒ Encoder EK8., AK8W, AK8Y, RK8M: To loosen the cone connection, continue turning the central retaining screw of the encoder [220] counterclockwise.
  - ⇒ Encoder AK8H: Continue turning the central retaining screw of the encoder [220] counterclockwise. To loosen the conical connection, screw an M6 screw (≥ 70 mm long) into the bore.
14. Remove the encoder [220] from the rotor [1] or from the coupling [233]/[1891].

**Installing EK8./EK9./AK8./AK9./RK8M – Add-on encoder set with integrated A1GA encoder connector with connection cover or without A2GA connection cover**

1. For size 355: Connect the two halves of the coupling [233] by plugging them together using the coupling star. The coupling [233] must be firmly connected. Make sure that the encoder is centered [220].
2. For size 63 – 315: Clean the cone of the encoder [220].
3. For size 355: Clean the cone of the encoder [220] and the coupling [233].
4. Remove the screw plug [A] of the encoder.
5. For size 355: Place the coupling [233] onto the bolt [3012]. Tighten the retaining screw at the clamping hub on the motor side to fasten the coupling.
  - ⇒ Tightening torque 3.3 Nm
6. Retrofitting insulation coupling on the encoder mounting adapter: Insert the insulation coupling [1891] into the conical bore of the rotor [1] and tighten the central retaining screw.
  - ⇒ Tightening torque 2.25 Nm
7. Use solvent to remove the residual adhesive from the central retaining screw.
8. For AK8H safety encoders: Wet the central retaining screw that is required in the following step with LOCTITE® 241.
9. Insert the encoder [220] into the conical bore of the rotor [1] or the coupling [233]/[1891].
10. To secure the encoder [220] in place, tighten the central retaining screw. Use a tool that is at least 45 mm long for this.
  - ⇒ Counter-tighten the spanner flat SW27 of the coupling and SW10 of the encoder shaft.
  - ⇒ Tightening torque 3.3 Nm
  - ⇒ For safety encoders: Tightening torque 3.3 Nm ± 8%

**NOTICE**

For encoders RK8M, EK8W, AK8H, AK8W, EK9Z and AK8Z on DR2C.. motors, a calibration process must be carried out for flawless operation. See "Additional work for the RK8M encoder on the DR2C.. motor" (→ 218) and "Additional work for EK8W, AK8H, AK8W, EK9Z, and AK8Z encoders on the DR2C.. motor" (→ 222).

Failure to calibrate results in greater motor losses and reduced torque. In the worst-case scenario, the motor will not run.

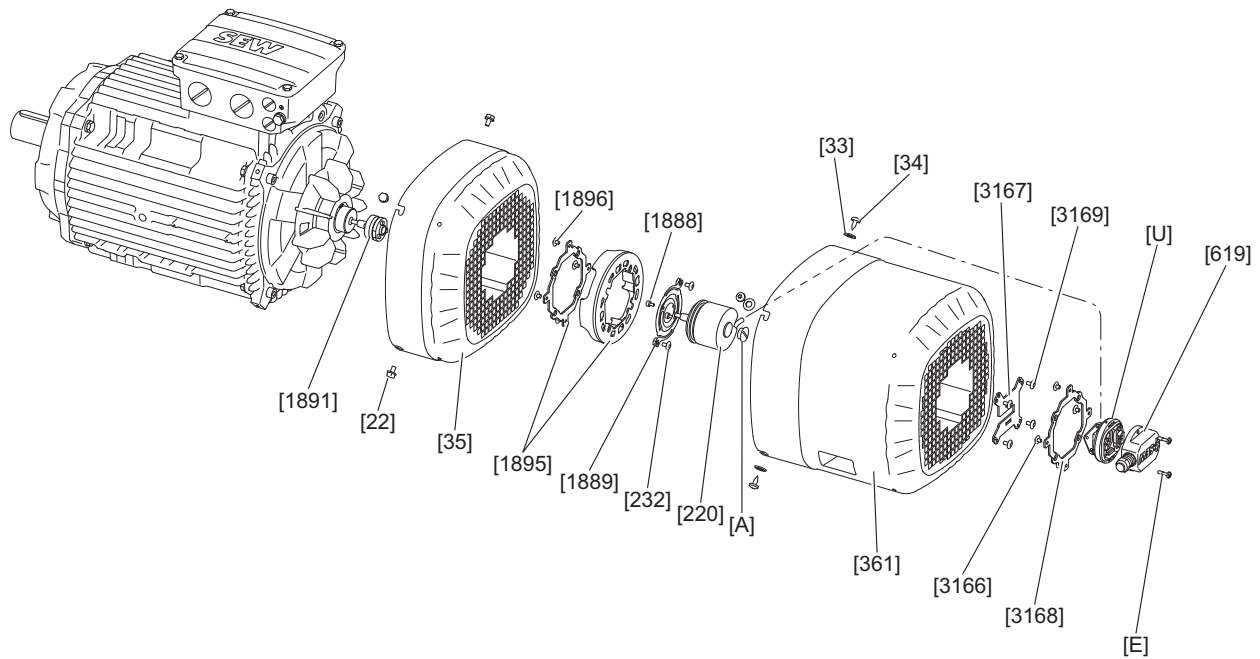
11. To seal the encoder [220], screw in the screw plug [A].
  - ⇒ Tightening torque 1.8 Nm
12. For size 355 with forced cooling fan: Mount the spacer bolts [934].
13. For size 132M – 355 with forced cooling fan: Guide the torque bracket [935] over the connection adapter [U] and the encoder [220].
14. For size 132M – 355 with forced cooling fan: When mounting the torque bracket [935], make sure it is aligned centrally to the encoder [220]. Screw in the screw [936] with the spacer bushings [934].
  - ⇒ Tightening torque 12 Nm
15. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.

16. Retrofitting insulation coupling on the encoder mounting adapter: Replace the support ring [1895] with the spacer ring [1895] and screw it securely in place with the new M5×10 screws [1896].
  - ⇒ Tightening torque 7 Nm
17. For size 132M – 355 with forced cooling fan: Screw the torque bracket of the encoder [1889] with the screws [232] through the bores of the torque bracket [935].
  - ⇒ Tightening torque 3.3 Nm
18. For size 63 – 355 without forced cooling fan: Mount the fan guard [35] over the encoder [220] with the screws [22]. When doing this, guide the connection adapter [U] with the signal cable through the central grille cutout of the fan guard [35].
  - ⇒ For size 63 – 132S: Tightening torque 3.3 Nm
  - ⇒ For size 132M/L: Tightening torque 11 Nm
  - ⇒ For size 160 – 355: Tightening torque 27 Nm
19. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.
20. For size 63 – 132S: Screw the screws [232] through the grille of the fan guard [35] and into the nuts of the torque bracket [1889].
  - ⇒ Tightening torque 3.3 Nm
21. For size 132M – 355 without forced cooling fan: Screw the screws [232] through the grille of the fan guard [35] or the central opening of the support ring [1895] and into the nuts of the torque bracket [1889].
  - ⇒ Tightening torque 3.3 Nm
  - ⇒ For safety encoders: Tightening torque 3.3 Nm ±10%
22. For size 132M – 355 with forced cooling fan: Screw the screws [232] through the torque bracket [935] and into the nuts of the torque bracket of the encoder [1889].
  - ⇒ If you need to turn the encoder [220] in order for the screws to reach the nuts of the torque bracket, turn the encoder [220] clockwise.
  - ⇒ Make sure the signal cable is of a sufficient length so that the connection adapter [U] can be inserted into the recess of the safety cover [361]/[657] of the forced cooling fan [170].
  - ⇒ Tightening torque 3.3 Nm
  - ⇒ For safety encoders: Tightening torque 3.3 Nm ±10%
23. Before you install the safety cover [361]/[657] or the forced cooling fan [170], slide the connection adapter [U] into the recess.
24. For size 63 – 280 without forced cooling fan: Place the safety cover [361] onto the fan guard [35].
25. For size 315 – 355: Place the safety cover [657] onto the metal brackets [1710].
26. For size 315 – 355: Secure the safety cover [657] in place by using the screws [1711].
  - ⇒ Tightening torque 12 Nm
27. With forced cooling fan: Place the forced cooling fan [170] onto the screws [22].
28. Slide the connection adapter [U] into the recess of the safety cover [361] or the forced cooling fan [170] up to the stop. The standard alignment of the recess points towards the terminal box.
  - ⇒ The arrow that is cast in the lower part [C] of the connection adapter [U] indicates the direction of the subsequent cable outlet for the connection cover [619].

- ⇒ If you wish to change the direction of the cable outlet: Unscrew the screws [D]. Twist the lower part [C] against the T-slot nut [B]. Screw in the screws [D]. When doing so, only tighten the screws [D] lightly.
- 29. With forced cooling fan: Secure the forced cooling fan [170] with the screws [22].
  - ⇒ For size 71 – 132S: Tightening torque 3.3 Nm
  - ⇒ For size 132M/L: Tightening torque 11 Nm
  - ⇒ For size 160 – 355: Tightening torque 27 Nm
- 30. For size 71 – 132S with forced cooling fan: Additionally secure the forced cooling fan [170] in place by using the screws [34] and washers [33].
  - ⇒ Tightening torque 2 Nm
- 31. Without forced cooling fan: Secure the safety cover [361] in place by using the screws [34] and washers [33].
  - ⇒ For size 63 – 132S: Tightening torque 2 Nm
  - ⇒ For size 132M – 280: Tightening torque 3.5 Nm
- 32. Turn the connection adapter [U] clockwise up to the stop.
- 33. Secure the connection adapter [U] in place by tightening the screws [D].
  - ⇒ Tightening torque 2 Nm
  - ⇒ For safety encoders: Tightening torque 2 Nm ± 10%
- 34. Place the connection cover [619] onto the connection adapter [U].
- 35. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.
- 36. Screw the screws [E] through the bores in the connection cover [619] and into the bores in the connection adapter [U].
  - ⇒ Tightening torque 2.25 Nm



### Removing EK8./EK9./AK8./AK9./RK8M – A1GA/A2GA axial add-on encoder set (installation on rear of fan guard)



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1. Unscrew the screws [E].
2. Remove the connection cover [619] from the connection adapter [U].
3. Unscrew the screws [3169].
4. For size 71 – 280: Unscrew the screws [34].
5. For size 315 – 355: Unscrew the screws [1711].
6. For size 71 – 280: Remove the safety cover [361] from the fan guard [35].
7. For size 315 – 355: Remove the safety cover [657] from the fan guard [35].
8. Guide the connection adapter [U] mounted on the support plate [3167] through the opening in the grille of the safety cover [361]/[657].
9. Loosen the screws [D] in the lower part [C].
  - ⇒ Only unscrew the screws [D] to such an extent that the connection adapter [U] can be moved in the recess of the support plate [3167].
10. When doing this, slide the connection adapter [U] out of the recess of the support plate [3167].
11. Remove the screws [22].
12. Unscrew the screws [232].
13. Remove the fan guard [35] over the encoder [220].
  - ⇒ Guide the connection adapter [U] with the signal cable through the cutout of the fan guard [35].



**NOTICE**

In the case of encoders RK8M, EK8W, AK8H, AK8W, EK8Z, EK9Z, and AK8Z on DR2C.. motors, loosening the central retaining screw [A] of the encoder [220] or loosening the insulation coupling [1891] of the motor or encoder shaft desynchronizes the encoder and motor rotor.

Higher motor losses and lower torques.

- Perform a new adjustment.

14. Unscrew the screw plug [A] of the encoder [220].

15. Loosen the central retaining screw of the encoder [220]. Use a tool that is at least 45 mm long for this.

- ⇒ If the central retaining screw of the encoder [220] cannot be loosened, counter-tighten the spanner flat SW10 of the encoder shaft.

16. Loosen the cone connection.

- ⇒ Encoder EK8., AK8W, AK8Y, RK8M: To loosen the cone connection, continue turning the central retaining screw of the encoder [220] counterclockwise.
- ⇒ Encoder AK8H: Continue turning the central retaining screw of the encoder [220] counterclockwise. To loosen the conical connection, screw an M6 screw (≥ 70 mm long) into the bore.

17. Remove the encoder [220] from the rotor [1] or from the coupling [233]/[1891].

**Installing EK8./EK9./AK8./AK9./RK8M – A1GA/A2GA axial add-on encoder set (installation on rear of fan guard)**

1. For size 355: Connect the two halves of the coupling [233] by plugging them together using the coupling star. The coupling [233] must be firmly connected. Make sure that the encoder is centered [220].
2. For size 63 – 315: Clean the cone of the encoder [220].
3. For size 355: Clean the cone of the encoder [220] and the coupling [233].
4. Remove the screw plug [A] of the encoder.
5. For size 355: Place the coupling [233] onto the bolt [3012]. Tighten the retaining screw at the clamping hub on the motor side to fasten the coupling.
  - ⇒ Tightening torque 3.3 Nm
6. Retrofitting insulation coupling on the encoder mounting adapter: Insert the insulation coupling [1891] into the conical bore of the rotor [1] and tighten the central retaining screw.
  - ⇒ Tightening torque 2.25 Nm
7. Use solvent to remove the residual adhesive from the central retaining screw.
8. For AK8H safety encoders: Wet the central retaining screw that is required in the following step with LOCTITE® 241.
9. Insert the encoder [220] into the conical bore of the rotor [1] or the coupling [233]/[1891].
10. To secure the encoder [220] in place, tighten the central retaining screw. Use a tool that is at least 45 mm long for this.
  - ⇒ Counter-tighten the spanner flat SW27 of the coupling and SW10 of the encoder shaft.
  - ⇒ Tightening torque 3.3 Nm
  - ⇒ For safety encoders: Tightening torque 3.3 Nm ± 8%

**NOTICE**

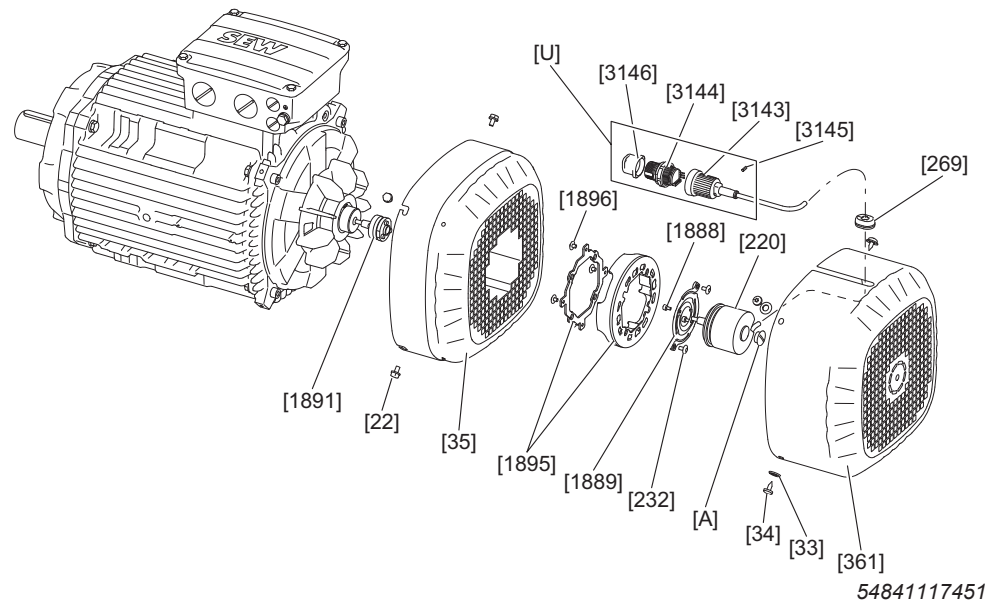
For encoders RK8M, EK8W, AK8H, AK8W, EK9Z and AK8Z on DR2C.. motors, a calibration process must be carried out for flawless operation. See "Additional work for the RK8M encoder on the DR2C.. motor" (→ 218) and "Additional work for EK8W, AK8H, AK8W, EK9Z, and AK8Z encoders on the DR2C.. motor" (→ 222).

Failure to calibrate results in greater motor losses and reduced torque. In the worst-case scenario, the motor will not run.

11. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.
12. Retrofitting insulation coupling on the encoder mounting adapter: Replace the support ring [1895] with the spacer ring [1895] and screw it securely in place with the new M5×10 screws [1896].
  - ⇒ Tightening torque 7 Nm
13. To seal the encoder [220], screw in the screw plug [A].
  - ⇒ Tightening torque 1.8 Nm
14. For size 71 – 355: Mount the fan guard [35] over the encoder [220]. When doing this, guide the connection adapter [U] with the signal cable through the central grille cutout of the fan guard [35]/the central opening of the support ring [1895].

15. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.
16. For size 71 – 355: Screw the screws [232] through the grille of the fan guard [35] or the central opening of the support ring [1895] and into the nuts of the torque bracket [1889].
  - ⇒ If you need to turn the encoder [220] in order for the screws to reach the nuts of the torque bracket, turn the encoder [220] clockwise.
  - ⇒ Tightening torque 3.3 Nm
  - ⇒ For safety encoders: Tightening torque 3.3 Nm  $\pm 10\%$
17. Screw the fan guard [35] firmly in place with the screws [22].
18. Insert the connection adapter [U] into the recess of the support plate [3167].
  - ⇒ Turn the connection adapter [U] until the 4 rectangular ridges are on the fastening side of the connection adapter [U] in the designated recesses of the support plate [3167].
  - ⇒ Tighten the screws [D] in the connection adapter [U] and thereby fasten the support plate [3167] onto the connection adapter [U].
  - ⇒ Tightening torque 2 Nm
19. Mount the safety cover [361]/[657] over the encoder [220].
  - ⇒ Guide the connection adapter [U] through the central grille cutout of the safety cover [361]/[657].
  - ⇒ Screw the screws [3169] through the grille of the safety cover [361] or the support ring [3168] and into the thread of the support plate [3167].
  - ⇒ Tightening torque 3.3 Nm
20. For size 71 – 280: Place the safety cover [361] onto the fan guard [35].
21. For size 315 – 355: Place the safety cover [657] onto the metal brackets [1710].
22. Secure the safety cover [361]/[657] in place by using the screws [34]/[1711].
  - ⇒ For size 71 – 132S: Tightening torque 2 Nm
  - ⇒ For size 132M – 280: Tightening torque 3.5 Nm
  - ⇒ For size 315 – 355: Tightening torque 12 Nm
23. Place the connection cover [619] onto the connection adapter [U].
24. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.
25. Screw the screws [E] through the bores in the connection cover [619] and into the bores in the connection adapter [U].
  - ⇒ Tightening torque 2.25 Nm

## Removing EK8./EK9./AK8./AK9./RK8M – Add-on encoder set with M23 connector directly on KIGA encoder



1. For size 71 – 132S with forced cooling fan: Remove the screw [22].
2. For size 71 – 132S with forced cooling fan: Remove the screws [34] and the washers [33].
3. For size 132M – 355 with forced cooling fan: Remove the screw [22].
4. Without forced cooling fan: Remove the screws [34]/[1711].
5. Remove the safety cover [361]/[657] or the forced cooling fan [170] from the motor. When doing this, slide the cable grommet [269] out of the recess.
6. With forced cooling fan: Remove the signal cable from the cable retainer [1900].
7. Unscrew the screws [232].
8. Without forced cooling fan: Remove the screws [22].
9. Remove the fan guard [35] over the encoder [220]. Guide the M23 connector [U] with the signal cable through the cutout of the fan guard [35].
10. For size 132M – 355 with forced cooling fan: Remove the screw [936] or the nut [734], the spacer bushing [934] and the torque bracket [935].

### NOTICE



In the case of encoders RK8M, EK8W, AK8H, AK8W, EK8Z, EK9Z, and AK8Z on DR2C.. motors, loosening the central retaining screw [A] of the encoder [220] or loosening the insulation coupling [1891] of the motor or encoder shaft desynchronizes the encoder and motor rotor.

Higher motor losses and lower torques.

- Perform a new adjustment.

11. Unscrew the screw plug [A] of the encoder [220].
12. Loosen the central retaining screw of the encoder [220]. Use a tool that is at least 45 mm long for this.
  - ⇒ If the central retaining screw of the encoder [220] cannot be loosened, counter-tighten the spanner flat SW10 of the encoder shaft.

13. Loosen the cone connection.

- ⇒ Encoder EK8., AK8W, AK8Y, RK8M: To loosen the cone connection, continue turning the central retaining screw of the encoder [220] counterclockwise.
- ⇒ Encoder AK8H: Continue turning the central retaining screw of the encoder [220] counterclockwise. To loosen the conical connection, screw an M6 screw (≥ 70 mm long) into the bore.

14. Remove the encoder [220] from the rotor [1] or from the coupling [233]/[1891].

**Installing EK8./EK9./AK8./AK9./RK8M – Add-on encoder set with M23 connector directly on KIGA encoder**

1. For size 355: Connect the two halves of the coupling [233] by plugging them together using the coupling star. The coupling [233] must be firmly connected. Make sure that the encoder is centered [220].
2. For size 63 – 315: Clean the cone of the encoder [220].
3. For size 355: Clean the cone of the encoder [220] and the coupling [233].
4. Remove the screw plug [A] of the encoder.
5. For size 355: Place the coupling [233] onto the bolt [3012]. Tighten the retaining screw at the clamping hub on the motor side to fasten the coupling.
  - ⇒ Tightening torque 3.3 Nm
6. Retrofitting insulation coupling on the encoder mounting adapter: Insert the insulation coupling [1891] into the conical bore of the rotor [1] and tighten the central retaining screw.
  - ⇒ Tightening torque 2.25 Nm
7. Use solvent to remove the residual adhesive from the central retaining screw.
8. For AK8H safety encoders: Wet the central retaining screw that is required in the following step with LOCTITE® 241.
9. Insert the encoder [220] into the conical bore of the rotor [1] or the coupling [233]/[1891].
10. To secure the encoder [220] in place, tighten the central retaining screw. Use a tool that is at least 45 mm long for this.
  - ⇒ Counter-tighten the spanner flat SW27 of the coupling and SW10 of the encoder shaft.
  - ⇒ Tightening torque 3.3 Nm
  - ⇒ For safety encoders: Tightening torque 3.3 Nm  $\pm$  8%

**NOTICE**

For encoders RK8M, EK8W, AK8H, AK8W, EK9Z and AK8Z on DR2C.. motors, a calibration process must be carried out for flawless operation. See "Additional work for the RK8M encoder on the DR2C.. motor" (→ 218) and "Additional work for EK8W, AK8H, AK8W, EK9Z, and AK8Z encoders on the DR2C.. motor" (→ 222).

Failure to calibrate results in greater motor losses and reduced torque. In the worst-case scenario, the motor will not run.

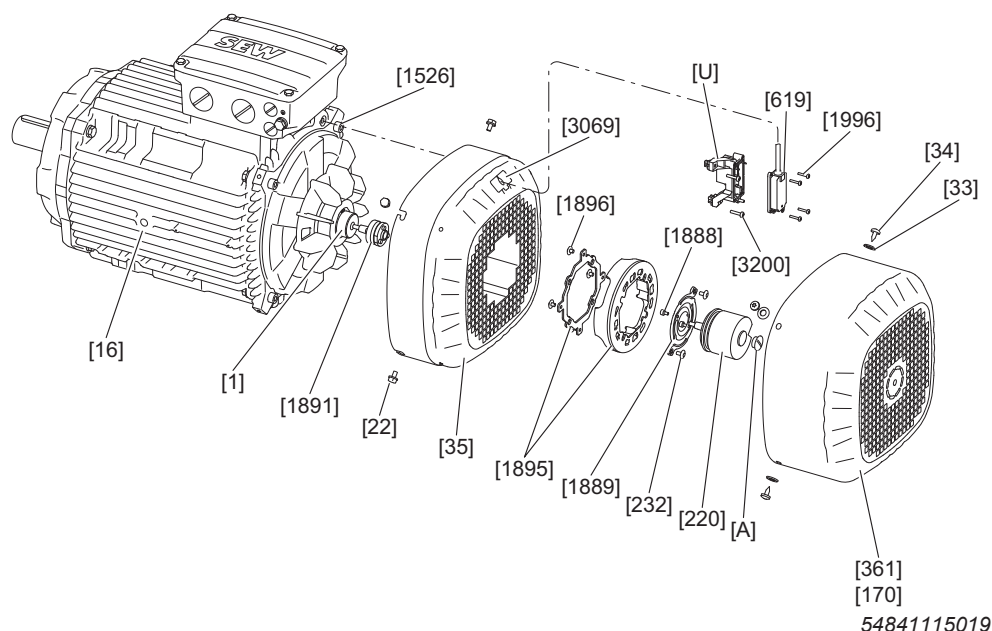
11. To seal the encoder [220], screw in the screw plug [A].
  - ⇒ Tightening torque 1.8 Nm
12. For size 355 with forced cooling fan: Mount the spacer bolts [934].
13. For size 132M – 355 with forced cooling fan: Guide the torque bracket [935] over the connection adapter [U] and the encoder [220].
14. For size 132M – 355 with forced cooling fan: When mounting the torque bracket [935], make sure it is aligned centrally to the encoder [220]. Screw in the screw [936] with the spacer bushings [934].
  - ⇒ For size 132M – 355: Tightening torque 12 Nm
15. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.

16. Retrofitting insulation coupling on the encoder mounting adapter: Replace the support ring [1895] with the spacer ring [1895] and screw it securely in place with the new M5×10 screws [1896].
  - ⇒ Tightening torque 7 Nm
17. For size 132M – 355 with forced cooling fan: Screw the torque bracket of the encoder [1889] with the screws [232] through the bores of the torque bracket [935].
  - ⇒ Tightening torque 3.3 Nm
  - ⇒ For safety encoders: Tightening torque 3.3 Nm ±10%
18. For size 63 – 355 without forced cooling fan: Mount the fan guard [35] over the encoder [220]. When doing this, guide the M23 connector with the signal cable through the central grille cutout of the fan guard [35].
  - ⇒ For size 63 – 132S: Tightening torque 3.3 Nm
  - ⇒ For size 132M/L: Tightening torque 12 Nm
  - ⇒ For size 160 – 355: Tightening torque 29 Nm
19. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.
20. For size 63 – 132S: Screw the screws [232] through the grille of the fan guard [35] and into the nuts of the torque bracket [1889].
  - ⇒ Tightening torque 3.3 Nm
21. For size 132M – 355 without forced cooling fan: Screw the screws [232] through the grille of the fan guard [35] or the central opening of the support ring [1895] and into the nuts of the torque bracket [1889].
  - ⇒ Tightening torque 3.3 Nm
  - ⇒ For safety encoders: Tightening torque 3.3 Nm ±10%
22. For size 132M – 355 with forced cooling fan: Screw the screws [232] through the torque bracket [935] and into the nuts of the torque bracket of the encoder [1889].
  - ⇒ If you need to turn the encoder [220] in order for the screws to reach the nuts of the torque bracket, turn the encoder [220] clockwise.
  - ⇒ Make sure the signal cable is of a sufficient length so that the M23 connector can be inserted into the recess of the safety cover [361]/[657] of the forced cooling fan [170].
  - ⇒ Tightening torque 3.3 Nm
  - ⇒ For safety encoders: Tightening torque 3.3 Nm ±10%
23. Before you install the safety cover [361]/[657] or the forced cooling fan [170], slide the cable grommet [269] into the recess.
24. For size 63 – 280 without forced cooling fan: Place the safety cover [361] onto the fan guard [35].
25. For size 315 – 355: Place the safety cover [657] onto the metal brackets [1710].
26. For size 315 – 355: Secure the safety cover [657] in place by using the screws [1711].
  - ⇒ Tightening torque 12 Nm
27. With forced cooling fan: Secure the forced cooling fan [170] with the screws [22].
  - ⇒ For size 71 – 132S: Tightening torque 3.3 Nm
  - ⇒ For size 132M/L: Tightening torque 12 Nm
  - ⇒ For size 160 – 355: Tightening torque 29 Nm

28. Insert the cable grommet [269] into the recess of the safety cover [361]/[657] or the forced cooling fan up to the stop.
29. For size 71 – 132S with forced cooling fan: Additionally secure the forced cooling fan [170] in place by using the screws [34] and washers [33].
  - ⇒ Tightening torque 2 Nm
30. Without forced cooling fan: Secure the safety cover [361] in place by using the screws [34] and washers [33].
  - ⇒ For size 63 – 132S: Tightening torque 2 Nm
  - ⇒ For size 132M – 280: Tightening torque 3.5 Nm



### Removing EK8./EK9./AK8./AK9./RK8M – Add-on encoder set A-Box-U for connection option in/on terminal box



#### NOTICE

Damage to the terminal strip when working below 0 °C.

Perform assembly/disassembly work on the terminal strip only at temperatures above 0 °C.

1. With forced cooling fan: Unscrew the screws [22].
2. Without forced cooling fan: Unscrew the screws [34]/[1711].
3. Remove the safety cover [361]/[657] or the forced cooling fan [170] from the motor.  
⇒ With forced cooling fan: Remove the signal cable from the 3 wings of the cable retainer [1900].
4. For size 80 with brake: Remove the cable tie [3229] that attaches the encoder cable [619] to the fan guard [35].
5. Unscrew the screws [1996] and remove the connection cover [1995] from the connection unit [U].
6. Without forced cooling fan: Loosen the screws [3200] on the connection unit [U] and then remove the connection unit [U] from the central grille of the fan guard [35].
7. For size 132M – 180 with forced cooling fan: Remove the screws [3188] with which the connection unit [U] is screwed to the torque bracket.
8. Unscrew the screws [232].
9. Remove the fan guard [35] over the encoder [220]. Guide the connection unit [U] with the signal cable through the cutout of the fan guard [35].
10. For size 132M – 180 with forced cooling fan: Remove the screw [936] or the nut [734], the spacer bushing [934], and the torque bracket [935].



## NOTICE

In the case of encoders RK8M, EK8W, AK8H, AK8W, EK8Z, EK9Z, and AK8Z on DR2C.. motors, loosening the central retaining screw [A] of the encoder [220] or loosening the insulation coupling [1891] of the motor or encoder shaft desynchronizes the encoder and motor rotor.

Higher motor losses and lower torques.

- Perform a new adjustment.

11. Unscrew the screw plug [A] of the encoder [220].
12. Loosen the central retaining screw of the encoder [220]. Use a tool that is at least 45 mm long for this.
  - ⇒ If the central retaining screw of the encoder [220] cannot be loosened, counter-tighten the spanner flat SW10 of the encoder shaft.
13. Loosen the cone connection.
  - ⇒ Encoder EK8., AK8W, AK8Y, RK8M: To loosen the cone connection, continue turning the central retaining screw of the encoder [220] counterclockwise.
  - ⇒ Encoder AK8H: Continue turning the central retaining screw of the encoder [220] counterclockwise. To loosen the conical connection, screw an M6 screw (≥ 70 mm long) into the bore.
14. Remove the encoder [220] from the rotor [1] or from the coupling [233]/[1891].

**Installing EK8./EK9./AK8./AK9./RK8M – Add-on encoder set A-Box-U for connection option in/on terminal box**

1. Force open the knock-out on the stator [16] and remove it.
2. Slide the grommet [1526] onto the cable end of the cover [619].
  - ⇒ To make it easier to insert the grommet [1526] into the opened knock-out on the stator [16], prevent the FCI connector from protruding out of the grommet [1526].
  - ⇒ When the grommet [1526] is inserted into the knock-out, retrieve the FCI connector from the grommet [1526].
  - ⇒ Pull the thin end of the grommet [1526] through the knock-out first. When doing this, make sure that the cable jacket is not yet located in the grommet [1526].
3. If the grommet [1526] is properly seated in the knock-out, use a cable lubricant such as LUB-I from 3M™ to pull the cable jacket through the grommet [1526] towards the terminal box [112].
4. Clean the cone of the encoder [220].
5. Remove the screw plug [A] of the encoder.
6. Retrofitting insulation coupling on the encoder mounting adapter: Insert the insulation coupling [1891] into the conical bore of the rotor [1] and tighten the central retaining screw.
  - ⇒ Tightening torque 2.25 Nm
7. Use solvent to remove the residual adhesive from the central retaining screw.
8. For AK8H safety encoders: Wet the central retaining screw that is required in the following step with LOCTITE® 241.
9. Insert the encoder [220] into the conical bore of the rotor [1] or the coupling [233]/[1891].
10. To secure the encoder [220] in place, tighten the central retaining screw. Use a tool that is at least 45 mm long for this.
  - ⇒ Counter-tighten the spanner flat SW27 of the coupling and SW10 of the encoder shaft.
  - ⇒ Tightening torque 3.3 Nm
  - ⇒ For safety encoders: Tightening torque 3.3 Nm ± 8%

**NOTICE**

For encoders RK8M, EK8W, AK8H, AK8W, EK9Z and AK8Z on DR2C.. motors, a calibration process must be carried out for flawless operation. See "Additional work for the RK8M encoder on the DR2C.. motor" (→ 218) and "Additional work for EK8W, AK8H, AK8W, EK9Z, and AK8Z encoders on the DR2C.. motor" (→ 222).

Failure to calibrate results in greater motor losses and reduced torque. In the worst-case scenario, the motor will not run.

11. To seal the encoder [220], screw in the screw plug [A].
  - ⇒ Tightening torque 1.8 Nm
12. For size 132M – 180 with forced cooling fan: Guide the torque bracket [935] over the connection unit [U] and the encoder [220].

13. For size 132M – 180 with forced cooling fan: When mounting the torque bracket [935], make sure it is aligned centrally to the encoder [220]. Screw in the screw [936] with the spacer bushings [934].
  - ⇒ Tightening torque 12 Nm
14. For size 132M – 180 with forced cooling fan: Screw the torque bracket of the encoder [1889] with the screws [232] through the bores of the torque bracket [935].
  - ⇒ Tightening torque 3.3 Nm
  - ⇒ For safety encoders: Tightening torque 3.3 Nm  $\pm 10\%$
15. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.
16. Retrofitting insulation coupling on the encoder mounting adapter: Replace the support ring [1895] with the spacer ring [1895] and screw it securely in place with the new M5×10 screws [1896].
  - ⇒ Tightening torque 7 Nm
17. For size 132M – 180 with forced cooling fan: Screw the connection unit [U] with the screws [3188] through the bores of the torque bracket [935].
  - ⇒ Tightening torque 1 Nm
18. For size 71 – 180 without forced cooling fan: Mount the fan guard [35] over the encoder [220].
  - ⇒ Guide the connection unit [U] with the signal cable through the central grille cutout of the fan guard [35] or the central opening of the support ring [1895].
  - ⇒ Guide the cover [619] with the signal cable through the designated opening of the fan guard [35].
  - ⇒ For size 71 – 132S: Tightening torque 3.3 Nm
  - ⇒ For size 132M/L: Tightening torque 12 Nm
  - ⇒ For size 160 – 180: Tightening torque 29 Nm
19. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.
20. For size 63 – 132S: Screw the screws [232] through the grille of the fan guard [35] and into the nuts of the torque bracket [1889].
  - ⇒ Tightening torque 3.3 Nm
21. For size 132M – 180 without forced cooling fan: Screw the screws [232] through the grille of the fan guard [35] or the central opening of the support ring [1895] and into the nuts of the torque bracket [1889].
  - ⇒ If you need to turn the encoder [220] in order for the screws to reach the nuts of the torque bracket, turn the encoder [220] clockwise.
  - ⇒ Tightening torque 3.3 Nm
  - ⇒ For safety encoders: Tightening torque 3.3 Nm  $\pm 10\%$
22. Without forced cooling fan: Insert the connection unit [U] with the expansion anchors into the corresponding punch-outs on the fan guard's grille [35] up to the stop.
  - ⇒ Fully insert and tighten the screws [3200].
  - ⇒ Tightening torque 1.6 Nm

23. Without forced cooling fan: Insert the signal cable of the cover [619] into the designated recess of the locking piece [3069].
  - ⇒ Fasten the signal cable into the rectangular cutout of the fan guard [35].
24. Place the cover [619] onto the connection unit [U].
  - ⇒ Screw the cover [619] onto the connection unit [U] with the screws [1996].
  - ⇒ Tightening torque 1 Nm
25. Make sure that the signal cable of the cover [619] does not form a loop between the fan guard [35] or the torque bracket [935] and the terminal box [112] that can collide with the fan.
26. For size 80 with brake: Attach the encoder cable [619] to the fan guard [35] using the cable tie [3229].
27. With forced cooling fan: Insert the signal cable of the encoder [220] into the designated openings in the cable retainer [1900] in such a way that prevents it from colliding with the fan wheel of the forced cooling fan.
28. For size 71 – 180 without forced cooling fan: Place the safety cover [361] onto the fan guard [35].
  - ⇒ For size 63 – 132S: Tightening torque 2 Nm
  - ⇒ For size 132M – 180: Tightening torque 3.5 Nm
29. With forced cooling fan: Secure the forced cooling fan [170] with the screws [22].
  - ⇒ For size 71 – 132S: Tightening torque 3.3 Nm
  - ⇒ For size 132M/L: Tightening torque 12 Nm
  - ⇒ For size 160 – 180: Tightening torque 29 Nm
30. For size 71 – 132S with forced cooling fan: Additionally secure the forced cooling fan [170] in place by using the screws [34] and washers [33].
  - ⇒ Tightening torque 2 Nm
31. Without forced cooling fan: Secure the safety cover [361] in place by using the screws [34] and washers [33].
  - ⇒ For size 63 – 132S: Tightening torque 2 Nm
  - ⇒ For size 132M – 180: Tightening torque 3.5 Nm

### 7.5.2 Information on configuring the zero-angle position for EK8W/AK8H/AK8W/EK9Z/AK8Z/RK8M encoders on the DR2C.. motor

The encoders can be electronically calibrated using a frequency inverter. During the process, the existing zero angle of the encoder is calibrated during assembly and compared to the defined zero angle. The offset is saved. The motor control operates with this saved value.

Alternatively, the RK8M encoder can be mechanically configured in order to match the defined zero angle in its real mounting position. See chapter "Additional work for the RK8M encoder on the DR2C.. motor" (→ 218) for additional information

#### Electronically calibrating the encoder

Note that the motor must be free of loads, the brake must be released, and the rotor must be able to freely rotate.

Using current injection (270° electrical position), the rotor adjusts itself to a certain position.

The current injection is achieved by supplying a direct current positive in phase W and negative in phase V. Phase U is not powered. It may not be powered with more than 80% of the respective motor's nominal current  $I_0$ .

In this position, the encoder position is subsequently set to 0° by the frequency inverter, or the discrepancy with the defined zero position is saved.

Thus, the offset of the encoder position to the electrical rotor angle of the motor is 270 ° or 4.7 rad.

Observe the following:

- The motor must be disconnected or disassembled to configure the system or machine's encoder.
- Before the configuration process, the "star" or "delta" connection type that is selected for the subsequent control mode of the motor must be wired to the motor. A correct zero position can be determined only if the connection type is identical during the configuration process and operation.
- The zero angle position set at the factory applies only for the selected "star" or "delta" connection type. If the connection type is changed, the encoder zero angle position must be recalibrated. To do so, use the encoder adjustment function "FCB 18 Rotor position identification" of the SEW-EURODRIVE frequency inverter.

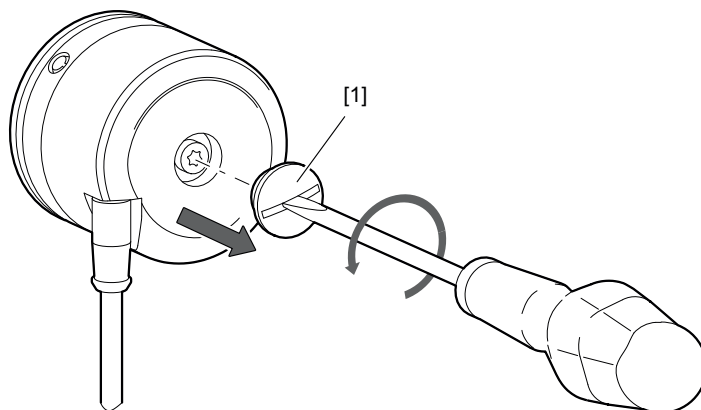
To that end, refer to the operating instructions for the frequency inverter or contact SEW-EURODRIVE Service.

**7.5.3 Additional work for the RK8M encoder on the DR2C.. motor**

Required tools:

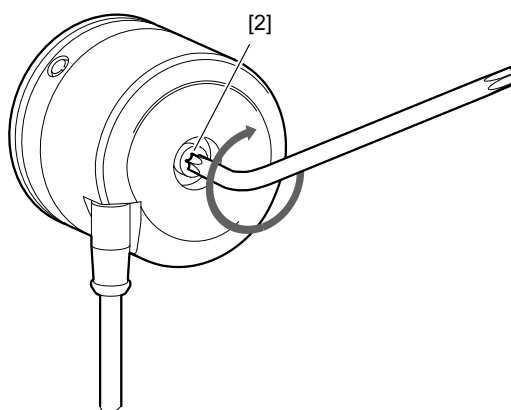
- Slotted screwdriver 1.6 × 8.0 mm
- Torx screwdriver TX20
- Allen wrench 2.5 mm

1. Remove the screw plug [1] from the resolver.



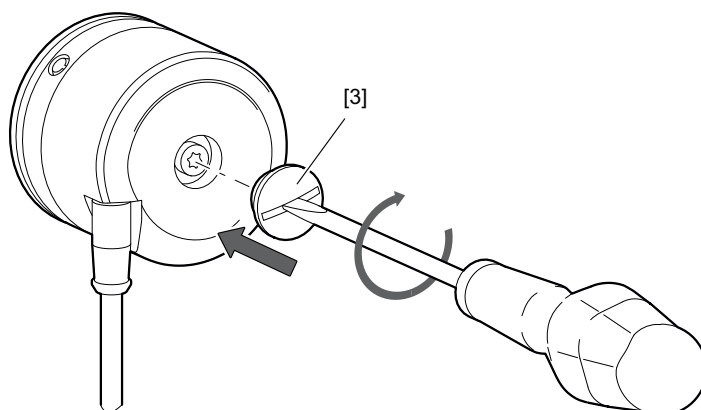
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2. Install the resolver by tightening the M5 central screw [2] with 3.3 Nm on the customer shaft.



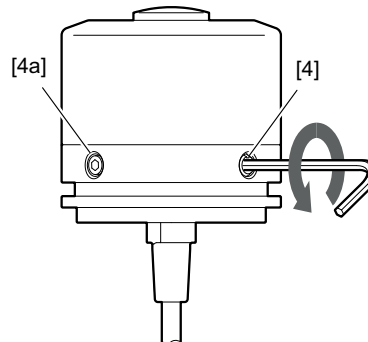
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3. Reinstall the screw plug [3] on the resolver with 1.8 Nm.



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4. When installing for the first time, loosen the set screw [4] slightly. When reinstalling, the set screw [4a] must also be loosened slightly.



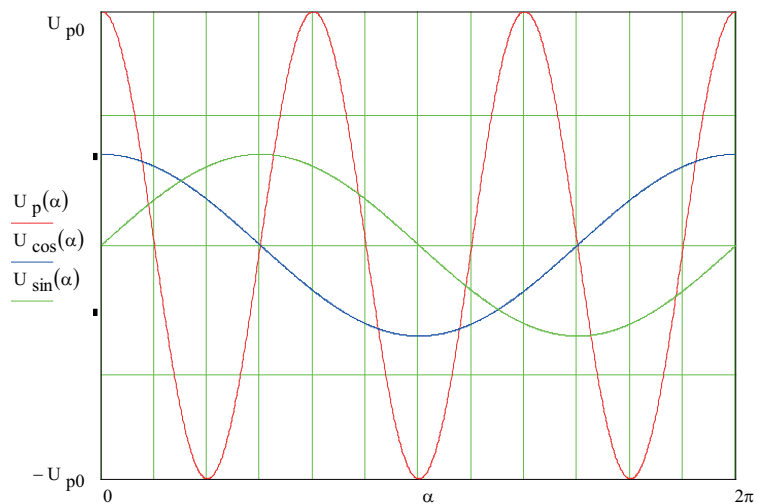
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⇒ The rear part of the resolver can now be moved.

### Resolver setting specifications for synchronous motors from SEW-EURODRIVE

Number of pole pairs for motor:  $p_M = 3$ , number of pole pairs for resolver:  $p_R = 1$

Setting specification:



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Resolver zero position ( $U_{\cos}$  (S1 – S3) positive maximum,  $U_{\sin}$  (S2 – S4) positive zero crossing) coincides with positive maximum of excitation in magnetic circuit (EMF)  $U_p$  in phase u (with clockwise rotor rotation as viewed on the output shaft end).

| Motor terminal | U    | V     | W    |
|----------------|------|-------|------|
| Supply         | open | minus | plus |

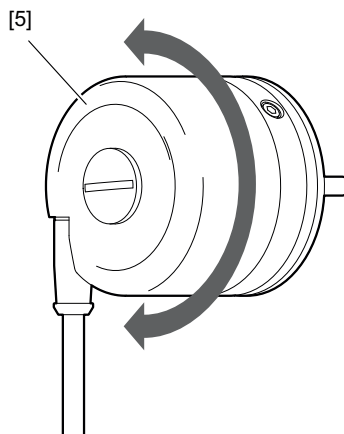
#### a) Adjustment check

- ✓ The motor is unloaded and the brake released. The rotor can freely align itself in the stator field. Supply the motor with direct current 60 – 80%  $I_0$  (for a maximum of 10 minutes).
  - ✓ The rotor aligns in the field.
5. Turn the movable part [5] of the resolver until:
    - ⇒ S2 – S4 ( $U_{\sin}$ ) positive zero crossing
    - ⇒ S1 – S3 ( $U_{\cos}$ ) positive maximum



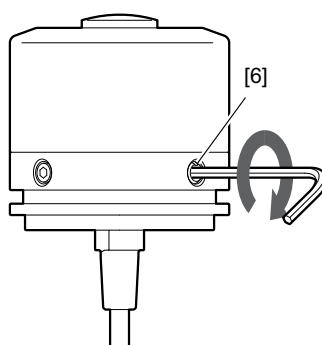
# 7 Mechanical installation

Removing/installing conical encoders and encoder mounting adapters for conical encoders



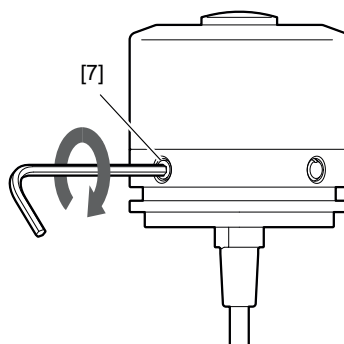
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6. Tighten the set screw [6] that was loosened at point (4) again with 1.2 Nm.



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7. Tighten the set screw [7] with 1.2 Nm.



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8. Perform a direction of rotation check. To do so, change the supply on the motor terminals (see the following table).

⇒ The amplitude  $U_{\cos}$  (S1 – S3) becomes smaller and the amplitude  $U_{\sin}$  (S2 - S4) becomes larger.

9. End the encoder installation.

| Motor terminal | U    | V     | W    |
|----------------|------|-------|------|
| Supply         | plus | minus | plus |

- b) Adjustment check with frequency inverters from SEW-EURODRIVE

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Resolver adjustment is typically performed using SEW-EURODRIVE inverter functions:

- Rotor position identification FCB18 in the "With rotating motor" procedure using the MOVISUITE® engineering software
- Encoder adjustment with MTEAdjust using the MOVITOOLS® MotionStudio engineering software

After the SEW-EURODRIVE inverter has performed the calibration process, the resolver stator will be set to the resolver rotor so that the display shows a resolver offset angle of 0.0°.

**7.5.4 Additional work for EK8W, AK8H, AK8W, EK9Z, and AK8Z encoders on the DR2C.. motor**

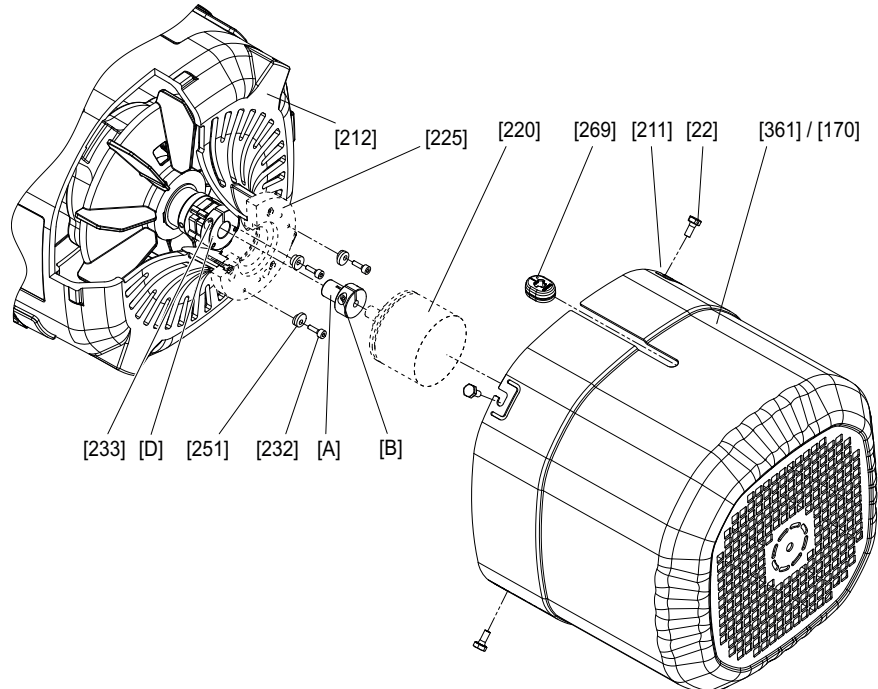
For the EK8W, AK8H, AK8W, EK9Z, and AK8Z encoders, perform the following steps after installing the encoder:

- ✓ The motor is unloaded and the brake released. The rotor can freely align itself in the stator field.
- 1. Supply the motor with direct current 60 – 80%  $I_0$  (for no more than 10 minutes) to perform an adjustment check (see the following table).
  - ⇒ The rotor aligns in the field.
- 2. In this rotor position, set the encoder angle to 0 via SEW-EURODRIVE's inverter and the RS485 interface.

| Motor terminal | U    | V     | W    |
|----------------|------|-------|------|
| Supply         | open | minus | plus |

## 7.6 Removing/installing an add-on encoder with encoder mounting adapter with fan guard with encoder mount

### 7.6.1 EV..., AV..., XV... rotary encoder - (E)DRN../DRU../DR2...71 – 225 motors, with encoder mounting adapter



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|       |                                                |       |                                                      |
|-------|------------------------------------------------|-------|------------------------------------------------------|
| [22]  | Screw                                          | [251] | Conical spring washers (included with XV1A and XV2A) |
| [170] | Forced cooling fan cover                       | [269] | Grommet                                              |
| [211] | Washer                                         | [361] | Safety cover (normal/long)                           |
| [212] | Fan guard with encoder mount                   | [A]   | Adapter                                              |
| [220] | Encoder                                        | [B]   | Clamping screw                                       |
| [225] | Intermediate flange (not applicable for XV1A)  | [D]   | Coupling (spread or solid shaft coupling)            |
| [232] | Retaining screws (included with XV1A and XV2A) |       |                                                      |
| [233] | Clamping screw                                 |       |                                                      |

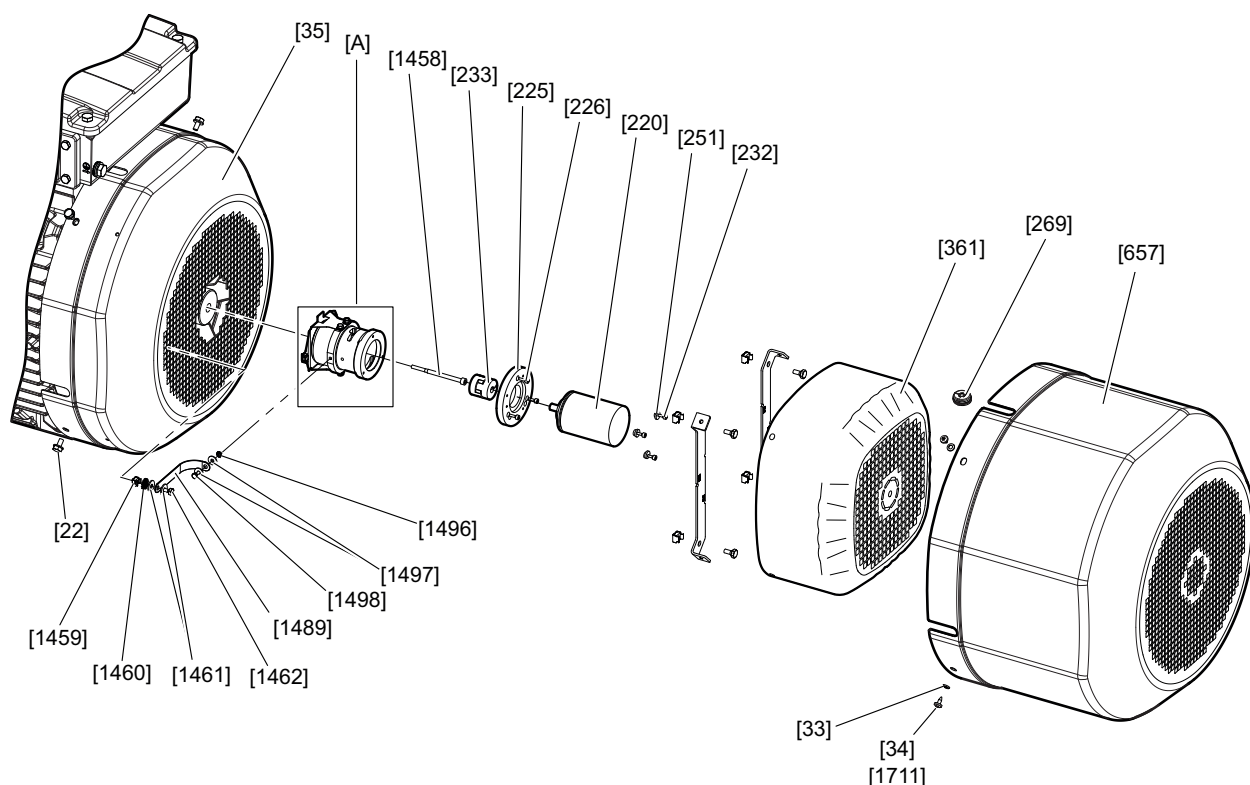
#### Removing EV../AV../XV...

1. Remove the safety cover [361] or the forced cooling fan [170] if applicable.
2. Loosen the retaining screws [232] and turn the conical spring washers [251] outwards.
3. Loosen the clamping screw [233] of the coupling.
4. Remove adapter [A] and encoder [220].

#### Installing EV../AV../XV...

1. Mount the intermediate flange [225] to the encoder mounting adapter [A] using screws [226].
2. Install the encoder [220]; refer to the chapter about installing encoders.
3. Secure the safety cover [361] or the forced cooling fan [170] in place by using the screws [22] and washers [211].

### 7.6.2 EV..., AV..., XV... rotary encoder - (E)DRN../DRU../DR2...250 – 315 motors, with encoder mounting adapter



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|       |                                                      |        |                            |
|-------|------------------------------------------------------|--------|----------------------------|
| [22]  | Screw                                                | [657]  | Safety cover (normal/long) |
| [33]  | Washer                                               | [1458] | Screw                      |
| [34]  | Screw                                                | [1459] | Cage nut                   |
| [35]  | Fan guard                                            | [1460] | Serrated lock washer       |
| [220] | Encoder                                              | [1461] | Washer                     |
| [225] | Intermediate flange (optional)                       | [1462] | Screw                      |
| [226] | Screw                                                | [1489] | Ground strap               |
| [232] | Screws (included with .V1A and .V2A)                 | [1496] | Serrated lock washer       |
| [233] | Coupling                                             | [1497] | Washer                     |
| [251] | Conical spring washers (included with .V1A and .V2A) | [1498] | Screw                      |
| [269] | Grommet                                              | [1711] | Screw                      |
| [361] | Safety cover (normal/long)                           | [A]    | Encoder mounting adapter   |

#### Removing the encoder mounting adapter

1. For size 250 – 280: Remove the screws [34] to disassemble the safety cover [361].
2. For size 315: Remove the screws [1711] to disassemble the safety cover [657].
3. Remove the encoder [220]; refer to chapter "Removing EV../AV../XV.." (→ 225).
4. In order to remove the ground strap [1489] from the encoder mounting adapter [A], loosen the serrated lock washer [1496], washer [1497], and screw [1498].

5. Remove the screws [22] to disassemble the fan guard [35].
6. Loosen the screw [1458] to remove the encoder mounting adapter [A].
  - ⇒ **If the encoder mounting adapter cannot easily be removed:** Screw an M6 set screw (length 20 – 35 mm) hand tight in the rotor bore. Screw an M8 set screw (length > 10 mm) into the same bore and push the encoder mounting adapter [A] off the rotor [1]. Remove the M6 set screw from the rotor bore.

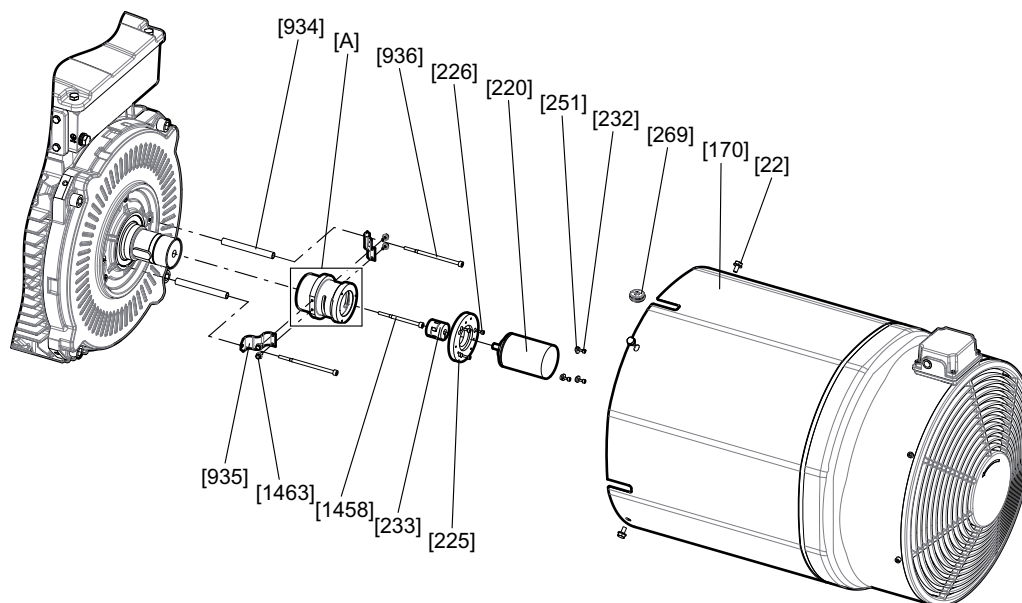
#### Removing EV../AV../XV..

1. For size 250 – 280: Remove the screws [34] to disassemble the safety cover [361].
2. For size 315: Remove the screws [1711] to disassemble the safety cover [657].
3. Pull out the cable grommet [269] together with the encoder cable from the safety cover [361].
4. Loosen the retaining screws [232] and turn the conical spring washers [251] outwards.
5. Loosen the screw at the coupling clamping hub [233] at the encoder end, the screw can be accessed through the slots of the encoder mounting adapter [A].
6. Remove the encoder [220] from the encoder mounting adapter [A] or the intermediate flange [225].

#### Installing EV../AV../XV..

1. Mount the intermediate flange [225] to the encoder mounting adapter [A] using screws [226].
2. Install the encoder [220]; refer to the chapter about installing encoders.
3. For size 250 – 280: Secure the safety cover [361] in place by using the screws [34] and washers [33].
4. For size 315: Secure the safety cover [657] in place by using the screws [1711].

### 7.6.3 EV..., AV..., XV... rotary encoder - (E)DRN../DRU../DR2...250 – 315 motors, with encoder mounting adapter and with forced cooling fan



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|       |                                                      |        |                          |
|-------|------------------------------------------------------|--------|--------------------------|
| [22]  | Screw                                                | [269]  | Grommet                  |
| [170] | Forced cooling fan cover                             | [934]  | Spacer bushing           |
| [220] | Encoder                                              | [935]  | Torque bracket           |
| [225] | Intermediate flange (optional)                       | [936]  | Screw                    |
| [226] | Screw                                                | [1458] | Screw                    |
| [232] | Screws (included with .V1A and .V2A)                 | [1463] | Screw                    |
| [233] | Coupling                                             | [A]    | Encoder mounting adapter |
| [251] | Conical spring washers (included with .V1A and .V2A) |        |                          |

#### Removing the encoder mounting adapter

1. Remove the screws [22] to disassemble the forced cooling fan [170].
  2. Remove the cable grommet [269] with the encoder cable from the forced cooling fan [170].
  3. Loosen the retaining screws [232] and turn the conical spring washers [251] outwards.
  4. Loosen the screw at the coupling clamping hub [233] at the encoder end, the screw can be accessed through the slots of the encoder mounting adapter [A].
  5. Remove the encoder [220] from the encoder mounting adapter [A] or the intermediate flange [225].
  6. Loosen the screws [1458] and [936] to remove the encoder mounting adapter [A]. The torque brackets [935] and screws [1463] can remain at the encoder mounting adapter [A].
- ⇒ **If the encoder mounting adapter cannot easily be removed:** Screw an M6 set screw (length 20 – 35 mm) hand tight in the rotor bore. Screw an M8 set screw (length > 10 mm) into the same bore and push the encoder mounting adapter [A] off the rotor [1]. Remove the M6 set screw from the rotor bore.

**Removing EV../AV../XV..**

1. Remove the screws [22] to disassemble the forced cooling fan [170].
2. Remove the cable grommet [269] with the encoder cable from the forced cooling fan [170].
3. Loosen the retaining screws [232] and turn the conical spring washers [251] outwards.
4. Loosen the screw at the coupling clamping hub [233] at the encoder end, the screw can be accessed through the slots of the encoder mounting adapter [A].
5. Remove the encoder [220] from the encoder mounting adapter [A] or the intermediate flange [225].

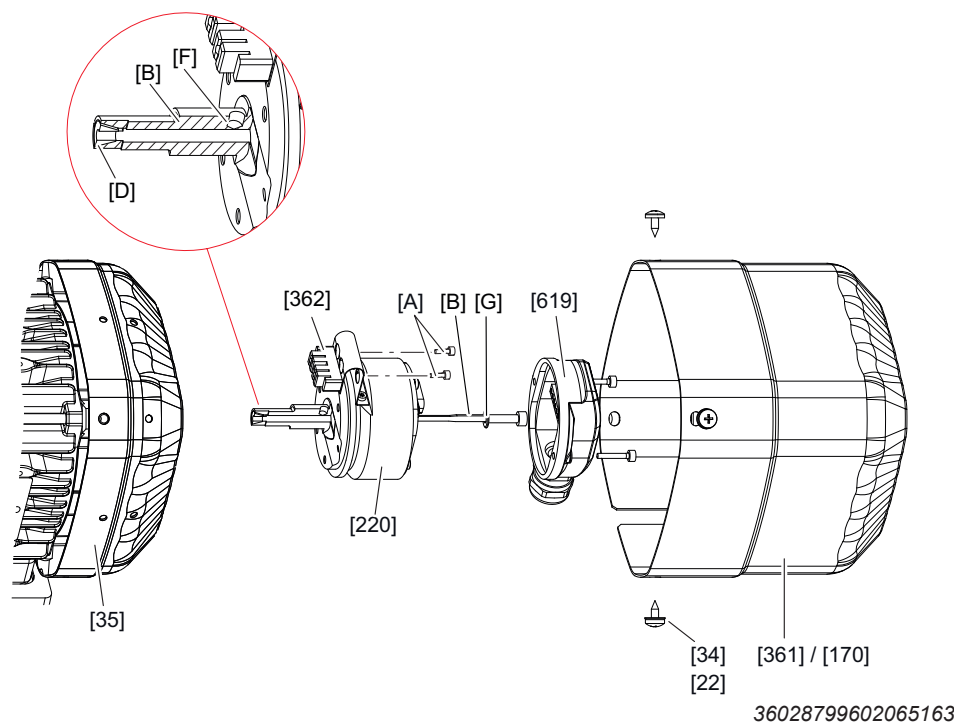
**Installing EV../AV../XV..**

1. Mount the intermediate flange [225] to the encoder mounting adapter [A] using screws [226].
2. Install the encoder [220]; refer to the chapter about installing encoders.
3. Secure the forced cooling fan [170] in place by using the screws [22].



## 7.7 Removing/installing add-on encoders with spread shaft, plug-in shaft, and hollow shaft

### 7.7.1 ES7., AS7. rotary encoder - DR..71 – 132, DRN80 – 132S motors



|       |                    |       |                                     |
|-------|--------------------|-------|-------------------------------------|
| [22]  | Screw              | [619] | Connection cover                    |
| [34]  | Tapping screw      | [A]   | Retaining screws for torque bracket |
| [35]  | Fan guard          | [B]   | Central retaining screw             |
| [170] | Forced cooling fan | [D]   | Cone                                |
| [220] | Encoder            | [F]   | Bore                                |
| [361] | Safety cover       | [G]   | Tooth lock washer                   |
| [362] | Expansion anchor   |       |                                     |

#### Removing ES7./AS7.

1. Remove the safety cover [361] or the forced cooling fan [170] if applicable.
2. Loosen the screws of the connection cover [619] and remove it. Do not disconnect the encoder cable.
3. Make sure the cone [D] does not fall out while the central retaining screw [B] is loosened. Loosen the central retaining screw [B] by 2 – 3 turns. Loosen the cone [D] by tapping lightly onto the screw head.
4. To loosen the expansion anchor [362], remove the retaining screw of the torque bracket [A]. Carefully pull the encoder [220] from the rotor bore.
5. For safety encoders: Dispose of the expansion anchor [362].

**Installing ES7./AS7.**

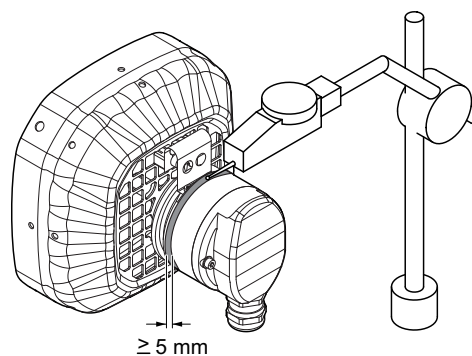
1. Apply a contact corrosion prevention compound, e.g. NOCO-Paste, to the encoder pins.
2. Attach the expansion anchor [362] to the torque bracket of the encoder.  
⇒ For safety encoders: Use a new expansion anchor.
3. Push the encoder to the stop of the shaft end.
4. Tighten the central retaining screw [B].  
⇒ Tightening torque  $2.75 \text{ Nm} \pm 6\%$
5. Press the expansion anchor [362] into the fan guard [35] and check if it is seated correctly.
6. Screw the retaining screws of the torque bracket [A] into the expansion anchor [362] up to the stop. Tighten the retaining screws of the torque bracket [A].  
⇒ Tightening torque  $1.6 \text{ Nm} \pm 10\%$
7. Screw on the connection cover [619].  
⇒ Tightening torque  $2.25 \text{ Nm}$
8. For safety encoders: Perform a wobble measurement.
9. Mount the safety cover [361] or the forced cooling fan [170] if applicable.  
⇒ For screw [22]: Tightening torque  $3.3 \text{ Nm}$   
⇒ For screw [34]: Tightening torque  $2 \text{ Nm}$

*Performing a wobble measurement (only for the safety encoder design)*

Fault exclusion of the mechanical motor-encoder connection according to EN 61800-5-2 requires that the encoder is seated properly. Wobbling must be measured each time an ES7S, AS7W, or AS7Y encoder is installed to ensure it is seated properly.

Measure wobbling as described in the following chapter.

1. Place the sensor on the upper edge of the encoder as shown in the figure below:



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2. The measurement must be made within the indicated zone (maximum width = 5 mm).
3. Turn the motor shaft. If required, start up the motor at low speed ( $< 60 \text{ min}^{-1}$ ).
4. Check the wobble on the sensor.  
⇒ The maximum permitted wobble on the encoder must be  $\leq 0.07 \text{ mm}$  when turning the motor shaft.

*Measured value exceeded*

Repeat the check if the measured value is exceeded. Proceed as follows:

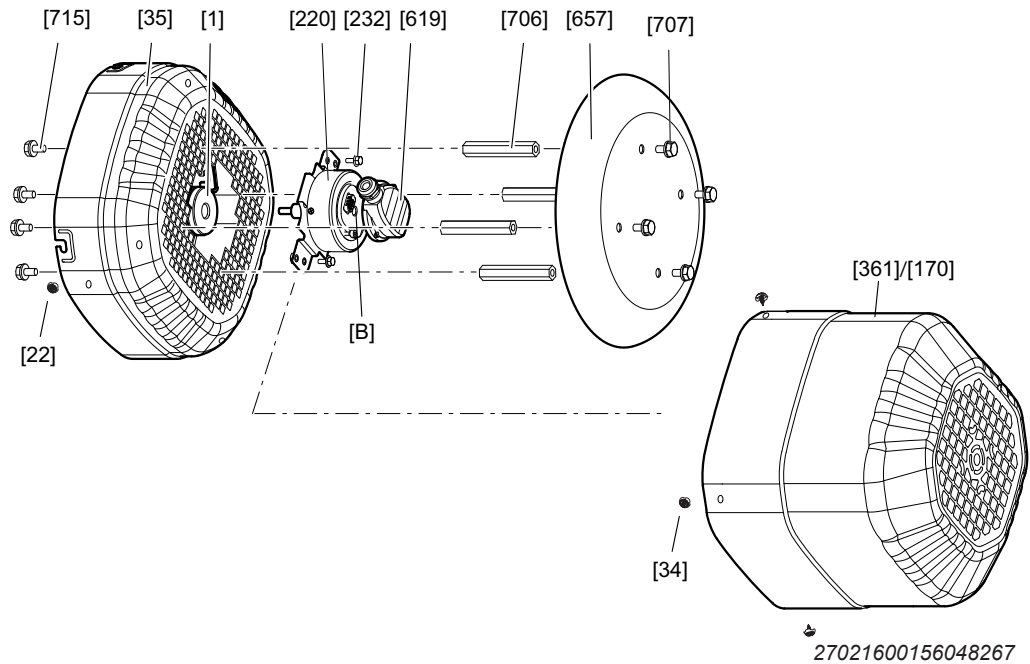
1. Loosen the screws of the connection cover [619] and remove it. Do not disconnect the encoder cable.
2. Make sure the cone [D] does not fall out while the central retaining screw [B] is loosened. Loosen the central retaining screw [B] by 2 – 3 turns. Loosen the cone [D] by tapping lightly onto the screw head.
3. Turn the motor shaft or the encoder shaft at the bore [F] by 120°.
4. Tighten the central retaining screw [B].
  - ⇒ Tightening torque 2.75 Nm ± 6%
5. Screw on the connection cover [619].
  - ⇒ Tightening torque 2.25 Nm
6. Repeat the wobble measurement.

**INFORMATION**

If it is not possible to carry out the measurement below the permitted wobble, contact the SEW-EURODRIVE Service department.

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### 7.7.2 EG7., AG7. rotary encoder - DR..160 – 280, DRN132M – 280 motors



|       |                    |       |                         |
|-------|--------------------|-------|-------------------------|
| [1]   | Rotor              | [361] | Safety cover            |
| [22]  | Screw              | [619] | Connection cover        |
| [34]  | Tapping screw      | [657] | Canopy                  |
| [35]  | Fan guard          | [706] | Spacer bolt             |
| [170] | Forced cooling fan | [707] | Screws                  |
| [220] | Encoder            | [715] |                         |
| [232] | Screws             | [B]   | Central retaining screw |

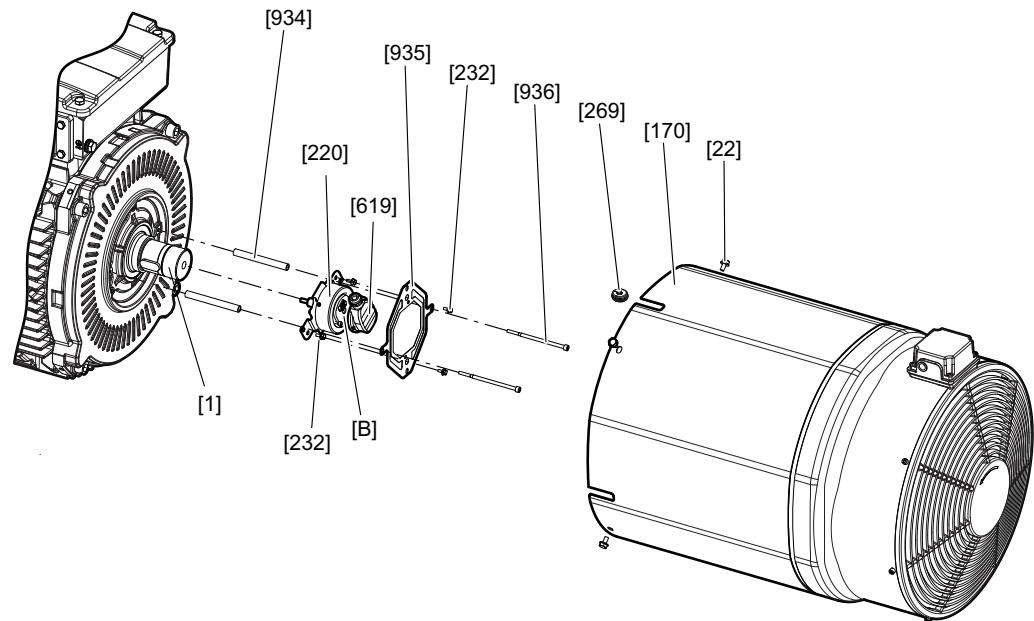
#### Removing EG7., AG7.

1. Proceed as follows, depending on the design:
  - ⇒ **With canopy:** Remove the screws [707] to disassemble the canopy [657]. If required, counter using a hexagon wrench SW13 on the spacer bolt [706].
  - ⇒ **Without canopy:** Remove the screws [22]/[34] to disassemble the safety cover [361] or the forced cooling fan [170].
2. Loosen the screws of the connection cover [619] and remove it. Do not disconnect the encoder cable.
3. Unscrew the retaining screws [232] of the torque bracket.
4. Loosen the screw [B] by 2 – 3 revolutions to pull off the encoder [220].

**Installing EG7., AG7.**

1. Apply a contact corrosion prevention compound, e.g. NOCO-Paste, to the encoder pins.
2. Push the encoder to the stop of the shaft end.
3. Tighten the central retaining screw [B].
  - ⇒ Tightening torque 8 Nm  $\pm$  5%
4. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.
5. Tighten the retaining screws [232] of the torque bracket..
  - ⇒ Tightening torque 6 Nm  $\pm$  10%
6. Screw on the connection cover [619].
  - ⇒ Tightening torque 2.25 Nm  $\pm$  10%
7. Mount the safety cover [361] or the forced cooling fan [170] if applicable.
  - ⇒ Tightening torque for screw [22]: M6 = 11 Nm, M8 = 27 Nm
  - ⇒ Tightening torque for screw [34]: 3.5 Nm
8. If necessary, mount the canopy [657] using the screws [707].
  - ⇒ Tightening torque 27 Nm

### 7.7.3 EG7., AG7. rotary encoder - (E)DR..160 – 225, (E)DRN132M – 280 motors, with forced cooling fan /V



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|       |                    |       |                  |
|-------|--------------------|-------|------------------|
| [1]   | Rotor              | [619] | Connection cover |
| [22]  | Screw              | [934] | Spacer bushing   |
| [170] | Forced cooling fan | [935] | Torque bracket   |
| [220] | Encoder            | [936] | Screw            |
| [232] | Screws             | [B]   | Retaining screw  |
| [269] | Grommet            |       |                  |

#### Removing EG7., AG7.

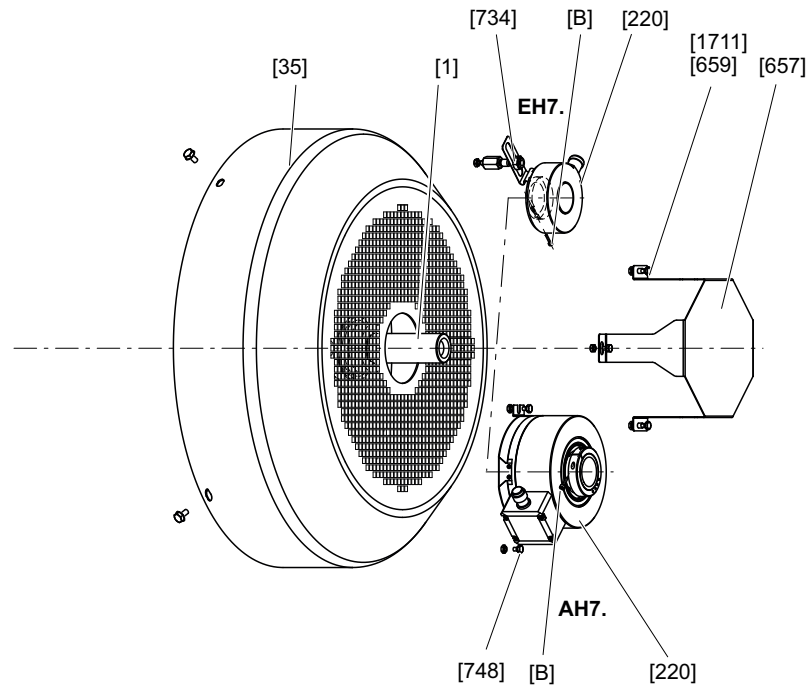
1. Remove the screws [22] to disassemble the forced cooling fan [170].
2. Remove the cable grommet [269] with the encoder cable from the forced cooling fan [170].
3. Remove the screws [232] and [936] to disassemble the torque bracket [935].
4. Loosen the screws of the connection cover [619] and remove it. Do not disconnect the encoder cable.
5. Loosen the screw [B] by 2 – 3 revolutions to pull off the encoder [220].

#### Installing EG7., AG7.

1. Apply a contact corrosion prevention compound, e.g. NOCO-Paste, to the encoder pins.
2. Push the encoder to the stop of the shaft end.
3. Tighten the central retaining screw [B].
  - ⇒ Tightening torque 8 Nm  $\pm$  5%
4. Place the torque bracket [935] onto the spacer bushing [934] and tighten the screws [936].
  - ⇒ Tightening torque: M6 = 11 Nm, M8 = 27 Nm
  - ⇒ For safety encoders: M6 = 11 Nm  $\pm$  10%, M8 = 27 Nm  $\pm$  10%

5. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.
6. Tighten the retaining screws [232] of the torque bracket..  
⇒ Tightening torque 6 Nm  $\pm$  10%
7. Screw on the connection cover [619].  
⇒ Tightening torque 2.25 Nm  $\pm$  10%
8. Insert the cable grommet [269] into the forced cooling fan [170].
9. Mount the forced cooling fan [170] and tighten the screws [22].  
⇒ Tightening torque 28 Nm

## 7.7.4 EH7., AH7. rotary encoder - (E)DRN315 motors



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|       |                 |        |                |
|-------|-----------------|--------|----------------|
| [1]   | Rotor           | [659]  | Screw          |
| [35]  | Fan guard       | [734]  | Nut            |
| [220] | Encoder         | [748]  | Screw          |
| [367] | Retaining screw | [1711] | Screw          |
| [657] | Cover plate     | [B]    | Clamping screw |

## Removing EH7., AH7.

1. Remove the screws [659] to disassemble the cover plate [657].
2. Depending on the design, remove the encoder [220] from the fan guard [35] as follows:
  - ⇒ **EH7.:** Remove the nut [734].
  - ⇒ **AH7.:** Remove screw [748].
3. Loosen the screw [B] by 2 – 3 revolutions to pull off the encoder [220].

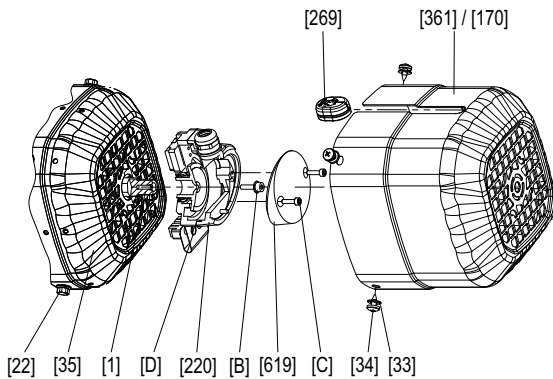
## Installing EH7., AH7.

1. Push the encoder to the stop of the shaft end.
2. Tighten the screw [B].
  - ⇒ Tightening torque 3 Nm
3. Proceed as follows, depending on the encoder:
  - ⇒ **EH7.:** Install the nut [734].
  - ⇒ Tightening torque 3 Nm
  - ⇒ **AH7.:** Insert and tighten the screw [748].
  - ⇒ Tightening torque 12 Nm
4. Mount the cover plate [657] using the screws [659]/[1711].
  - ⇒ Tightening torque 11 Nm



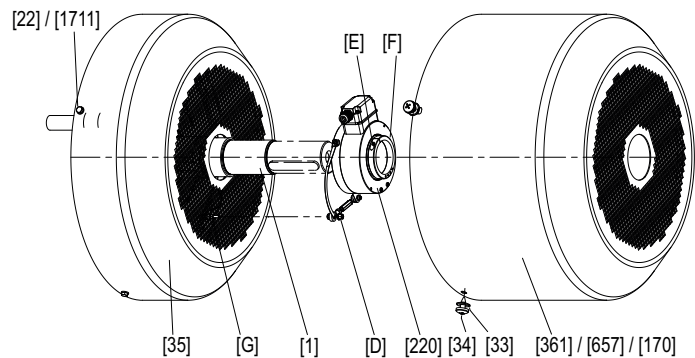
### 7.7.5 XH.A hollow-shaft rotary encoders – DR..71 – 225, DRN71 – 225, DR2..71 – 80 motors

Encoder mounting with XH1A encoder mounting adapter



|       |                          |
|-------|--------------------------|
| [1]   | Rotor                    |
| [22]  | Screws                   |
| [33]  | Washer                   |
| [34]  | Tapping screw            |
| [35]  | Fan guard                |
| [170] | Forced cooling fan cover |
| [220] | Encoder                  |
| [269] | Grommet                  |
| [361] | Safety cover             |

Encoder mounting with XH7A and XH8A encoder mounting adapter



|        |                           |
|--------|---------------------------|
| [619]  | Connection cover          |
| [657]  | Safety cover              |
| [1711] | Screw                     |
| [B]    | Central retaining screw   |
| [C]    | Connection cover screws   |
| [D]    | Torque bracket screws     |
| [E]    | Screw                     |
| [F]    | Clamping ring             |
| [G]    | Nut of the torque bracket |

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#### Removing XH1A

1. Remove the safety cover [361] or the forced cooling fan [170] if applicable.
2. Loosen the screws of the connection cover [619] and remove it. Do not disconnect the encoder cable.
3. Screw out the central retaining screw [B].
4. Remove the torque bracket screws [D].
5. Pull the torque bracket off.
6. Remove the encoder [220] from the shaft end.

#### Removing XH7A, XH8A

1. Remove the safety cover [361] or the forced cooling fan [170] if applicable.
2. Loosen the screw [E] from clamping ring [F].
3. Remove the torque bracket screws [D].
4. Remove the encoder [220] from the shaft end.

#### Installing XH1A

1. Push the encoder [220] onto the shaft end.
2. Screw in the screws [D] to mount the torque bracket.  
⇒ Tightening torque 1.6 Nm ± 10%
3. Tighten the screw [B].  
⇒ Tightening torque 2.9 Nm

4. Screw on the connection cover [619].  
⇒ Tightening torque 3 Nm
5. Mount the safety cover [361] or the forced cooling fan [170] if applicable.  
⇒ Tightening torque 3 Nm

### Installing XH7A, XH8A

1. Push the encoder [220] onto the shaft end.
2. Screw in the screws [D] to mount the torque bracket.  
⇒ Tightening torque 6 Nm
3. Tighten the screw [E] of the clamping ring [F].  
⇒ Tightening torque 5 Nm
4. Mount the safety cover [657] or the forced cooling fan [170].  
⇒ Screw [1711]: Tightening torque 11 Nm  
⇒ Screw [22]: Tightening torque 28 Nm

## 7.8 Checklist for installing safety encoders

The checklists allow you to document the performed and safety-related tasks when exchanging safety encoders.

### 7.8.1 Drive and encoder data

| Drive and encoder data |  |
|------------------------|--|
| Technician:            |  |
| Date:                  |  |
| Drive designation:     |  |
| Motor serial number:   |  |
| Encoder part number:   |  |
| Encoder serial number: |  |
| Encoder manufacturer:  |  |

### 7.8.2 ES7., AS7. checklist

| Checklist for (E)DR..80 – 132/(E)DRN80 – 132S motors with ES7., AS7. encoders                                             |                          |
|---------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Performed task                                                                                                            | Completed                |
| Encoder pin coated with NOCO-Paste                                                                                        | <input type="checkbox"/> |
| Central retaining screw [B] of the encoder tightened (tightening torque 2.75 Nm $\pm$ 6%)                                 | <input type="checkbox"/> |
| New expansion anchor [362] pressed into the fan guard [35]                                                                | <input type="checkbox"/> |
| Retaining screws on the torque bracket [A] tightened into the expansion anchor [362] (tightening torque 1.6 Nm $\pm$ 10%) | <input type="checkbox"/> |
| Connection cover [619] screwed in place (tightening torque 2.25 Nm)                                                       | <input type="checkbox"/> |
| Wobble measurement performed (tolerance $\leq$ 0.07 mm)                                                                   | <input type="checkbox"/> |
| Safety cover [361] or, if necessary, the forced cooling fan [170] installed                                               | <input type="checkbox"/> |

### 7.8.3 EG7., AG7. checklist

| Checklist for (E)DR..160 – 280/(E)DRN132M – 280 motors with EG7., AG7. encoders                 |                          |
|-------------------------------------------------------------------------------------------------|--------------------------|
| Performed task                                                                                  | Completed                |
| Encoder pin coated with NOCO-Paste                                                              | <input type="checkbox"/> |
| Central retaining screw [B] of the encoder tightened (tightening torque 8 Nm $\pm$ 5%)          | <input type="checkbox"/> |
| Retaining screws on the torque bracket [232] wetted with LOCTITE® 241                           | <input type="checkbox"/> |
| Retaining screws on the torque bracket [232] tightened (tightening torque 6 Nm $\pm$ 10%)       | <input type="checkbox"/> |
| Connection cover [619] screwed in place (tightening torque 2.25 Nm $\pm$ 10%)                   | <input type="checkbox"/> |
| Safety cover [361] or, if necessary, the canopy [657] or the forced cooling fan [170] installed | <input type="checkbox"/> |

**7.8.4 EK8., AK8., EK9. checklist**

| <b>Checklist for (E)DRN../DRU../DR2..63 – 315 motors with EK8., AK8., EK9. encoders</b>                                                                                                                                                                                                                                      |                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>Performed task</b>                                                                                                                                                                                                                                                                                                        | <b>Completed</b>         |
| For initial installation via an encoder mounting adapter with insulation coupling: <ul style="list-style-type: none"> <li>Insulation coupling [1891] screwed in place (tightening torque 2.25 Nm)</li> <li>Screws [1896] for the spacer ring [1895] wetted with LOCTITE® 241 and secured (tightening torque 7 Nm)</li> </ul> | <input type="checkbox"/> |
| Cone of the encoder [220] and the rotor [1] and, if available, of the insulation coupling [1891] or the coupling [233] cleaned                                                                                                                                                                                               | <input type="checkbox"/> |
| For AK8H safety encoders, wet the central retaining screw of the encoder [220] with LOCTITE® 241                                                                                                                                                                                                                             | <input type="checkbox"/> |
| Central retaining screw of the encoder [220] tightened (tightening torque 3.3 Nm ± 8%)                                                                                                                                                                                                                                       | <input type="checkbox"/> |
| Screw plug [A] screwed in<br>(Tightening torque 1.8 Nm)                                                                                                                                                                                                                                                                      | <input type="checkbox"/> |
| Fan guard [35] mounted                                                                                                                                                                                                                                                                                                       | <input type="checkbox"/> |
| Screws [232] wetted with LOCTITE® 241                                                                                                                                                                                                                                                                                        | <input type="checkbox"/> |
| Screws [232] screwed into the nuts of the torque bracket [1889] through the grille of the fan guard [35]/support ring [1895]<br>(For size 63 – 132S: Tightening torque 3.3 Nm)<br>(For size 132M – 355: Tightening torque 3.3 Nm ± 10%)                                                                                      | <input type="checkbox"/> |
| Safety cover [361]/[657] mounted                                                                                                                                                                                                                                                                                             | <input type="checkbox"/> |
| Connection adapter [U] placed into recess of the safety cover [361]/[657] or the forced cooling fan [170] and tightened with screws [D] (tightening torque 2 Nm ±10%)                                                                                                                                                        | <input type="checkbox"/> |
| Screws [E] for fastening the connection cover [619] wetted with LOCTITE® 241                                                                                                                                                                                                                                                 | <input type="checkbox"/> |
| Connection cover [619] screwed onto connection adapter (tightening torque 2.25 Nm)                                                                                                                                                                                                                                           | <input type="checkbox"/> |

## 8 Electrical installation

### 8.1 General information



#### INFORMATION

When selecting and using cables as well as connection technology components that are not supplied by SEW-EURODRIVE or that are determined by the motor and encoder configuration, note the applicable requirements of the country of use with regard to conformity guidelines and standards.

---



#### DANGER

Cables and cores with insufficient mechanical resistance.

Severe or fatal injuries due to electric shock. System damage.

- Avoid mechanical damage to the cables and cores.
  - Use fabric hoses to mechanically protect the cables and cores.
- 



#### DANGER

The cables and cores have inadequate dielectric strength.

Severe or fatal injuries due to electric shock. System damage.

- Observe the electrical voltage and current values that are in the motor.
  - Ensure that the cables and cores used have the necessary dielectric strength.
  - Observe air gaps and creepage distances. If necessary, use additional materials for electrical insulation.
- 



#### INFORMATION

SEW-EURODRIVE recommends using prefabricated cables from SEW-EURODRIVE to connect the safety encoders.

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## 8.2 Encoder connection

When connecting the encoders to the inverters, follow the operating instructions for the inverter and the wiring diagrams supplied with the encoders.

There may be differing requirements or limitations for the EI7C FS safety encoder due to the encoder evaluation unit, e.g. regarding the maximum cable lengths or the core cross sections. Observe the product documentation for the encoder evaluation unit for this.

### Mechanical requirements

- For connection variants with M12 or M23 connector, a strain relief of the cable must be carried out by the customer in accordance with IEC 60079-14.
- Note the following for connection variants with terminal strips or connection units:
  - Cables and cores must be mechanically protected against damage when they come into contact with motor components in the terminal box. Use fabric hoses.
  - Cables and cores must be electrically shielded from live parts such as terminal boards or power terminals of the motor. Observe the required air gaps and creepage distances.
  - Observe possible requirements regarding conformity with UL or CSA. For mechanical and electrical protection, use suitable glass fiber sheathing with UL style, for example.

### Electrical requirements

- Polarity protection and overvoltage protection
  - Signal cables

|                                           |                                                                  |
|-------------------------------------------|------------------------------------------------------------------|
| Short-circuit protection:                 |                                                                  |
| Signal outputs against each other         | ✓                                                                |
| Against supply                            | –                                                                |
| Against GND                               | ✓                                                                |
| Against encoder housing                   | ✓                                                                |
| Against shielding                         | ✓<br>(Assumption: Potential difference of GND to shielding: 0 V) |
| Minimum short-circuit current per channel | 50 mA                                                            |
| Overvoltage protection                    | –                                                                |

- Digital interface

|                                   |                                                                  |
|-----------------------------------|------------------------------------------------------------------|
| Short-circuit protection:         |                                                                  |
| Signal outputs against each other | ✓                                                                |
| Against supply                    | ✓ (up to 24 V)                                                   |
| Against GND                       | ✓                                                                |
| Against encoder housing           | ✓                                                                |
| Against shielding                 | ✓<br>(Assumption: Potential difference of GND to shielding: 0 V) |

|                        |                                                      |
|------------------------|------------------------------------------------------|
| Overvoltage protection | $\pm 70$ V (fault protected, $\pm 70$ V (transient)) |
|------------------------|------------------------------------------------------|

- Maximum cable length (inverter to encoder):
  - 100 m with a capacitance from core to shield  $\leq 110$  nF/km
  - 100 m with a capacitance from core to core  $\leq 70$  nF/km
- Core cross section:
  - Supply cores  $\geq 0.25$  mm<sup>2</sup> for cable lengths up to 50 m
  - Supply cores  $\geq 0.5$  mm<sup>2</sup> for cable lengths up to 100 m
  - Signal cores  $\geq 0.25$  mm<sup>2</sup>
- Shielded cable with twisted core pairs. Connect the shield over a wide area at both ends:
  - On the encoder side: in the cable gland of the encoder connection cover or the terminal box or in the encoder connector.
  - On the inverter side or the side of the evaluation unit: on an electronics shield clamp and on the housing of the D-sub connector or another connector.
- Install the encoder cables separately from the power cables, maintaining a distance of at least 200 mm.
- Observe the technical data of the encoder when selecting the cabling, in particular with regard to the operating voltage or current.

Encoders are protected from polarity reversal in the following areas:

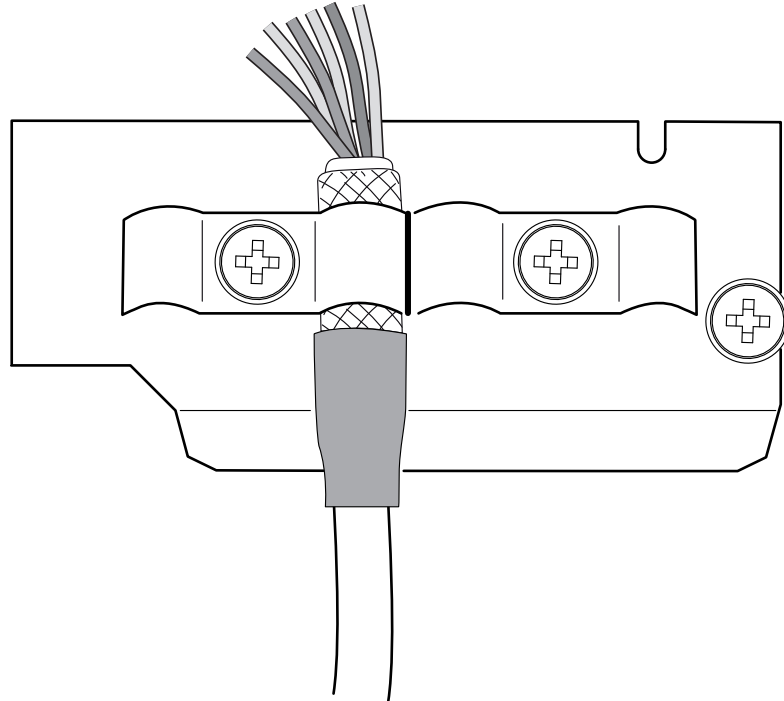
- Supply voltage
- Signal cables
- Digital signal cables, such as RS485

No voltage may be applied externally to output signals. There is no short-circuit protection between the encoder cables. Unused cables must be individually insulated and protected against short circuit.

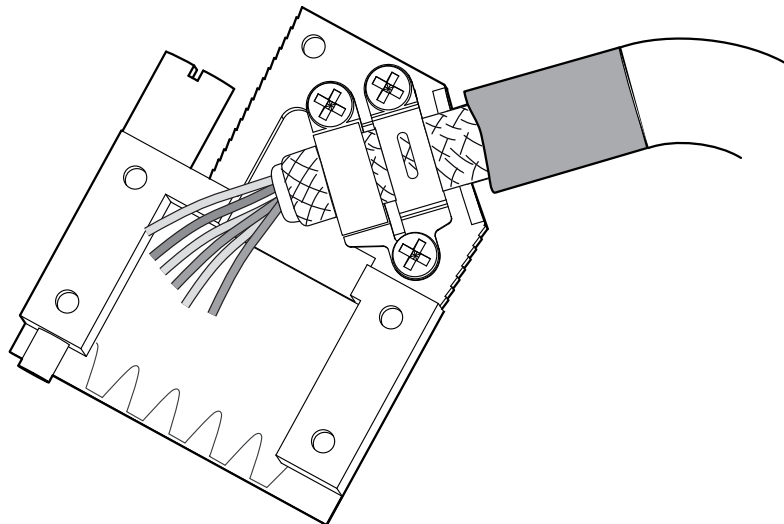
### 8.2.1 Installation requirements

#### Encoder line shield on inverter

Connect the shield of the encoder line on the inverter or the encoder evaluation unit over a wide area.



1866148491

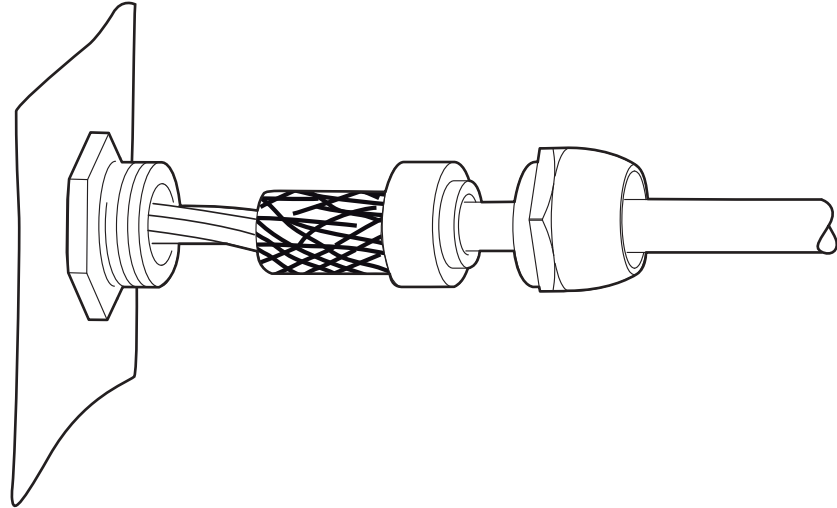


1866145803



**Encoder line shield on encoder**

Connect the shield of the encoder cable on the encoder, the encoder connector, the grounding terminal in the terminal box, or the grounded housing of the encoder connector over a wide area.



1866163979

## 8.3 Overview of wiring diagrams

### 8.3.1 Assignment of wiring diagrams to encoder designs

#### Legend

|        |   |                                                                                                                                                                      |
|--------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type   | = | Type designation of the encoder                                                                                                                                      |
| SB-SNR | = | Wiring diagram part number                                                                                                                                           |
| SB-NR  | = | Wiring diagram number                                                                                                                                                |
| AD     | = | Connection cover on encoder                                                                                                                                          |
| iGS    | = | Integrated encoder connector: General designation for the encoder connector without specifying the design with/without connection cover or the installation location |

#### Connector codes from SEW-EURODRIVE

|           |   |                                                                                                                                                                                |
|-----------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AIGA      | = | M23 without temperature sensor, e.g. /TF or /PI                                                                                                                                |
| AIGB      | = | M23 with temperature sensor, e.g. /TF or /PI                                                                                                                                   |
| AVSE      | = | M12 without inverted signal tracks /A, /B and without temperature sensor, e.g. /TF or /PI                                                                                      |
| AVRE      | = | M12 with non-inverted signal tracks A, B and with inverted signal tracks /A, /B and with optional temperature sensor, e.g. /TF or /PI. With EI7C FS safety encoder without TF. |
| AE + AVRE | = | Connection unit + M12 with non-inverted signal tracks and with optional temperature sensor /TF or /PI                                                                          |
| AE        | = | Terminal strip/connection unit in the terminal box                                                                                                                             |
| A1GA      | = | Integrated encoder connector installed on the side or rear of the encoder cover, delivered with connection cover                                                               |
| A2GA      | = | Integrated encoder connector installed on the side or rear of the encoder cover, delivered without connection cover                                                            |
| KIGA      | = | M23 connector with 0.36 m cable directly installed on the encoder, delivered without mating connector                                                                          |

#### Connector catalog designation from SEW-EURODRIVE

|     |   |                                                                                                                             |
|-----|---|-----------------------------------------------------------------------------------------------------------------------------|
| KD1 | = | Hybrid connector for MOVILINK® DDI: M23 (motor cable cross section 1.5 mm <sup>2</sup> – 4 mm <sup>2</sup> )                |
| KDB | = | Hybrid connector for MOVILINK® DDI: M40 (motor cable cross section 6 mm <sup>2</sup> – 10 mm <sup>2</sup> )                 |
| KD  | = | Hybrid cable screw fitting for MOVILINK® DDI: M25/M32 (motor cable cross section 1.5 mm <sup>2</sup> – 10 mm <sup>2</sup> ) |
| KDD | = | Power cable screw fitting and M23 signal connector for MOVILINK® DDI                                                        |

## Incremental encoder

The wiring diagrams can be accessed via the Online Support portal on the SEW-EURODRIVE website by specifying the wiring diagram part number (SB-SNR) or the wiring diagram number (SB-NR).

## 1 Vpp sin/cos + RS485

| Type | Connection  | SB-SNR   | Notes |
|------|-------------|----------|-------|
| EG7S | AD          | 63377500 | –     |
| EK8S | A1GA/A2GA   | 63377500 | –     |
| EK8S | AIGA/AIGB   | 63378043 | –     |
| EK8S | KIGA (AIGA) | 63377454 | –     |
| EK8S | AE          | 63378108 | –     |
| ES7S | AD          | 63377500 | –     |
| EV8S | KIGA (AIGA) | 63377454 | –     |
| EV8S | A1GA/A2GA   | 63377500 | –     |

## 1 Vpp sin/cos

| Type | Connection | SB-SNR   | Notes |
|------|------------|----------|-------|
| EH7S | AIGA       | 63160234 | –     |

## HTL

| Type | Connection            | SB-SNR   | Notes                                                                                                                 |
|------|-----------------------|----------|-----------------------------------------------------------------------------------------------------------------------|
| EH7C | AIGA                  | 63160234 | –                                                                                                                     |
| EI7. | M12, 4-pin + AVSE     | 63089149 | With configuration box; without TF; EI7. Generation B                                                                 |
| EI7. | internal to the drive | 63079925 | MOVIMOT® MQ../MFE72; with configuration box; without TF; EI7. Generation B                                            |
| EI7. | M12, 4-pin + AVSE     | 63082659 | With configuration box; without TF; EI7. Generation B                                                                 |
| EI7. | M12, 8-pin + TF AVRE  | 63111063 | With configuration box; with TF; EI7. Generation B                                                                    |
| EI7. | M12, 8-pin + AVRE     | 63154439 | With configuration box; without TF; EI7. Generation B                                                                 |
| EI7. | M12, 8-pin + AVRE     | 63189151 | With configuration box; without TF; EI7. Generation B                                                                 |
| EI7. | AE                    | 63125455 | With configuration box; with TF; EI7. Generation B                                                                    |
| EI71 | internal to the drive | 63091062 | MOVIMOT® MM..D [MF..]; without configuration box; without TF; EI7. Generation A (discontinued)                        |
| EI71 | internal to the drive | 63255758 | MOVIMOT® MM..D/MMLK3./TH/BEM; with configuration box; with TF (TH) external braking resistor; EI7. Generation B; AS-i |
| EI71 | internal to the drive | 63198207 | MOVIMOT® MM..D/MMLK3.; with configuration box; without TF; Generation B; AS-i                                         |

| Type                  | Connection            | SB-SNR   | Notes                                                                                                                               |
|-----------------------|-----------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------|
| EI71                  | internal to the drive | 63080125 | MOVIMOT® MM..D/MMLK3./TH; with configuration box; with TF (TH) internal braking resistor; EI7. Generation B; AS-i                   |
| EI71                  | internal to the drive | 63106329 | MOVIMOT® MM..D/MMLK3./TH; without configuration box; with TF (TH) internal braking resistor; EI7. Generation A (discontinued); AS-i |
| EI71                  | internal to the drive | 63198347 | MOVIMOT® MM..D/MMLK3./TH/URM; with configuration box; with TF (TH); EI7. Generation B; AS-i                                         |
| EI71                  | internal to the drive | 63113911 | MOVIMOT® MM..D/MMLK3./TH/URM; without configuration box; with TF (TH); EI7. Generation A (discontinued); AS-i                       |
| EI71                  | internal to the drive | 63012944 | MOVI-SWITCH®; MSW-25/CK0/TF;TH; without configuration box; EI7. Generation A (discontinued); AS-i                                   |
| EI71,EI72, EI76, EI7C | M12, 4-pin + AVSE     | 63137259 | Without configuration box; without TF; EI7. Generation A (discontinued)                                                             |
| EI71,EI72, EI76, EI7C | internal to the drive | 63088436 | MOVIMOT® MM..D [MQ..]; without configuration box; without TF; EI7. Generation A (discontinued)                                      |
| EI71,EI72, EI76, EI7C | M12, 4-pin + AVSE     | 63277689 | MOVIMOT® MM..D/BME..; without configuration box; without TF; EI7. Generation A (discontinued)                                       |
| EI71,EI72, EI76, EI7C | M12, 4-pin + AVSE     | 63076977 | MOVIMOT® MM..; without configuration box; without TF; EI7. Generation A (discontinued)                                              |
| EI71,EI72, EI76, EI7C | M12, 8-pin + TF AVRE  | 63076365 | Without configuration box; with TF; EI7. Generation A (discontinued)                                                                |
| EI71,EI72, EI76, EI7C | M12, 8-pin + AVRE     | 63155176 | Without configuration box; without TF; EI7. Generation A (discontinued)                                                             |
| EI71,EI72, EI76, EI7C | M12, 4-pin + AVSE     | 63069423 | Without configuration box; without TF; EI7. Generation A (discontinued)                                                             |
| EI7C (63)             | M12, 8-pin + AVRE     | 63430959 | Without configuration box only for DRN63; with TF; EI7. Generation B                                                                |
| EI7C FS               | M12, 8-pin + AVRE     | 63089238 | Without configuration box; without TF                                                                                               |
| EI8C                  | AE                    | 63290839 | –                                                                                                                                   |
| EI8C                  | AIGA/AIGB             | 63286114 | –                                                                                                                                   |
| EI8C                  | AVRE                  | 63357615 | –                                                                                                                                   |

#### HTL/TTL (RS422)

| Type | Connection  | SB-SNR   | Notes |
|------|-------------|----------|-------|
| EG7C | AD          | 63377500 | –     |
| EK8C | A1GA/A2GA   | 63377500 | –     |
| EK8C | AIGA/AIGB   | 63378043 | –     |
| EK8C | KIGA (AIGA) | 63377454 | –     |
| EK8C | AE          | 63378108 | –     |
| EK8X | A1GA/A2GA   | 63452537 | –     |

| Type | Connection  | SB-SNR   | Notes |
|------|-------------|----------|-------|
| EK8X | AE          | 63452626 | –     |
| EK8X | AIGA        | 63456672 | –     |
| ES7C | AD          | 63377500 | –     |
| ES7R | AD          | 63377500 | –     |
| EV8C | A1GA/A2GA   | 63377500 | –     |
| EV8C | KIGA (AIGA) | 63377454 | –     |

**TTL**

| Type | Connection  | SB-SNR   | Notes |
|------|-------------|----------|-------|
| EI8R | AE          | 63290839 | –     |
| EI8R | AIGA/AIGB   | 63286114 | –     |
| EI8R | AVRE        | 63357615 | –     |
| EG7R | AD          | 63377500 | –     |
| EH7R | AIGA        | 63160234 | –     |
| EH7T | AIGA        | 63160234 | –     |
| EK8R | A1GA/A2GA   | 63377500 | –     |
| EK8R | AIGA/AIGB   | 63378043 | –     |
| EK8R | KIGA (AIGA) | 63377454 | –     |
| EK8R | AE          | 63378108 | –     |
| EV8R | A1GA/A2GA   | 63377500 | –     |
| EV8R | KIGA (AIGA) | 63377454 | –     |

**MOVILINK® DDI**

| Type | Connection | SB-SNR   | Notes                                              |
|------|------------|----------|----------------------------------------------------|
| EI8Z | KD         | 63329050 | MOVILINK® DDI + KD external brake rectifier        |
| EI8Z | KD         | 63329069 | MOVILINK® DDI + KD + BG.Z                          |
| EI8Z | KD1        | 63329077 | MOVILINK® DDI + KD1 (M23) external brake rectifier |
| EI8Z | KD1        | 63329085 | MOVILINK® DDI + KD1 (M23) + BG.Z                   |
| EI8Z | KDB        | 63329093 | MOVILINK® DDI + KDB (M40) external brake rectifier |
| EI8Z | KDB        | 63329115 | MOVILINK® DDI + KDB (M40) + BG.Z                   |
| EI8Z | KDD        | 63338734 | MOVILINK® DDI + KDD (M23) external brake rectifier |
| EI8Z | KDD        | 63338742 | MOVILINK® DDI + KDD (M23) + BG.Z                   |
| EK8Z | KD         | 63329050 | MOVILINK® DDI + KD external brake rectifier        |
| EK8Z | KD         | 63329069 | MOVILINK® DDI + KD + BG.Z                          |
| EK8Z | KD1        | 63329077 | MOVILINK® DDI + KD1 (M23) external brake rectifier |
| EK8Z | KD1        | 63329085 | MOVILINK® DDI + KD1 (M23) BG.Z                     |
| EK8Z | KDB        | 63329093 | MOVILINK® DDI + KDB (M40) external brake rectifier |
| EK8Z | KDB        | 63329115 | MOVILINK® DDI + KDB (M40) BG.Z                     |

| Type | Connection | SB-SNR   | Notes                                              |
|------|------------|----------|----------------------------------------------------|
| EK8Z | KDD        | 63338734 | MOVILINK® DDI + KDD (M23) external brake rectifier |
| EK8Z | KDD        | 63338742 | MOVILINK® DDI + KDD (M23) + BG.Z                   |

**Absolute encoder**

The wiring diagrams can be accessed via the Online Support portal on the SEW-EURODRIVE website by specifying the wiring diagram part number (SB-SNR) or the wiring diagram number (SB-NR).

**1 Vpp sin/cos + RS485**

| Type | Connection  | SB-SNR   | Notes |
|------|-------------|----------|-------|
| AG7W | AD          | 63377926 | –     |
| AG7W | AIGA        | 63377918 | –     |
| AK8W | A1GA/A2GA   | 63377926 | –     |
| AK8W | KIGA (AIGA) | 63377918 | –     |
| AK8W | AIGA/AIGB   | 63377276 | –     |
| AK8W | AE          | 63377292 | –     |
| AS7W | AD          | 63377926 | –     |
| AS7W | AIGA        | 63377918 | –     |
| AV8W | A1GA/A2GA   | 63377926 | –     |
| EV8W | A1GA/A2GA   | 63377926 | –     |
| AV8W | KIGA (AIGA) | 63377918 | –     |
| EK8W | A1GA/A2GA   | 63377926 | –     |
| EK8W | KIGA (AIGA) | 63377918 | –     |
| EK8W | AIGA/AIGB   | 63377276 | –     |
| EK8W | AE          | 63377292 | –     |
| EV8W | KIGA (AIGA) | 63377918 | –     |

**1 Vpp sin/cos + SSI**

| Type | Connection  | SB-SNR   | Notes |
|------|-------------|----------|-------|
| AG7Y | AD          | 63377926 | –     |
| AK8Y | A1GA/A2GA   | 63377926 | –     |
| AK8Y | KIGA (AIGA) | 63377918 | –     |
| AK8Y | AIGA/AIGB   | 63377276 | –     |
| AK8Y | AE          | 63377292 | –     |
| AS7Y | AD          | 63377926 | –     |
| AS7Y | AIGA        | 63377918 | –     |
| AV8Y | KIGA (AIGA) | 63377918 | –     |
| AV8Y | A1GA/A2GA   | 63377926 | –     |

**HIPERFACE®**

| Type | Connection  | SB-SNR   | Notes |
|------|-------------|----------|-------|
| AK8H | A1GA/A2GA   | 63377926 | –     |
| AK8H | KIGA (AIGA) | 63377918 | –     |

| Type | Connection  | SB-SNR   | Notes |
|------|-------------|----------|-------|
| AK8H | AIGA/AIGB   | 63377276 | –     |
| AK8H | AE          | 63377292 | –     |
| AV8H | A1GA/A2GA   | 63377926 | –     |
| AV8H | KIGA (AIGA) | 63377918 | –     |

#### TTL (RS422) + SSI

| Type | Connection | SB-SNR   | Notes |
|------|------------|----------|-------|
| AH7Y | AD         | 63121085 | –     |

#### MOVILINK® DDI

| Type      | Connection | SB-SNR   | Notes                                              |
|-----------|------------|----------|----------------------------------------------------|
| EK9Z/AK8Z | KD         | 63329050 | MOVILINK® DDI + KD external brake rectifier        |
| EK9Z/AK8Z | KD         | 63329069 | MOVILINK® DDI + KD + BG.Z                          |
| EK9Z/AK8Z | KD1        | 63329077 | MOVILINK® DDI + KD1 (M23) external brake rectifier |
| EK9Z/AK8Z | KD1        | 63329085 | MOVILINK® DDI + KD1 (M23) + BG.Z                   |
| EK9Z/AK8Z | KDB        | 63329093 | MOVILINK® DDI + KDB (M40) external brake rectifier |
| EK9Z/AK8Z | KDB        | 63329115 | MOVILINK® DDI + KDB (M40) + BG.Z                   |
| EK9Z/AK8Z | KDD        | 63338734 | MOVILINK® DDI + KDD (M23) external brake rectifier |
| EK9Z/AK8Z | KDD        | 63338742 | MOVILINK® DDI + KDD (M23) + BG.Z                   |



**Resolver**

The wiring diagrams can be accessed via the Online Support portal on the SEW-EURODRIVE website by specifying the wiring diagram part number (SB-SNR) or the wiring diagram number (SB-NR).

**Resolver, analog modulated**

| Type | Connection  | SB-SNR   | Notes |
|------|-------------|----------|-------|
| RK8M | A1GA/A2GA   | 63359685 | –     |
| RK8M | KIGA (AIGA) | 63374935 | –     |
| RK8M | AE          | 63377306 | –     |
| RK8M | AIGA/AIGB   | 63377284 | –     |

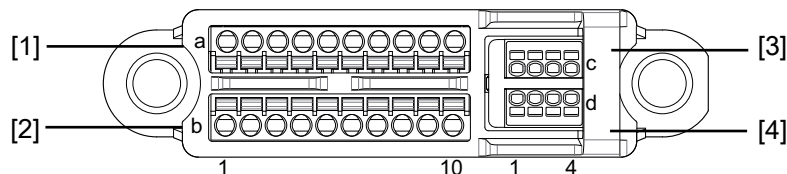
**Encoder mounting adapters**

Encoder mounting adapters prepare the motor for retrofitting an encoder. The wiring diagrams of the respective encoder that is being retrofitted are therefore applicable.

### 8.3.2 Structure of wiring diagram of EI7. built-in encoder

#### Connection via terminal strip in the terminal box

The encoder is equipped with a 10-pin terminal strip for connection:



29160248331

|     |                                                                                                     |
|-----|-----------------------------------------------------------------------------------------------------|
| [1] | The range 1a – 10a has been pre-configured by SEW-EURODRIVE. It must not be changed.                |
| [2] | The range 1b – 10b is intended for connection by the customer.                                      |
| [3] | The range 1c – 4c has been pre-configured by SEW-EURODRIVE. It must not be changed.                 |
| [4] | The range 1d – 4d has been pre-configured by SEW-EURODRIVE. It must not be changed by the customer. |

#### Basic connection:

The connections 1a – 10a, 1c – 4c and 1d – 4d lead to the encoder and/or the motor.

The connections 1b – 10b lead to the cable gland.

|   | 1                 | 2                 | 3                         | 4                         | 5           | 6           | 7         | 8                 | 9                 | 10        |
|---|-------------------|-------------------|---------------------------|---------------------------|-------------|-------------|-----------|-------------------|-------------------|-----------|
| a | TF1 <sup>1)</sup> | TF1 <sup>1)</sup> | TF2 <sup>1)</sup><br>opt. | TF2 <sup>1)</sup><br>opt. | +UB<br>(GY) | GND<br>(PK) | A<br>(BN) | $\bar{A}$<br>(WH) | $\bar{B}$<br>(YE) | B<br>(GN) |
| b | TF1 <sup>1)</sup> | TF1 <sup>1)</sup> | TF2 <sup>1)</sup><br>opt. | TF2 <sup>1)</sup><br>opt. | +UB         | GND         | A         | $\bar{A}$         | B                 | $\bar{B}$ |

1) TF, PI, PK motor temperature sensor (operation only in protective extra-low voltage)

| Pin assignment EI7C |                        |       |       |       |
|---------------------|------------------------|-------|-------|-------|
|                     | 1                      | 2     | 3     | 4     |
| c                   | GND_<br>Config<br>(BU) | n. c. | n. c. | n. c. |
| d                   | EI7C<br>(RD)           | n. c. | n. c. | n. c. |

| Pin assignment EI76 |                        |              |       |       |
|---------------------|------------------------|--------------|-------|-------|
|                     | 1                      | 2            | 3     | 4     |
| c                   | GND_<br>Config<br>(BU) | n. c.        | n. c. | n. c. |
| d                   | n. c.                  | EI76<br>(RD) | n. c. | n. c. |

| Pin assignment EI72 |                        |       |              |       |
|---------------------|------------------------|-------|--------------|-------|
|                     | 1                      | 2     | 3            | 4     |
| c                   | GND_<br>Config<br>(BU) | n. c. | n. c.        | n. c. |
| d                   | n. c.                  | n. c. | EI72<br>(RD) | n. c. |

| Pin assignment EI71 |                        |       |       |              |
|---------------------|------------------------|-------|-------|--------------|
|                     | 1                      | 2     | 3     | 4            |
| c                   | GND_<br>Config<br>(BU) | n. c. | n. c. | n. c.        |
| d                   | n. c.                  | n. c. | n. c. | EI71<br>(RD) |

### Connection via M12 connector on the terminal box

An 8-pin or a 4-pin M12 connector is available for the connection.

| 4-pin M12 connector AVSE                                                                                                                                  |               | 8-pin M12 connector AVRE                                                                                                                                   |                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <ul style="list-style-type: none"> <li>A-coded</li> <li>male</li> </ul>  | Pin 1: $+U_B$ | <ul style="list-style-type: none"> <li>A-coded</li> <li>male</li> </ul>  | Pin 1: $+U_B$    |
|                                                                                                                                                           | Pin 2: B      |                                                                                                                                                            | Pin 2: GND       |
|                                                                                                                                                           | Pin 3: GND    |                                                                                                                                                            | Pin 3: A         |
|                                                                                                                                                           | Pin 4: A      |                                                                                                                                                            | Pin 4: $\bar{A}$ |
|                                                                                                                                                           |               |                                                                                                                                                            | Pin 5: B         |
|                                                                                                                                                           |               |                                                                                                                                                            | Pin 6: $\bar{B}$ |
|                                                                                                                                                           |               |                                                                                                                                                            | Pin 7: TF1       |
|                                                                                                                                                           |               |                                                                                                                                                            | Pin 8: TF1       |

### 8.3.3 Structure of wiring diagram of EI7C FS built-in encoder

#### Connection via M12 connector on the terminal box

An 8-pin M12 connector is available on the terminal box for the connection.

| 8-pin M12 connector AVRE                                                                           |        |                 |        |           |
|----------------------------------------------------------------------------------------------------|--------|-----------------|--------|-----------|
| male, A-coded<br> | Pin 1: | +U <sub>B</sub> | Pin 5: | B         |
|                                                                                                    | Pin 2: | GND             | Pin 6: | $\bar{B}$ |
|                                                                                                    | Pin 3: | A               | Pin 7: | n.c.      |
|                                                                                                    | Pin 4: | $\bar{A}$       | Pin 8: | n.c.      |

## INFORMATION



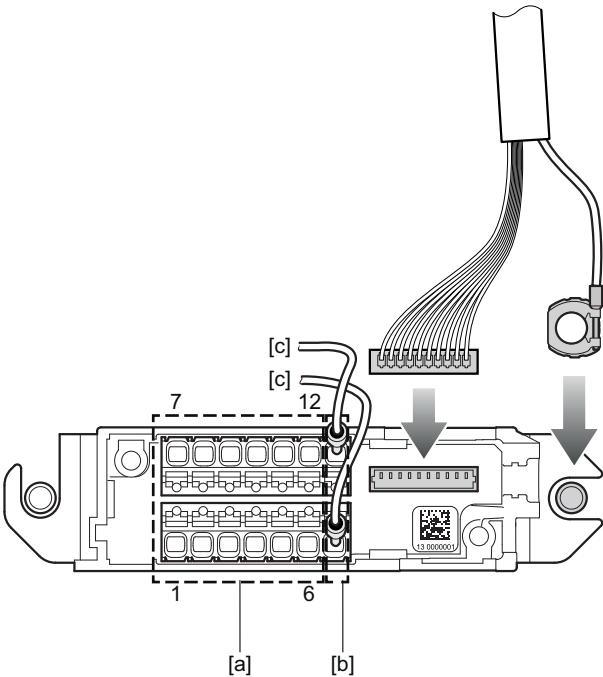
Pins 7 and 8 must **not** be used.

The following guidelines apply for the encoder cable:

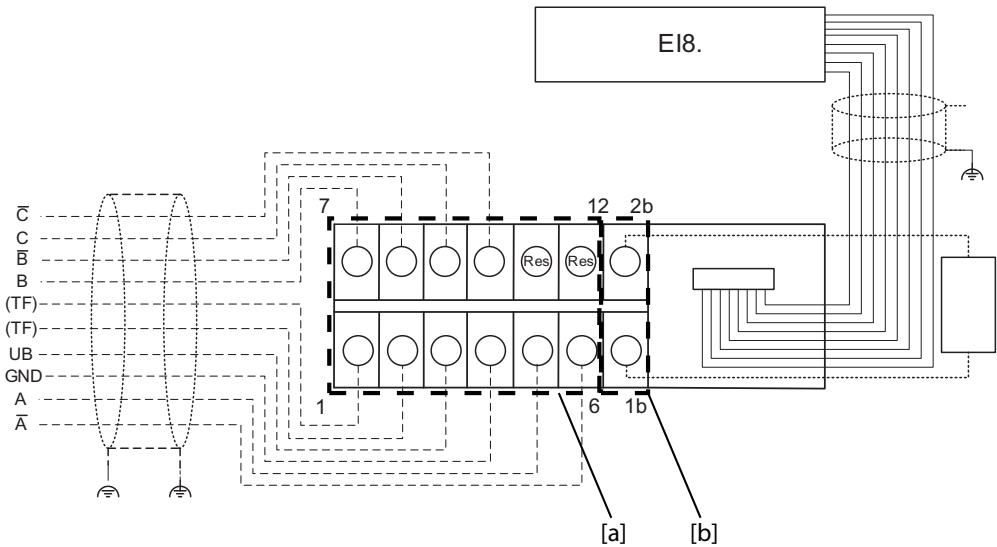
- Max. length of the cable: 100 m. The cable length may be limited by the encoder evaluation unit.
- The minimum core cross section must meet the specifications of the encoder evaluation unit. If this value is not specified, the core cross section must be at least 0.25 mm<sup>2</sup>.
- The cable must be shielded. The shield must be connected over a large surface area on both sides.
- The cable must have pairs of twisted cores.

## 8.3.4 Structure of wiring diagram of EI8R, EI8C

### Connection unit via terminal strip in the terminal box



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|     |                                                                                 |
|-----|---------------------------------------------------------------------------------|
| [a] | The range 1 – 12 is intended for connection by the customer.                    |
| [b] | The range 1b – 2b has been configured by SEW-EURODRIVE. It must not be changed. |
| [c] | Temperature sensor (wired at the factory)                                       |

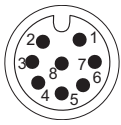
### Basic connection:

The connections 1 – 12 lead to the cable gland.

| 1    | 2    | 3  | 4   | 5 | 6  | 7 | 8  | 9 | 10 | 11  | 12  |
|------|------|----|-----|---|----|---|----|---|----|-----|-----|
| (TF) | (TF) | UB | GND | A | /A | B | /B | C | /C | Res | Res |

### Connection via M12 connector on the terminal box

An 8-pin M12 connector is available for the connection.

| 8-pin M12 connector AVRE                                                          |                        |
|-----------------------------------------------------------------------------------|------------------------|
| A-coded                                                                           | Pin 1: +U <sub>B</sub> |
| male                                                                              | Pin 2: GND             |
|  | Pin 3: A               |
|                                                                                   | Pin 4: n.c.            |
|                                                                                   | Pin 5: B               |
|                                                                                   | Pin 6: C               |
|                                                                                   | Pin 7: TF              |
|                                                                                   | Pin 8: TF              |

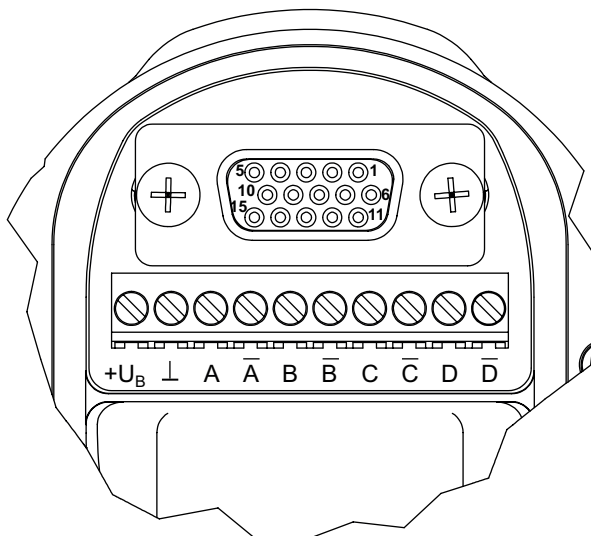
The following guidelines apply for the encoder cable:

- Max. length of the cable: 100 m. The cable length may be limited by the encoder evaluation unit.
- The minimum core cross section must meet the specifications of the encoder evaluation unit. If this value is not specified, the core cross section must be at least 0.25 mm<sup>2</sup>.
- The cable must be shielded. The shield must be connected over a large surface area on both sides.
- The cable must have pairs of twisted cores.

### 8.3.5 Structure of wiring diagram of EK8., AK8., ES7., AS7., EG7., AG7., RK8M add-on encoders

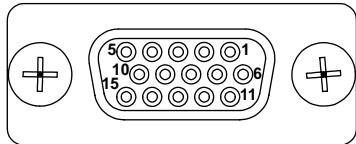
#### Connection via integrated encoder connector

Observe the notes in the respective chapters about connecting your encoder when connecting the encoder.



|  |                 | EK8W<br>AK8W<br>AS7W<br>AG7W<br>AV8W | AK8Y<br>AS7Y<br>AG7Y<br>AV8Y | AK8H<br>AV8H    | EK8C<br>EK8R<br>ES7C<br>EG7C<br>ES7R<br>EG7R<br>EV8C<br>EV8R | EK8S<br>ES7S<br>EG7S<br>EV8S | RK8M    |
|--|-----------------|--------------------------------------|------------------------------|-----------------|--------------------------------------------------------------|------------------------------|---------|
|  | +U <sub>B</sub> | +U <sub>B</sub>                      | +U <sub>B</sub>              | +U <sub>B</sub> | +U <sub>B</sub>                                              | +U <sub>B</sub>              | R1 ref+ |
|  | ⊥               | DGND                                 | DGND                         | DGND            | DGND                                                         | DGND                         | R2 ref- |
|  | A               | Cos+                                 | Cos+                         | Cos             | A                                                            | Cos+                         | S1 cos+ |
|  | A̅              | Cos-                                 | Cos-                         | Cos ref         | A̅                                                           | Cos-                         | S3 cos- |
|  | B               | Sin+                                 | Sin+                         | Sin             | B                                                            | Sin+                         | S2 sin+ |
|  | B̅              | Sin-                                 | Sin-                         | Sin ref         | B̅                                                           | Sin-                         | S4 sin- |
|  | C               | –                                    | Clock+                       | –               | C                                                            | C                            | n.c.    |
|  | C̅              | –                                    | Clock-                       | –               | C̅                                                           | C̅                           | n.c.    |
|  | D               | Data+                                | Data+                        | Data+           | –                                                            | Data+                        | n.c.    |
|  | D̅              | Data-                                | Data-                        | Data-           | –                                                            | Data-                        | n.c.    |

15-pin D-sub socket



Pin 1: D+, data+

Pin 2: D-, data-

Pin 3: n.c.

Pin 4: n.c.

Pin 5: U<sub>B</sub>

Pin 6: C-, clock-

Pin 7: n.c.

Pin 8: n.c.

Pin 9: GND

Pin 10: GND

Pin 11: C+, clock+

Pin 12: B-, sin-

Pin 13: B+, sin+

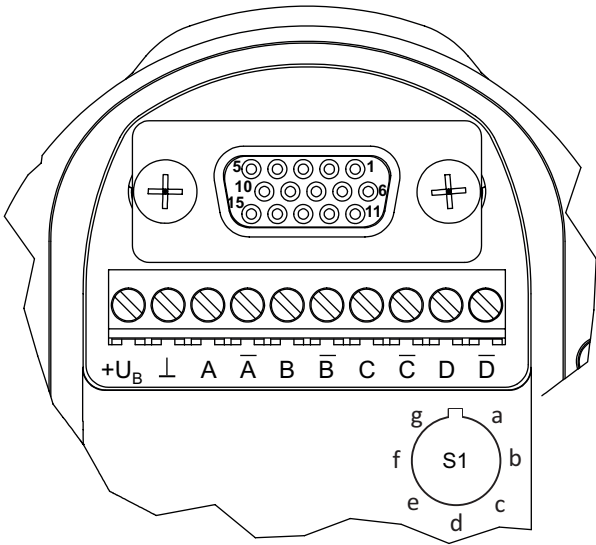
Pin 14: A-, cos-

Pin 15: A+, cos+



## 8.3.6 Structure of wiring diagram of EK8X add-on encoder – with adjustable resolution

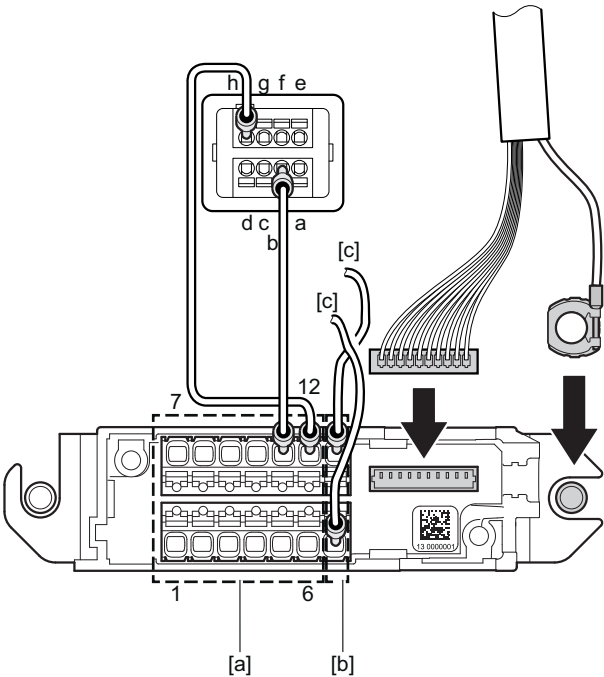
Connection via integrated encoder connector



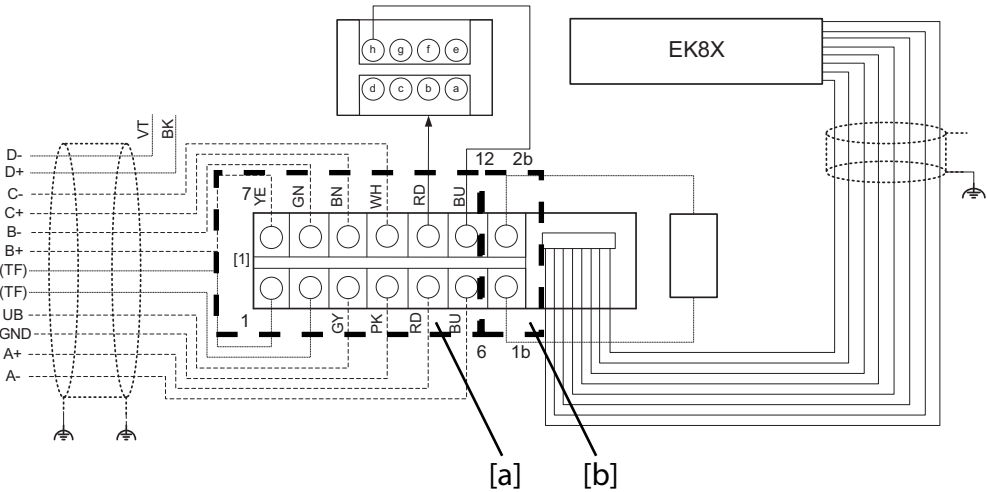
|                    |                 | EK8X            |
|--------------------|-----------------|-----------------|
|                    | +U <sub>B</sub> | +U <sub>B</sub> |
|                    | ⊥               | DGND            |
|                    | A               | A               |
|                    | $\bar{A}$       | $\bar{A}$       |
|                    | B               | B               |
|                    | $\bar{B}$       | $\bar{B}$       |
|                    | C               | C               |
|                    | $\bar{C}$       | $\bar{C}$       |
|                    | D               | –               |
|                    | $\bar{D}$       | –               |
| S1 switch position | Resolution      |                 |
| a                  | 1               |                 |
| b                  | 2               |                 |
| c                  | 6               |                 |
| d                  | 24              |                 |
| e                  | 100             |                 |
| f                  | 128             |                 |
| g                  | 1024            |                 |

| 15-pin D-sub socket |                       |
|---------------------|-----------------------|
|                     | Pin 1: D+, data+      |
|                     | Pin 2: D-, data-      |
|                     | Pin 3: n.c.           |
|                     | Pin 4: n.c.           |
|                     | Pin 5: U <sub>B</sub> |
|                     | Pin 6: C-, clock-     |
|                     | Pin 7: n.c.           |
|                     | Pin 8: n.c.           |
|                     | Pin 9: GND            |
|                     | Pin 10: GND           |
|                     | Pin 11: C+, clock+    |
|                     | Pin 12: B-, sin-      |
|                     | Pin 13: B+, sin+      |
|                     | Pin 14: A-, cos-      |
|                     | Pin 15: A+, cos+      |

## Connection via terminal strip in the terminal box



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|     |                                                                                 |
|-----|---------------------------------------------------------------------------------|
| [a] | The range 1 – 12 is intended for connection by the customer.                    |
| [b] | The range 1b – 2b has been configured by SEW-EURODRIVE. It must not be changed. |
| [c] | Temperature sensor (wired at the factory)                                       |

### Pin assignment

| Pin | Signal         | EK8X           |
|-----|----------------|----------------|
| 1   | TF             | TF             |
| 2   | TF             | TF             |
| 3   | U <sub>B</sub> | U <sub>B</sub> |
| 4   | GND            | GND            |

| Pin | Signal | EK8X                |
|-----|--------|---------------------|
| 5   | A+     | A+                  |
| 6   | A-     | A-                  |
| 7   | B+     | B+                  |
| 8   | B-     | B-                  |
| 9   | C+     | C+                  |
| 10  | C-     | C-                  |
| 11  | –      | Configuration a – g |
| 12  | –      | Configuration h     |

**Color assignment of the cable to the options**

| Option       | Cable 1b | Cable 2b |
|--------------|----------|----------|
| /TF (100 °C) | RD       | RD       |
| /TF (130 °C) | BU       | BU       |
| /TF (150 °C) | BK       | BK       |
| /TF (170 °C) | WH       | BN       |
| /KY          | RD(+)    | BU(-)    |
| /PT          | RD       | WH       |
| /PK          | RD       | BK       |
| /PI          | BK       | BK       |

**Assignment of resolution to pin 11 and pin 12**

| Resolution | Pin 11 (RD) | Pin 12 (BU) |
|------------|-------------|-------------|
| 1          | a           | h           |
| 2          | b           | h           |
| 6          | c           | h           |
| 24         | d           | h           |
| 100        | e           | h           |
| 128        | f           | h           |
| 1024       | g           | h           |

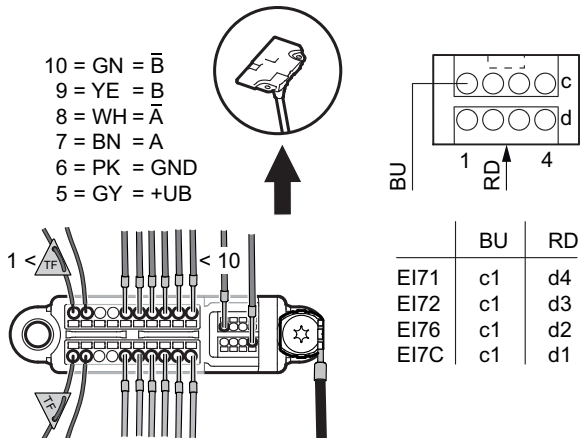
## 8.4 Connecting EI7. built-in encoders

### INFORMATION

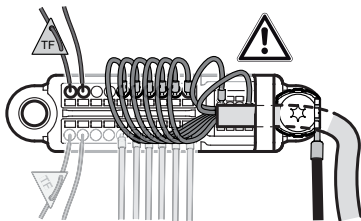


Observe the wiring diagrams in chapter "Overview of wiring diagrams"

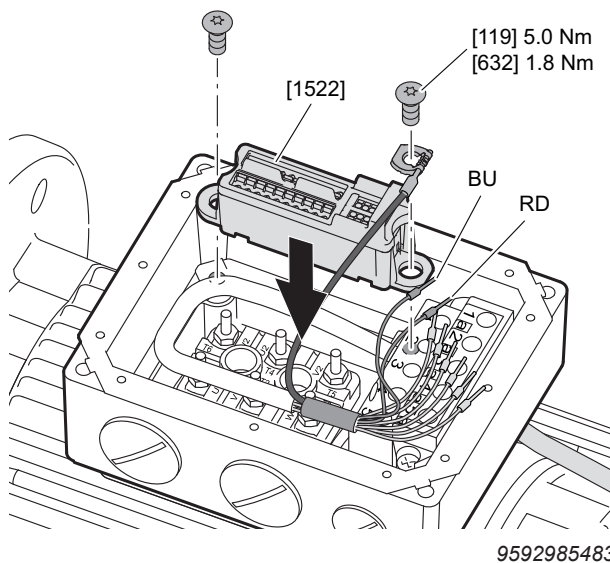
#### 8.4.1 Wiring EI7. - with M12 connector and connection box



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9592985483

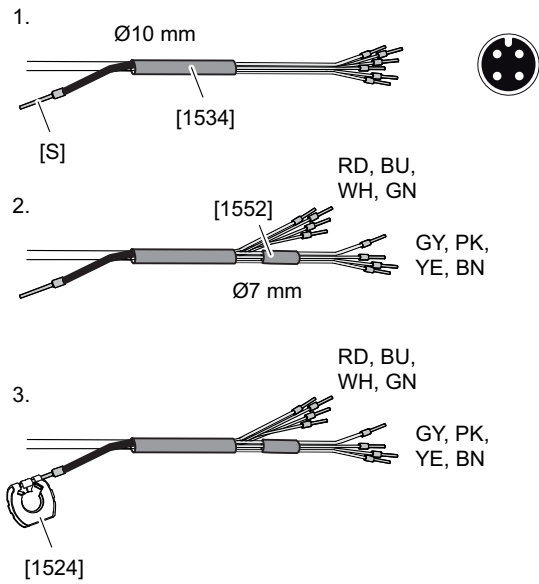
1. Wire the connection unit [1522] in accordance with the installed encoder type and the wiring diagrams (see "Overview of wiring diagrams").

1. Secure the connection unit with the M8 screws [119] or M4 screws [632].

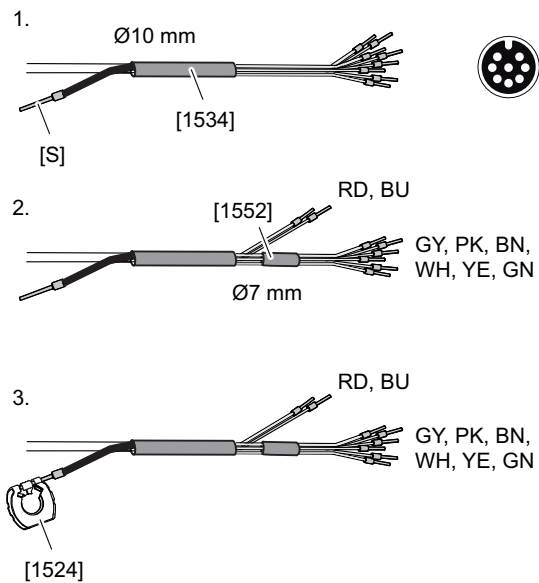
⇒ For M8 screws: Tightening torque 5 Nm

⇒ For M4 screws: Tightening torque 1.8 Nm

#### 8.4.2 Wiring EI7. – with connection unit



18014407973893771



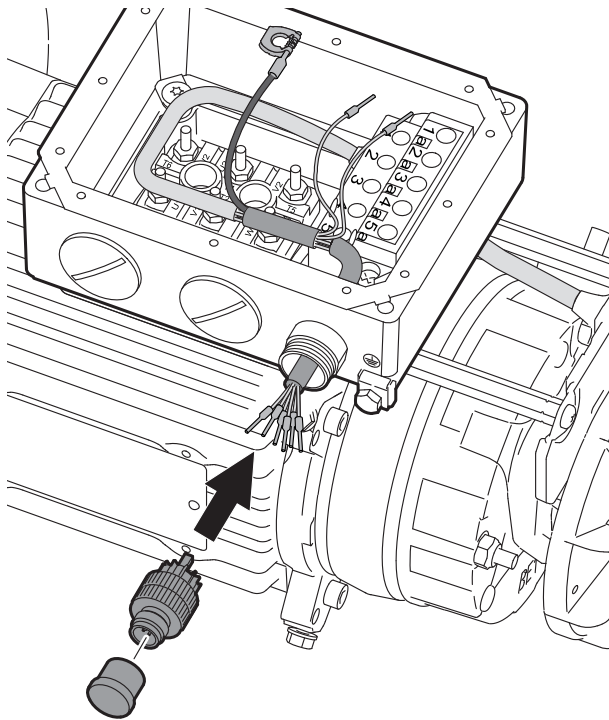
18014407973891467

4-pin:

1. Push the long glass fiber sheathing [1534] over the single cores of the encoder cable. Lay the shielding [S] in the opposite direction.
2. Push the short glass fiber sheathing [1552] over the single cores.
3. Install the terminal washer [1524].

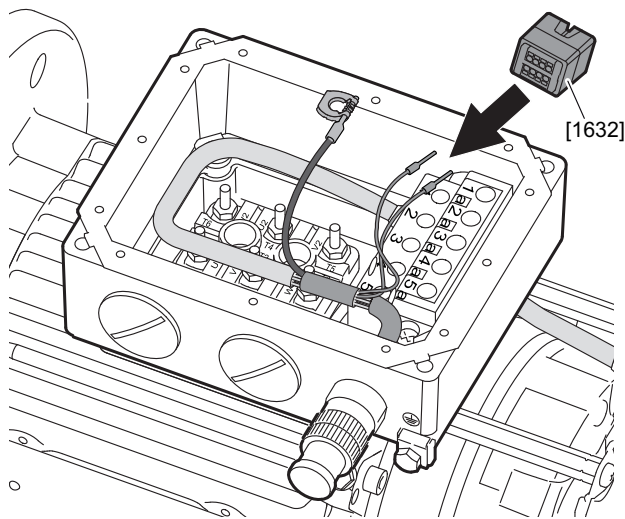
8-pin:

1. Push the long glass fiber sheathing [1534] over the single cores of the encoder cable. Lay the shielding [S] in the opposite direction.
2. Push the short glass fiber sheathing [1552] over the single cores.
3. Install the terminal washer [1524].



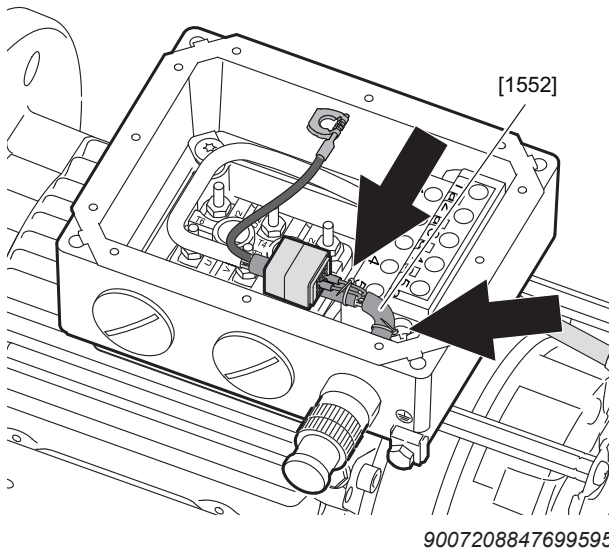
9007208847722635

1. Route the cores through the thread reduction out of the terminal box to the outside.
2. Connect the M12 connector as shown in the wiring diagram (see "Overview of wiring diagrams").
3. Screw the cores to the M12 connector.  
⇒ Tightening torque  $0.8 \text{ Nm} \pm 10\%$
4. Fasten the connector.

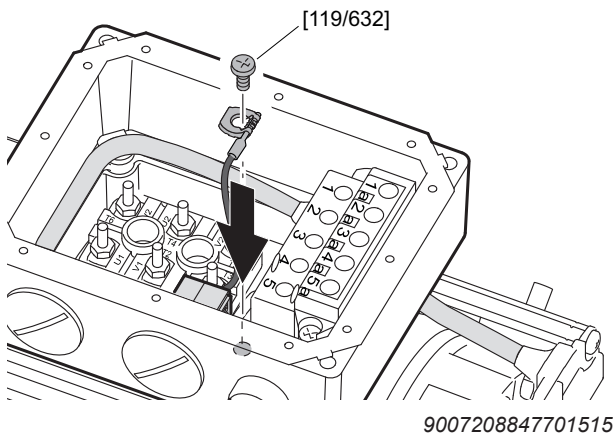


9007208847724555

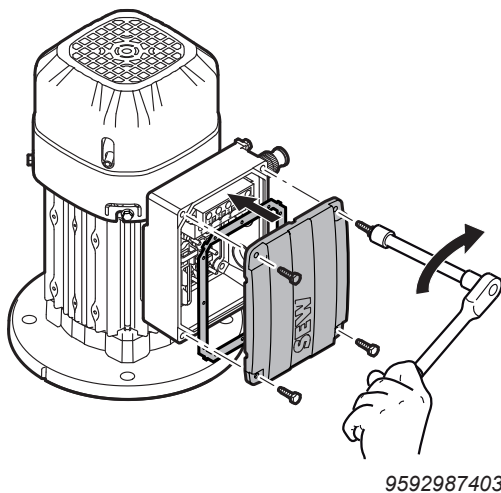
1. Wire the connection unit [1632] in accordance with the previously installed encoder type (see "Overview of wiring diagrams").



1. Fasten the short glass fiber sheathing [1552] using a cable tie.
2. Fasten the connection unit using a cable tie as close to the core end sleeves on the glass fiber sheathing as possible.



1. Screw the shielding onto the terminal box.
  - ⇒ Tightening torque [119]: 5 Nm
  - ⇒ Tightening torque [632]: 1.8 Nm



1. Install the cover of the terminal box.
2. Fasten the cover using the screws.
  - ⇒ Tightening torque 4 Nm



**8.4.3 Connecting EI7C FS – with M12 connector****NOTICE**

Improperly carried out work on drives with functionally safe motor options.

Loss of the safety function.

- Improperly carried out work on drives with functionally safe motor options can result in loss of the safety functions. This can cause injuries and damage.
- Only qualified specialists are allowed to carry out work on drives with functionally safe motor options.
- For EK8Z, EK9Z, AK8Z safety encoders, work on the MOVILINK® DDI communication unit is not permitted. Place an order with SEW-EURODRIVE Service to have any necessary work on the encoder performed.
- With the EI7C FS built-in encoder, no work may be performed on the encoder. Place an order with SEW-EURODRIVE Service to have any necessary work on the encoder performed.
- When using an encoder mounting adapter to retrofit a safety encoder, the retrofitting of the FS motor option is not identifiable on the motor, e.g. by the FS logo on the motor nameplate. If retrofitting of a safety encoder is performed by the user, the user accepts responsibility and liability. Retrofitting by SEW-EURODRIVE Service is recommended.

For further information, refer to the wiring diagrams in chapter "Overview of wiring diagrams" (→ 245).

**8.5 Connecting EI8. built-in encoders**

Note the available wiring diagrams from chapter "Overview of wiring diagrams" (→ 245) and the assembly procedure from "EI8. built-in encoders and EI8A encoder mounting adapters – DRN../DRU../DR2..71 – 132S motors, with connection unit" (→ 186).

## 8.6 Connecting .K8./.K9./.V8. conical encoders

Note the available wiring diagrams from chapter "Overview of wiring diagrams" (→  245) and the assembly procedure from "Removing/installing conical encoders and encoder mounting adapters for conical encoders" (→  194).

### 8.6.1 Connecting the .K8./.K9./.V8. conical encoder with integrated A1GA/A2GA encoder connector

1. Loosen the screws of the connection cover [619] and remove it.
2. Connect the encoder as shown in the wiring diagram. Observe the stripping length of 8 mm when connecting the encoder to the terminal block in the connection adapter [U]. The cable gland of the included connection adapter is suitable for cables with a diameter of 5 to 9.5 mm. Ensure that this clamping range is maintained. Note that the supplied cable gland must not be replaced with other types, as it enables use in potentially explosive atmospheres and provides suitable shielding against interference.
3. Place the connection cover [619] onto the connection adapter [U].
4. For safety encoders: Wet the screws that are required in the following step with LOCTITE® 241.
5. Screw the screws [E] through the bores in the connection cover [619] and into the bores in the connection adapter [U].
  - ⇒ Secure the screws [E] using a medium-strength thread locker. The tightening torque is 2.25 Nm.
6. Tighten the cable gland.
  - ⇒ Tightening torque 2 Nm ± 15%
7. Provide a strain relief in accordance with IEC 60079-14. Do not damage the signal cables.
8. EK8X encoder: Set the desired encoder resolution using the rotary switch in the connection cover [619].

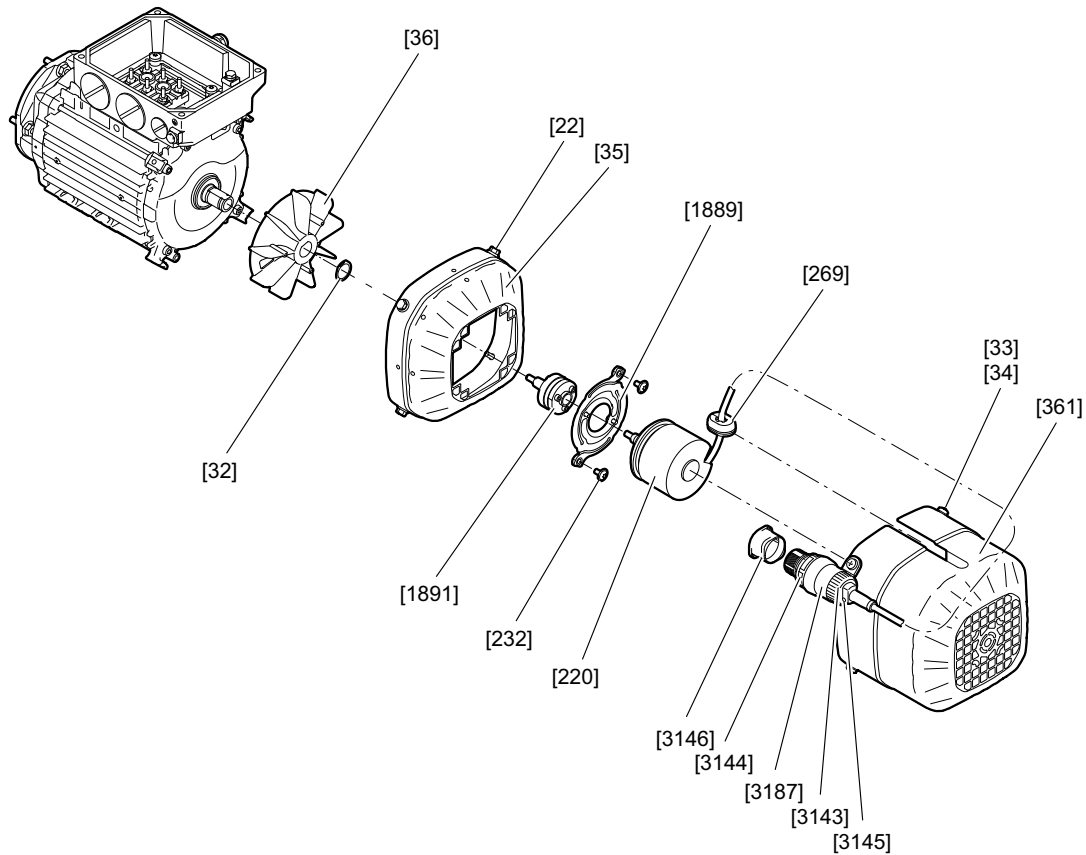
## INFORMATION



The connection covers of the EK8X and .K8./.V8. encoder designs are not compatible. Observe the following information to avoid damaging the encoder:

- Do not use a .K8./.V8. connection cover with the EK8X encoder design.
- Do not use an EK8X connection cover with the .K8./.V8. encoder designs.

### 8.6.2 Connecting the .K8./.K9./.V8. conical encoder with cable and M23 connector directly on the KIGA encoder

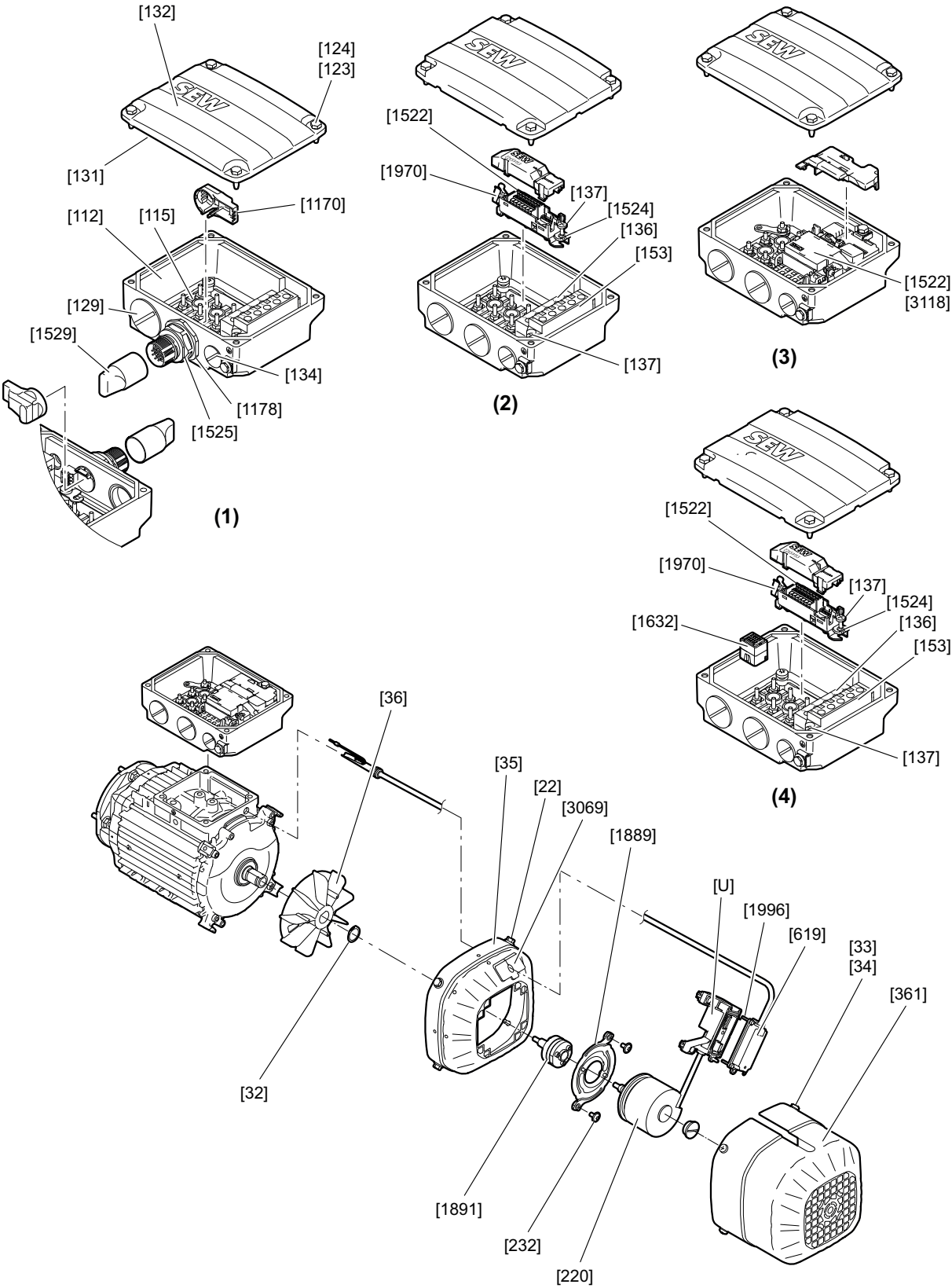


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✓ Required resources: Screwdriver

1. Release the transport protection clamp if present.
2. Remove the protection cap [3146] of the M23 connector [3144].
3. Connect the M23 connector [3144] to the corresponding connection cable with the M23 mating connector.
4. Ensure adequate strain relief.

8.6.3 Terminal box connections



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**(1) – Connecting the .K8./V8. conical encoder with the M23 connector on the AIGA/AIGB terminal box**

✓ Required resources: Screwdriver

1. Remove the protection cap [1529] of the M23 connector [1525].
2. Connect the M23 connector [1525] to the corresponding connection cable with the M23 mating connector [1].

**(2) – Connecting the .K8./V8. conical encoder with the connection unit in the terminal box**

1. Unscrew the screws [123] to remove the terminal box cover [132].
2. Remove the cover of the connection unit [1522] by pressing the cover on both sides behind the cable bushing.
3. Connect the customer's evaluation unit for the encoder to the connection unit [1522] with a shield plate [1970]. Attach the cover of the connection unit [1522].
4. Mount the terminal box cover [132] using the screws [123] (4 × M5 SW8).  
⇒ Tightening torque 4 Nm

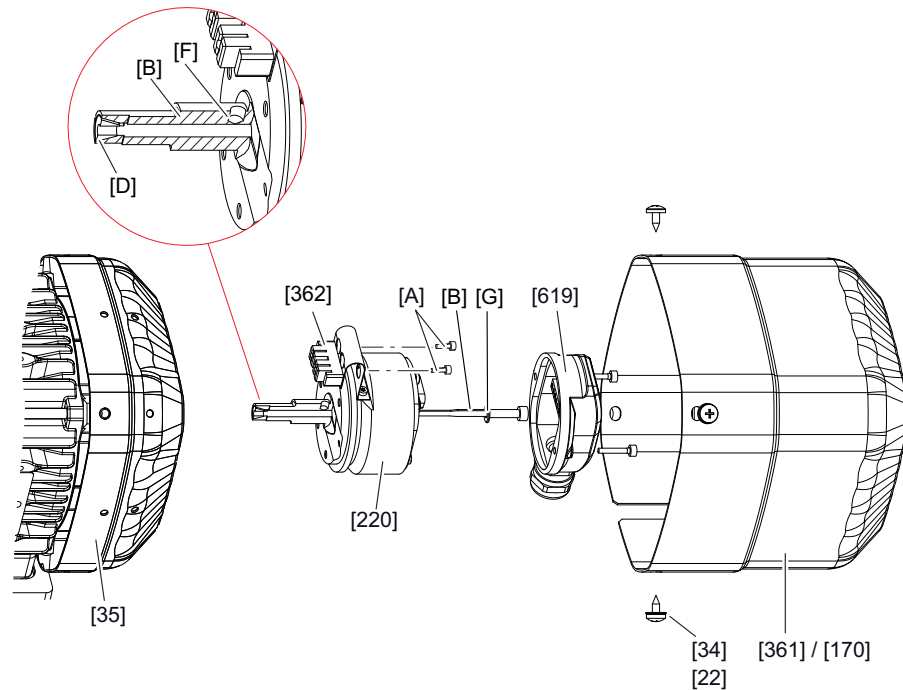
**(3) – Connecting the .K8./V8. conical encoder with DDI KD1, KDB, KD, or KDD**

For more information, refer to the addendum to the "AC motors with MOVILINK® DDI interface" operating instructions.

**(4) – Connecting the EK8X conical encoder with the connection unit in the terminal box**

1. Unscrew the screws [123] to remove the terminal box cover [132].
2. Remove the cover of the connection unit [1522] by pressing the cover on both sides behind the cable bushing.
3. Connect the customer's evaluation unit for the encoder to the connection unit [1522] with a shield plate [1970]. Attach the cover of the connection unit [1522].
4. Mount the terminal box cover [132] using the screws [123] (4 × M5 SW8).  
⇒ Tightening torque 4 Nm

## 8.7 Connecting .S7./V7./G7. spread-shaft encoders/plug-in-shaft encoders



1. Remove the safety cover [361] or the forced cooling fan [170] if applicable.
2. Loosen the screws of the connection cover [619] and remove it.
3. Connect the encoder as shown in the wiring diagram.
4. Screw on the connection cover [619].
  - ⇒ For size 71 – 132S: Tightening torque 2.25 Nm
  - ⇒ For sizes 132M – 315: Tightening torque 2.25 Nm ± 10%
5. Tighten the cable gland.
  - ⇒ Tightening torque 2 Nm ± 15%
6. Provide a strain relief in accordance with IEC 60079-14. Do not damage the signal cables.
7. Mount the safety cover [361] or the forced cooling fan [170] if applicable.
  - ⇒ Tightening torque for screw [22]: 3.3 Nm
  - ⇒ Tightening torque for screw [34]: 2 Nm

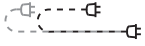
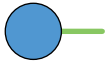
## **8.8 Connecting third-party encoders**

When using third-party encoders, observe the installation requirements of the supplied manufacturer's operating instructions.

## 9 Connection technology

### 9.1 Overview of encoder cables for DR.. motors – MOVI-C® inverters

#### 9.1.1 Key

| Symbol                                                                            | Meaning                                                              |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------|
|  | Cable carrier installation                                           |
|  | Fixed installation                                                   |
|  | Cable with connector                                                 |
|  | Cable with right-angled connector                                    |
|  | Cable with connection cover for connection with integrated connector |
|  | Cable with open end, cut off or with core end sleeves                |
|  | Extension cable                                                      |

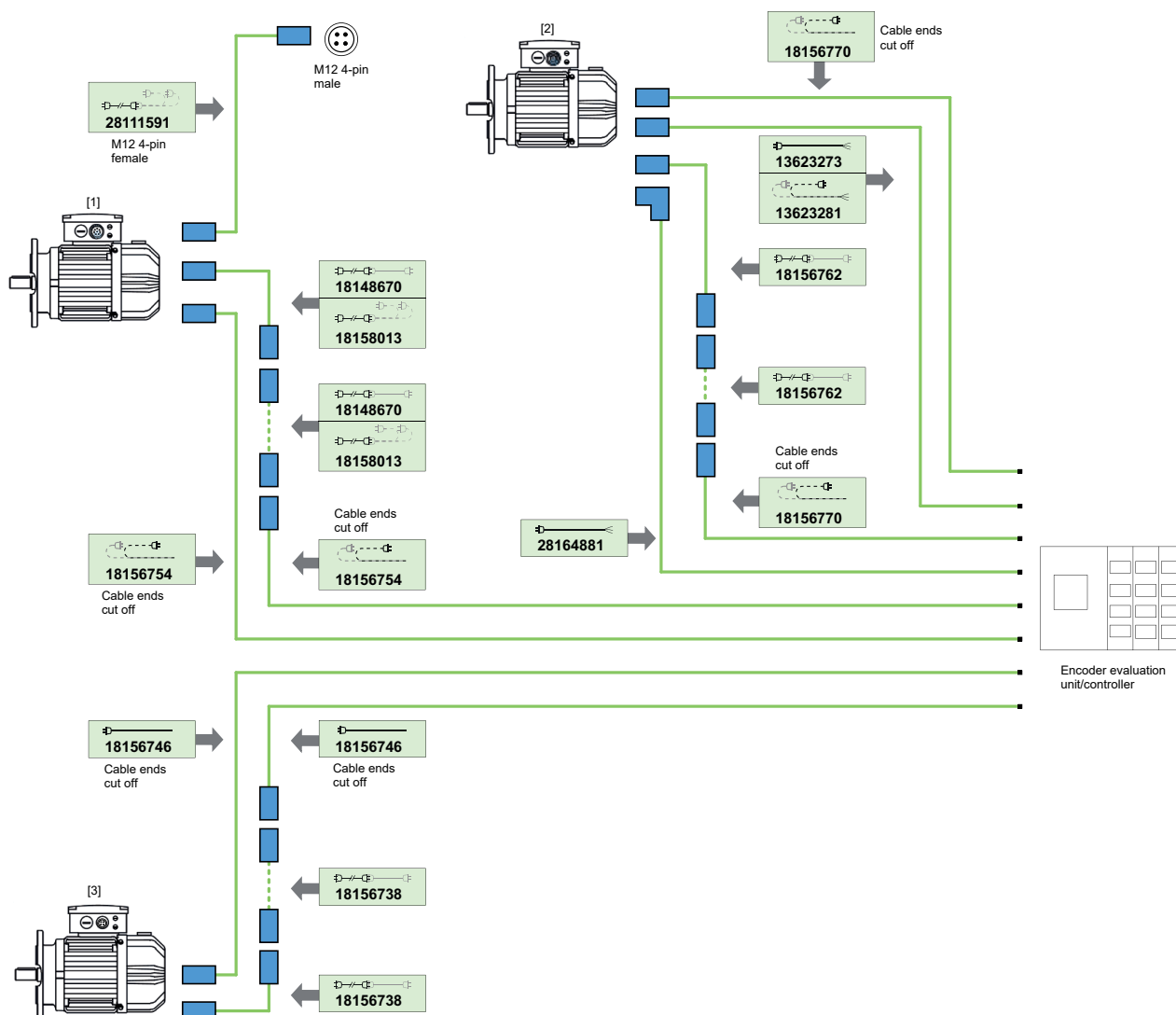
| Abbreviation | Full term                                                               |
|--------------|-------------------------------------------------------------------------|
| CL           | Ring cable lug                                                          |
| CES          | Core end sleeve                                                         |
| TF           | Temperature sensor for motor protection without temperature measurement |
| PI           | Temperature sensor for motor protection with temperature measurement    |

#### 9.1.2 Connector codes from SEW-EURODRIVE

|           |   |                                                                                                                                                                                |
|-----------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AIGA      | = | M23 without temperature sensor, e.g. /TF or /PI                                                                                                                                |
| AIGB      | = | M23 with temperature sensor, e.g. /TF or /PI                                                                                                                                   |
| AVSE      | = | M12 without inverted signal tracks /A, /B and without temperature sensor, e.g. /TF or /PI                                                                                      |
| AVRE      | = | M12 with non-inverted signal tracks A, B and with inverted signal tracks /A, /B and with optional temperature sensor, e.g. /TF or /PI. With EI7C FS safety encoder without TF. |
| AE + AVRE | = | Connection unit + M12 with non-inverted signal tracks and with optional temperature sensor /TF or /PI                                                                          |
| AE        | = | Terminal strip/connection unit in the terminal box                                                                                                                             |
| A1GA      | = | Integrated encoder connector installed on the side or rear of the encoder cover, delivered with connection cover                                                               |
| A2GA      | = | Integrated encoder connector installed on the side or rear of the encoder cover, delivered without connection cover                                                            |
| KIGA      | = | M23 connector with 0.36 m cable directly installed on the encoder, delivered without mating connector                                                                          |



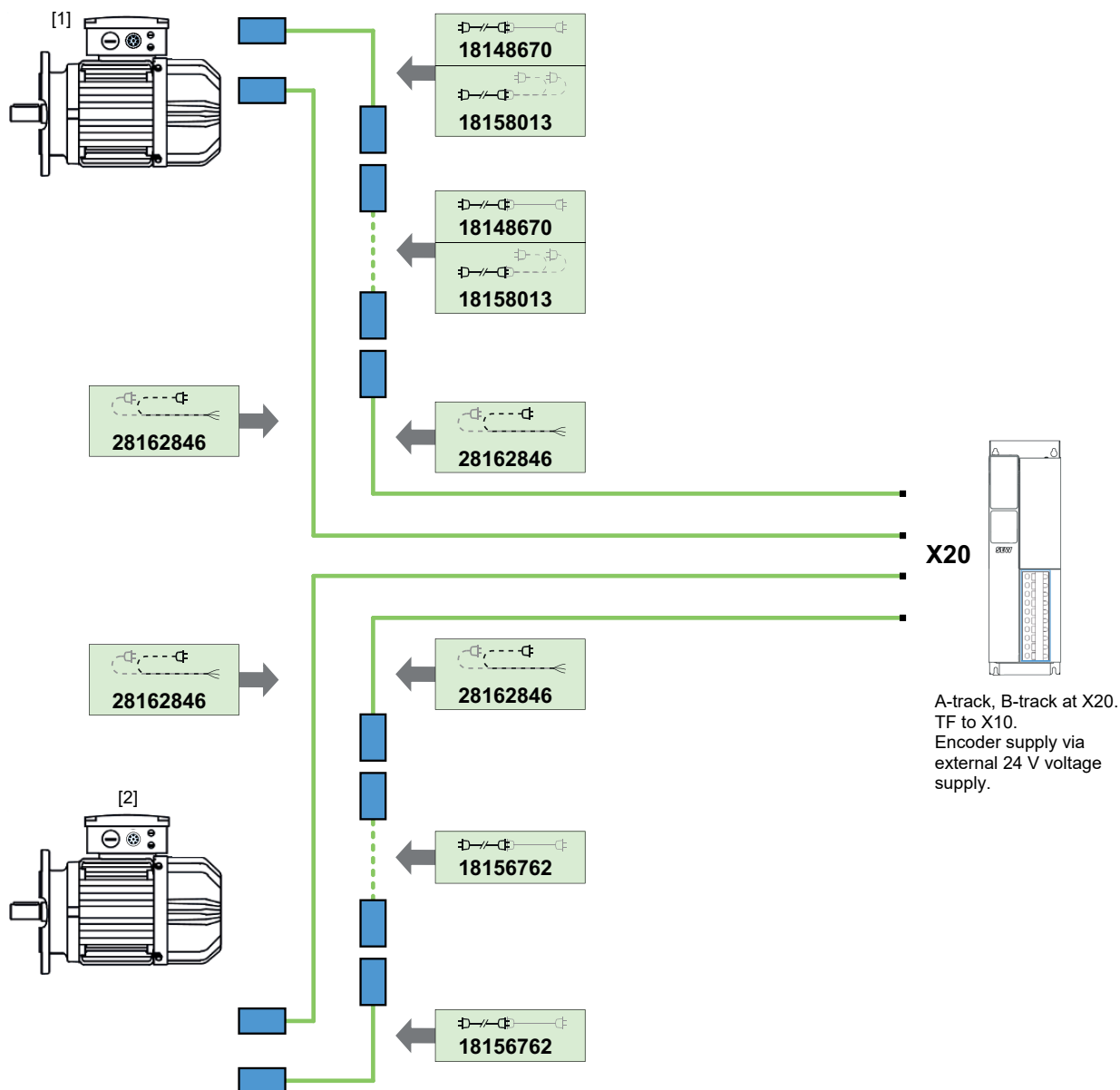
### 9.1.3 EI7. encoder – Terminal strip or M12 on the terminal box – AVRE, AVSE – Encoder evaluation unit/controller



9007249702053515

|     |                                                                                                                                                                                                                                            |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] | DR.. motors with 8-pin M12 connector for encoder signals on the terminal box, without TF.<br>Connection type: AVSE<br>Encoder: EI7.<br>The signals for thermal monitoring of the motor are not transmitted in the encoder cable.           |
| [2] | DR.. motors with 8-pin M12 connector for encoder signals and TF thermal monitoring on the terminal box.<br>Connection type: AVRE<br>Encoder: EI7.<br>The signals for thermal monitoring of the motor are transmitted in the encoder cable. |
| [3] | DR.. motors with 4-pin M12 connector for encoder signals on the terminal box, without TF.<br>Connection type: AVSE<br>Encoder: EI7.<br>The signals for thermal monitoring of the motor are not transmitted in the encoder cable.           |

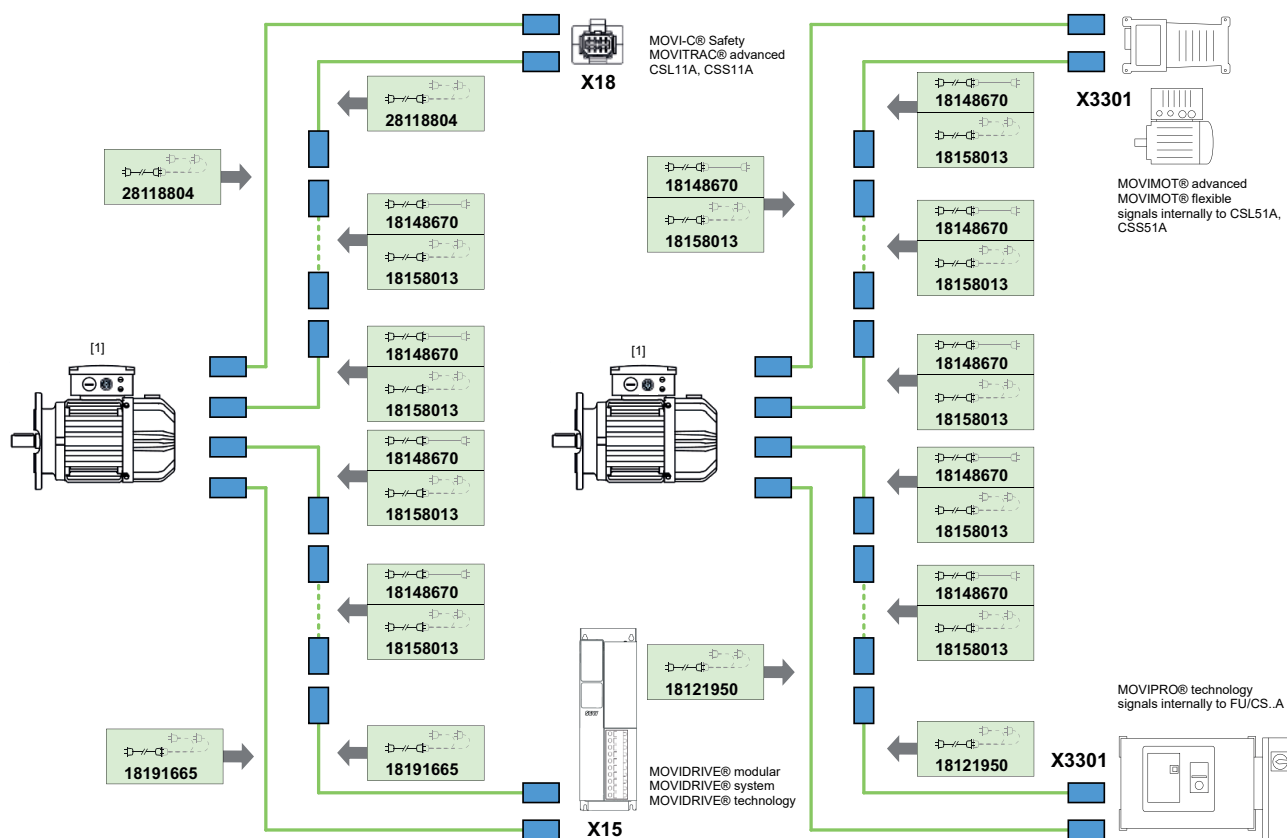
### 9.1.4 EI7. encoder – M12 on the terminal box – AVRE, AVSE – MOVITRAC® advanced



9007249702704523

|     |                                                                                                                                                                                                                                            |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] | DR.. motors with 8-pin M12 connector for encoder signals on the terminal box, without TF.<br>Connection type: AVSE<br>Encoder: EI7.<br>The signals for thermal monitoring of the motor are not transmitted in the encoder cable.           |
| [2] | DR.. motors with 8-pin M12 connector for encoder signals and TF thermal monitoring on the terminal box.<br>Connection type: AVRE<br>Encoder: EI7.<br>The signals for thermal monitoring of the motor are transmitted in the encoder cable. |

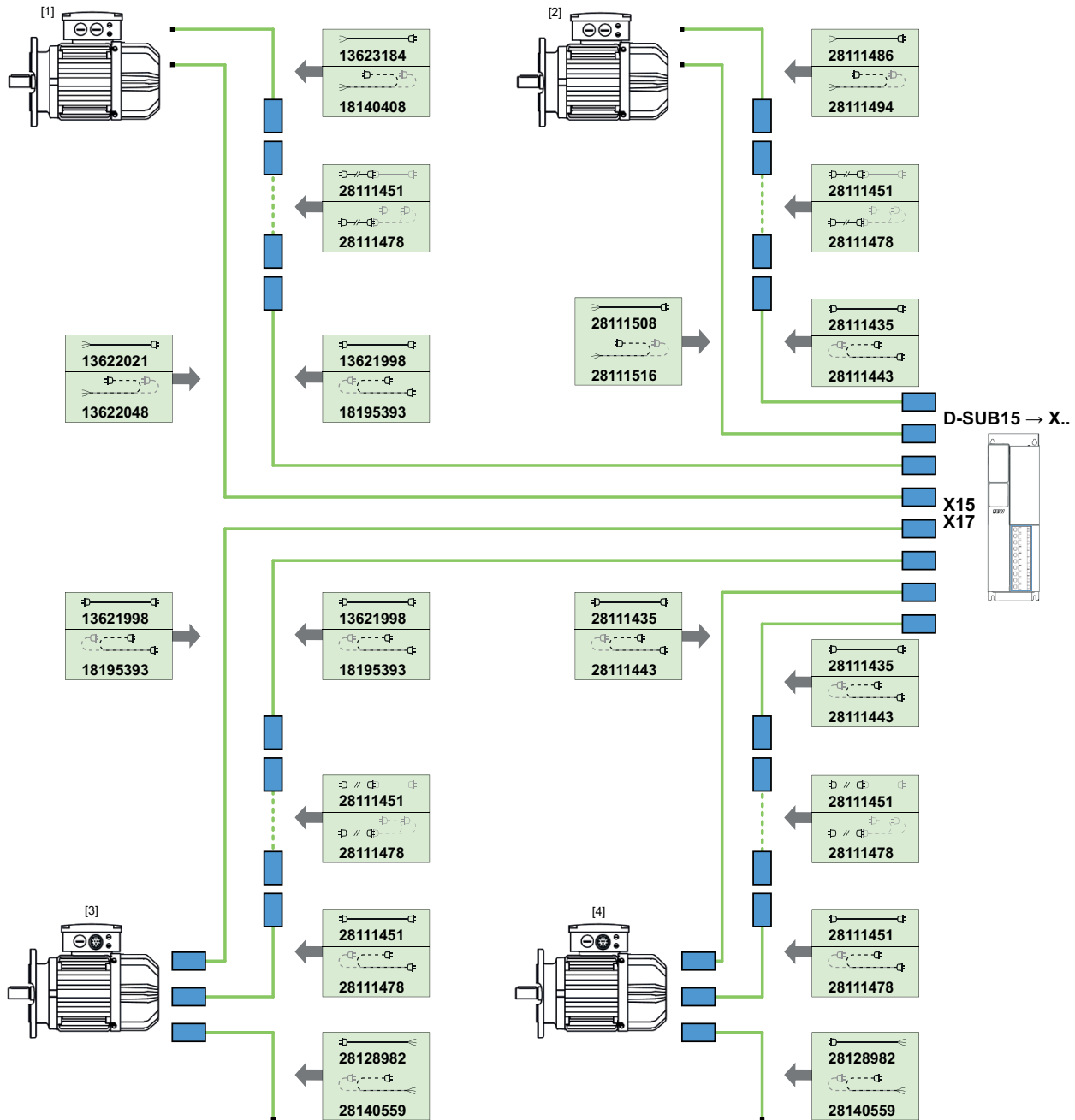
**9.1.5 EI7C FS safety encoder – M12 on the terminal box – AVRE – MOVIDRIVE®/MOVITRAC® advanced/MOVIMOT® advanced/MOVIMOT® flexible/MOVIPRO® technology**



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|     |                                                                                                                                                                                                                                                                    |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] | <p>DR.. motors with 8-pin M12 connector for encoder signals on the terminal box, without TF.<br/>         Connection type: AVRE<br/>         Encoder: EI7C FS</p> <p>The signals for thermal monitoring of the motor are not transmitted in the encoder cable.</p> |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 9.1.6 EI8. encoder – Terminal strip or M23 on the terminal box – AIGA, AIGB – MOVIDRIVE®

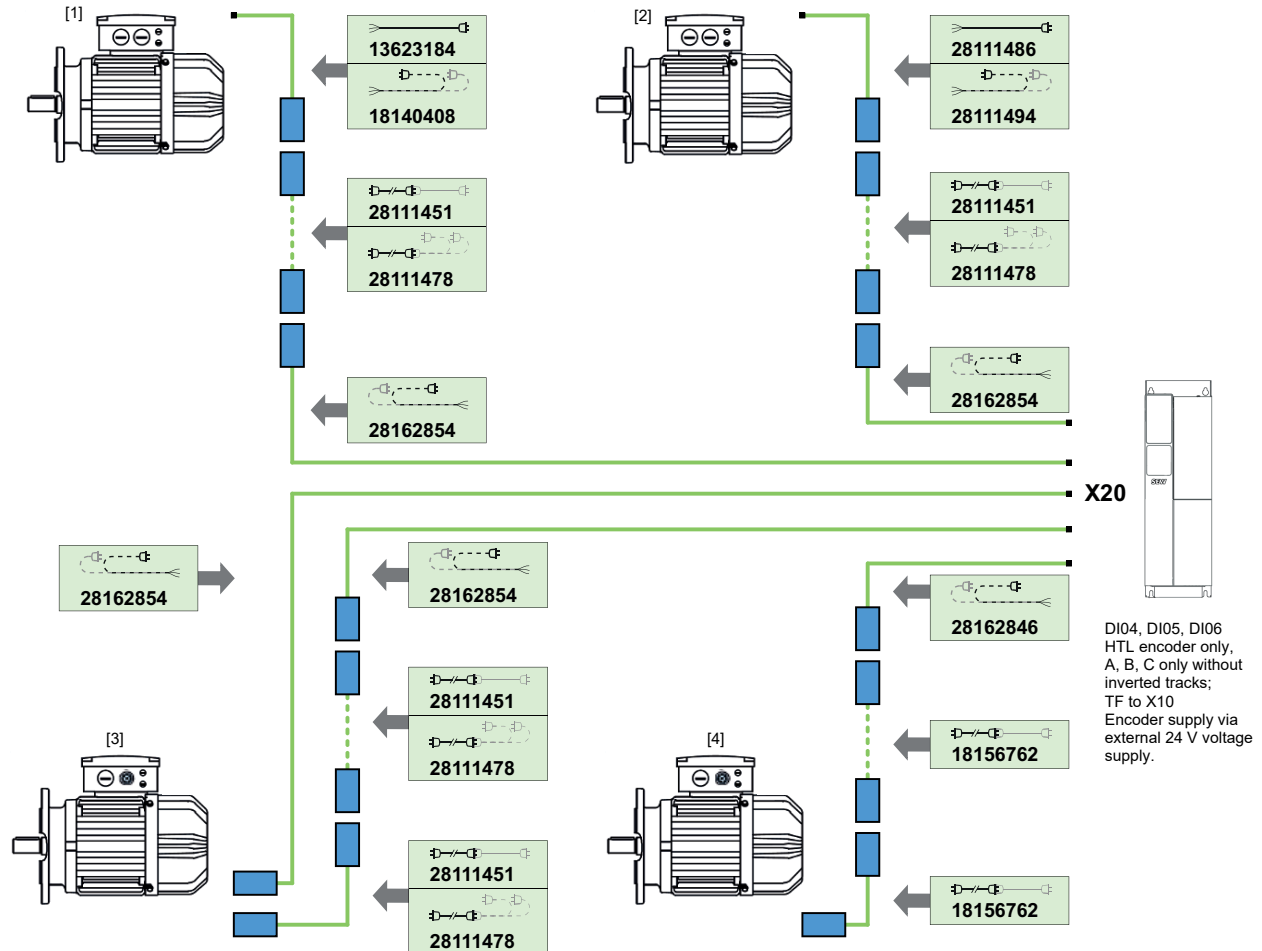


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|             |                                                                                                                                                                                                                                  |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D-sub → X.. | X15: Connection of encoder/resolver to a MOVIDRIVE® modular/system/technology basic unit<br>X17: CES11A multi-encoder card                                                                                                       |
| [1]         | DR.. motors with terminal strip in the terminal box for encoder signals, without TF.<br>Encoder: EI8R, EI8C<br>The signals for thermal monitoring of the motor are not transmitted in the encoder cable.                         |
| [2]         | DR.. motors with terminal strip in the terminal box for encoder signals and TF thermal monitoring.<br>Encoder: EI8R, EI8C<br>The signals for thermal monitoring of the motor are transmitted in the encoder cable.               |
| [3]         | DR.. motors with M23 connector on the terminal box for encoder signals, without TF.<br>Connection type: AIGA<br>Encoder: EI8R, EI8C<br>The signals for thermal monitoring of the motor are not transmitted in the encoder cable. |

|     |                                                                                                                                                                                                                                            |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [4] | DR.. motors with M23 connector on the terminal box for encoder signals and TF thermal monitoring.<br>Connection type: AIGB<br>Encoder: EI8R, EI8C<br>The signals for thermal monitoring of the motor are transmitted in the encoder cable. |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 9.1.7 EI8C encoder – terminal strip, M23, or M12 on the terminal box – AIGA, AIGB, AVRE – MOVITRAC® advanced



9007249705367691

|     |                                                                                                                                                                                                                                                       |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] | DR.. motors with terminal strip in the terminal box for encoder signals without TF thermal monitoring.<br>Encoder: EI8C<br>The signals for thermal monitoring of the motor are not transmitted in the encoder cable.                                  |
| [2] | DR.. motors with terminal strip in the terminal box for encoder signals and TF thermal monitoring.<br>Encoder: EI8C<br>The signals for thermal monitoring of the motor are transmitted in the encoder cable.                                          |
| [3] | DR.. motors with M23 connector on the terminal box for encoder signals with or without TF thermal monitoring.<br>Connection type: AIGA/AIGB<br>Encoder: EI8C<br>The signals for thermal monitoring of the motor are transmitted in the encoder cable. |
| [4] | DR.. motors with M12 connector on the terminal box for encoder signals with or without TF thermal monitoring.<br>Connection type: AVRE<br>Encoder: EI8C<br>The signals for thermal monitoring of the motor are transmitted in the encoder cable.      |

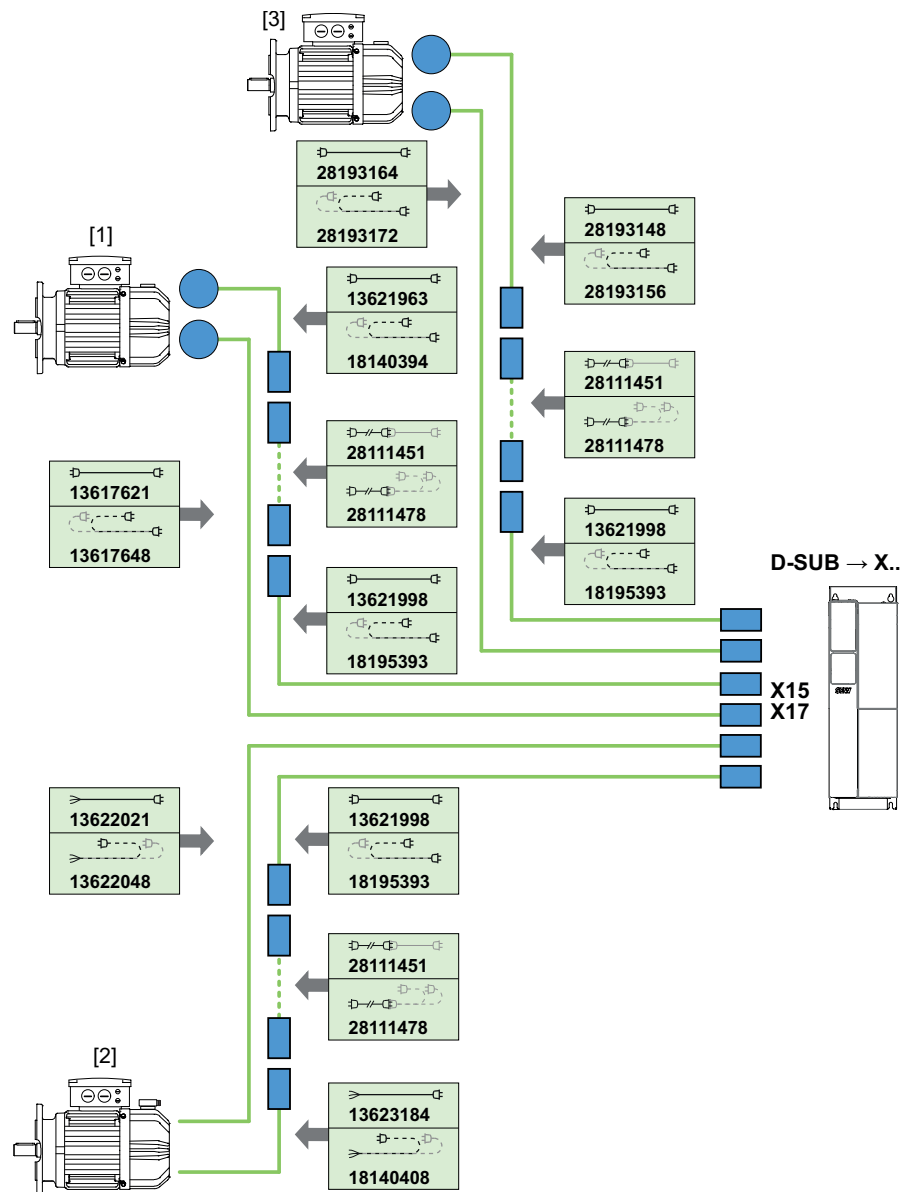
## 9.1.8 Encoder .K8./V8. - Integrated encoder connector - A1GA, A2GA - MOVIDRIVE®

## INFORMATION



The connection covers of the EK8X and .K8./V8. encoder designs are not compatible. Observe the following information to avoid damaging the encoder:

- Do not use a .K8./V8. connection cover with the EK8X encoder design.
- Do not use an EK8X connection cover with the .K8./V8. encoder designs.



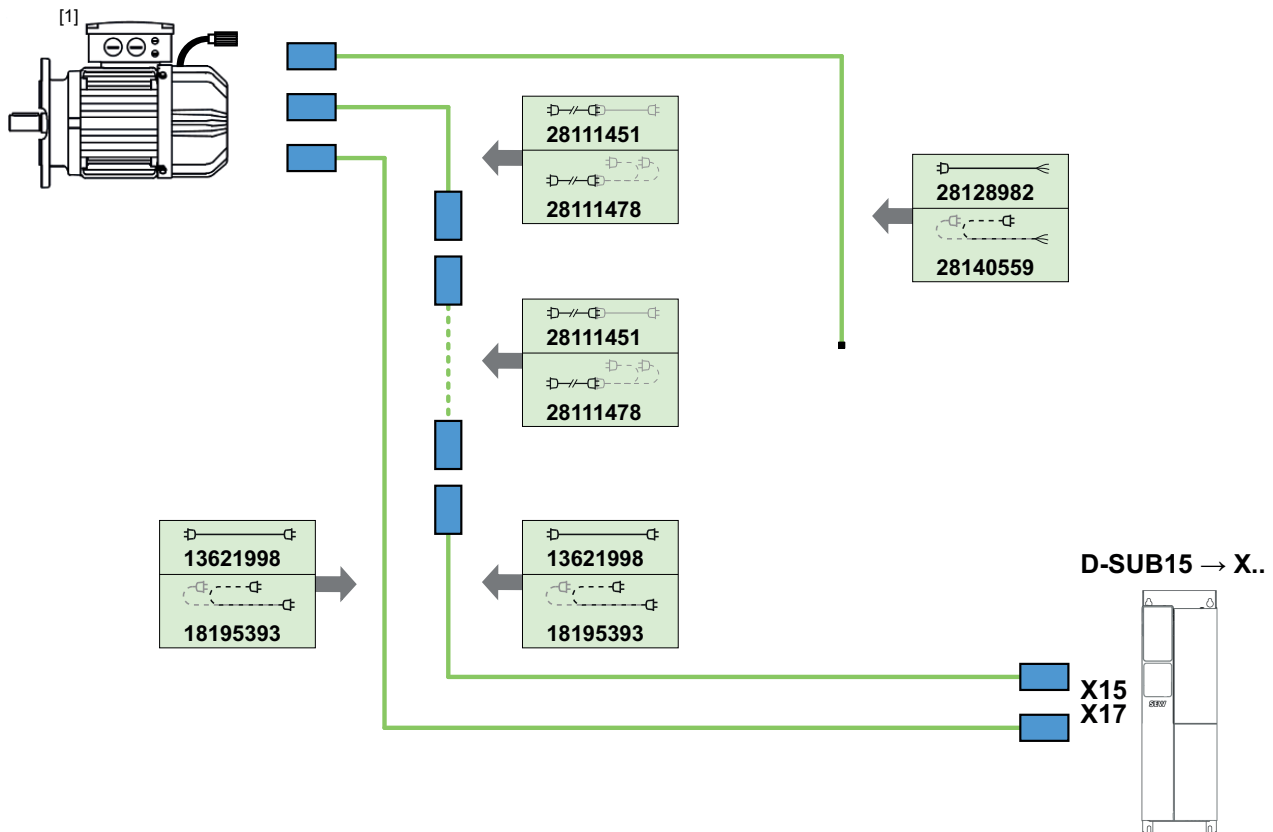
27021637631267339

|             |                                                                                                                                                                                                                    |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D-sub → X.. | <p>X15: Connection of encoder/resolver to a MOVIDRIVE® modular/system/technology basic unit</p> <p>X17: CES11A multi-encoder card</p> <p>A..Y encoders can be connected only to the CES11A multi-encoder card.</p> |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|     |                                                                                                                                                                                                                                                                                                                                    |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] | <p>DR.. motors with integrated connector for encoder signals without connection cover on the motor, with connection cover on the cable.</p> <p>Connection type: A2GA</p> <p>Encoder: E.8S, E.8R, E.8C, A.8W, A.8Y, A.8H, EK8W</p> <p>The signals for thermal monitoring of the motor are not transmitted in the encoder cable.</p> |
| [2] | <p>DR.. motors with integrated connector for encoder signals with connection cover on the motor and open ends on the cable.</p> <p>Connection type: A1GA</p> <p>Encoder: E.8S, E.8R, E.8C, A.8W, A.8Y, A.8H, EK8W, EK8X</p> <p>The signals for thermal monitoring of the motor are not transmitted in the encoder cable.</p>       |
| [3] | <p>DR.. motors with integrated connector for encoder signals without connection cover on the motor, with connection cover on the cable.</p> <p>Connection type: A2GA</p> <p>Encoder: EK8X</p> <p>The signals for thermal monitoring of the motor are not transmitted in the encoder cable.</p>                                     |



## 9.1.9 Encoder .K8./V8. – M23 on the encoder – KIGA – MOVIDRIVE®



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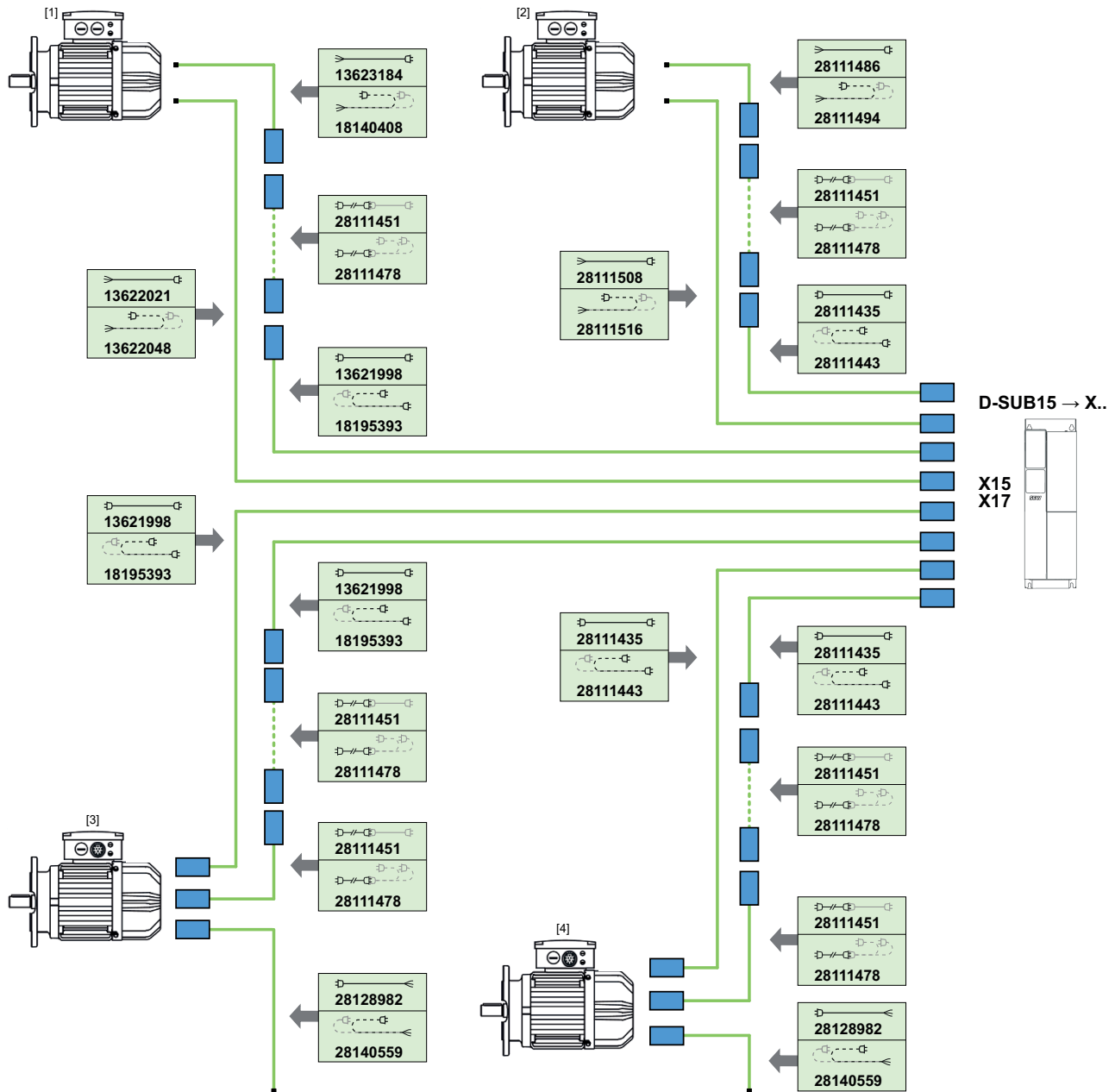
|             |                                                                                                                                                                                                                   |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D-sub → X.. | X15: Connection of encoder/resolver to a MOVIDRIVE® modular/system/technology basic unit<br>X17: CES11A multi-encoder card<br>A..Y encoders can be connected only to the CES11A multi-encoder card.               |
| [1]         | DR.. motors with M23 connector on the encoder for encoder signals.<br>Connection type: KIGA<br>Encoder: .K8./K9./V8.<br>The signals for thermal monitoring of the motor are not transmitted in the encoder cable. |

## INFORMATION



The strain relief of the encoder connection cable for KIGA connection variant must be ensured by the customer.

### 9.1.10 Encoder .K8. – Terminal strip or M23 on the terminal box – AIGA, AIGB – MOVIDRIVE®



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|             |                                                                                                                                                                                                                   |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D-sub → X.. | X15: Connection of encoder/resolver to a MOVIDRIVE® modular/system/technology basic unit<br>X17: CES11A multi-encoder card<br>A..Y encoders can be connected only to the CES11A multi-encoder card.               |
| [1]         | DR.. motors with terminal strip in the terminal box for encoder signals without thermal monitoring.<br>Encoder: .K8.<br>The signals for thermal monitoring of the motor are not transmitted in the encoder cable. |
| [2]         | DR.. motors with terminal strip in the terminal box for encoder signals and TF thermal monitoring.<br>Encoder: .K8.<br>The signals for thermal monitoring of the motor are transmitted in the encoder cable.      |
| [3]         | DR.. motors with M23 connector on the terminal box for encoder signals.<br>Connection type: AIGA<br>Encoder: .K8.<br>The signals for thermal monitoring of the motor are not transmitted in the encoder cable.    |

|     |                                                                                                                                                                                                                                      |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [4] | DR.. motors with M23 connector on the terminal box for encoder signals and TF thermal monitoring.<br>Connection type: AIGB<br>Encoder: .K8.<br>The signals for thermal monitoring of the motor are transmitted in the encoder cable. |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

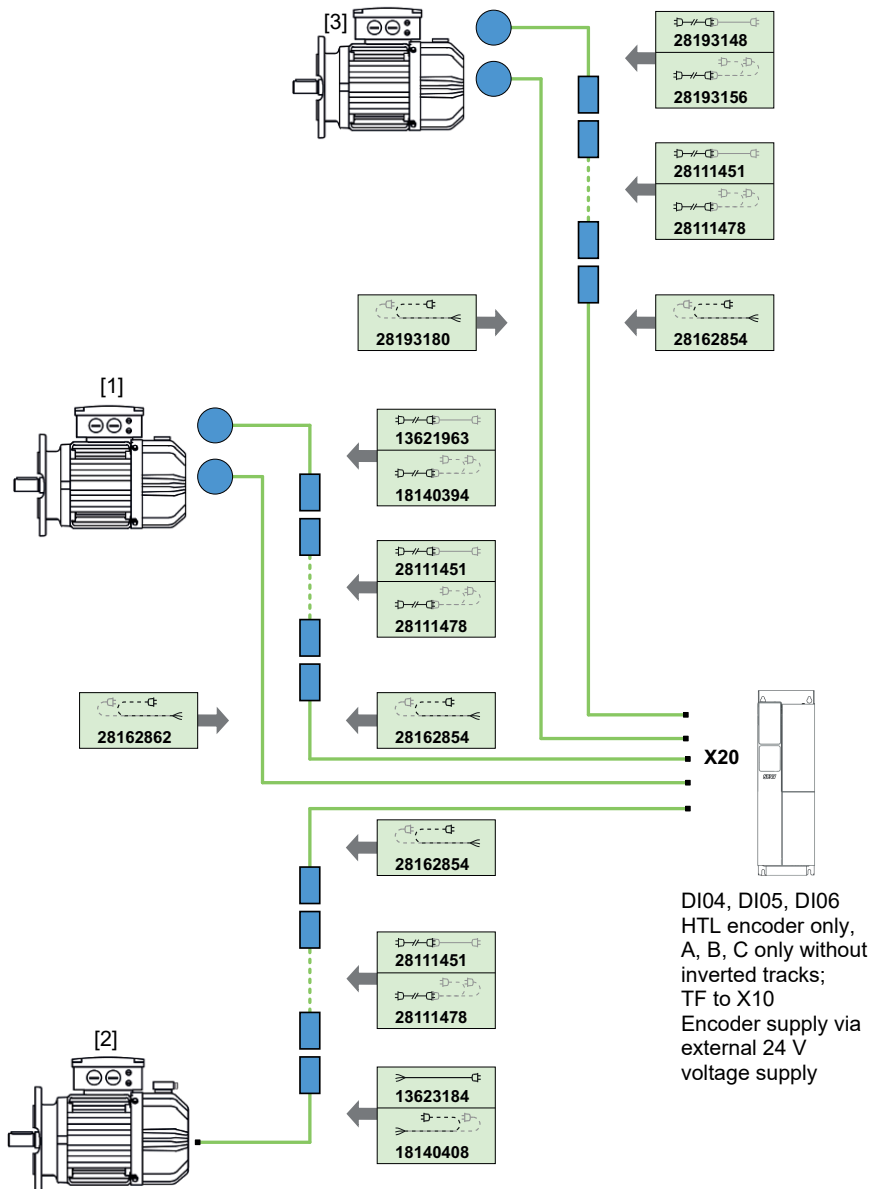
### 9.1.11 EK8C/EV8C/EK8X encoder – Integrated encoder connector – A1GA, A2GA – MOVITRAC® advanced

## INFORMATION



The connection covers of the EK8X and .K8./V8. encoder designs are not compatible. Observe the following information to avoid damaging the encoder:

- Do not use a .K8./V8. connection cover with the EK8X encoder design.
- Do not use an EK8X connection cover with the .K8./V8. encoder designs.

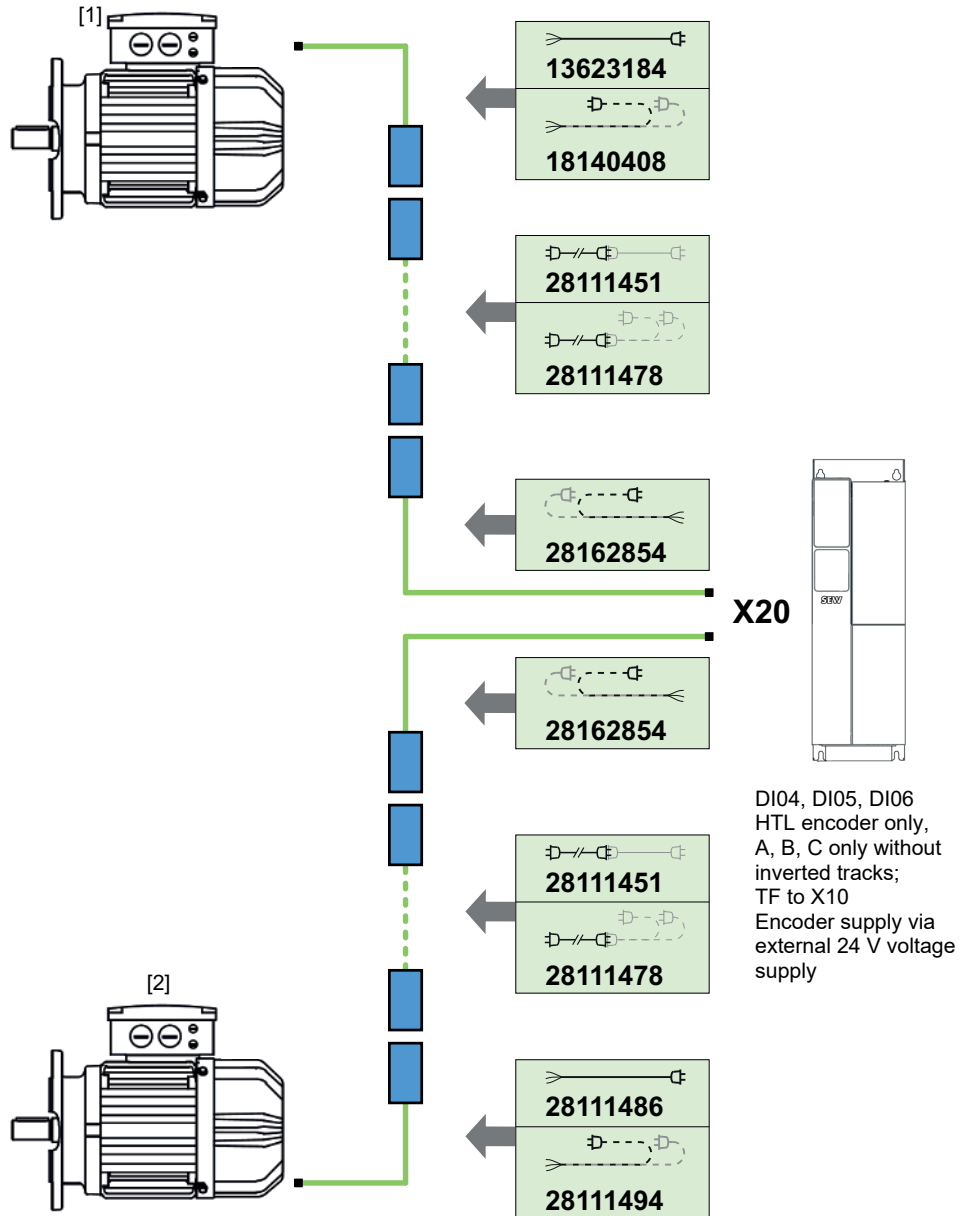


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|     |                                                                                                                                                                                                                                                                                                                         |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] | <p>DR.. motors with integrated connector for encoder signals without connection cover on the motor, with connection cover on the cable.<br/>         Connection type: A2GA.<br/>         Encoder: EK8C, EV8C<br/>         The signals for thermal monitoring of the motor are not transmitted in the encoder cable.</p> |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|     |                                                                                                                                                                                                                                                                                                 |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [2] | <p>DR.. motors with integrated connector for encoder signals with connection cover on the motor and open ends on the cable.</p> <p>Connection type: A1GA.</p> <p>Encoder: EK8C, EV8C</p> <p>The signals for thermal monitoring of the motor are not transmitted in the encoder cable.</p>       |
| [3] | <p>DR.. motors with integrated connector for encoder signals without connection cover on the motor, with connection cover on the cable.</p> <p>Connection type: A2GA.</p> <p>Encoder: EK8X</p> <p>The signals for thermal monitoring of the motor are not transmitted in the encoder cable.</p> |

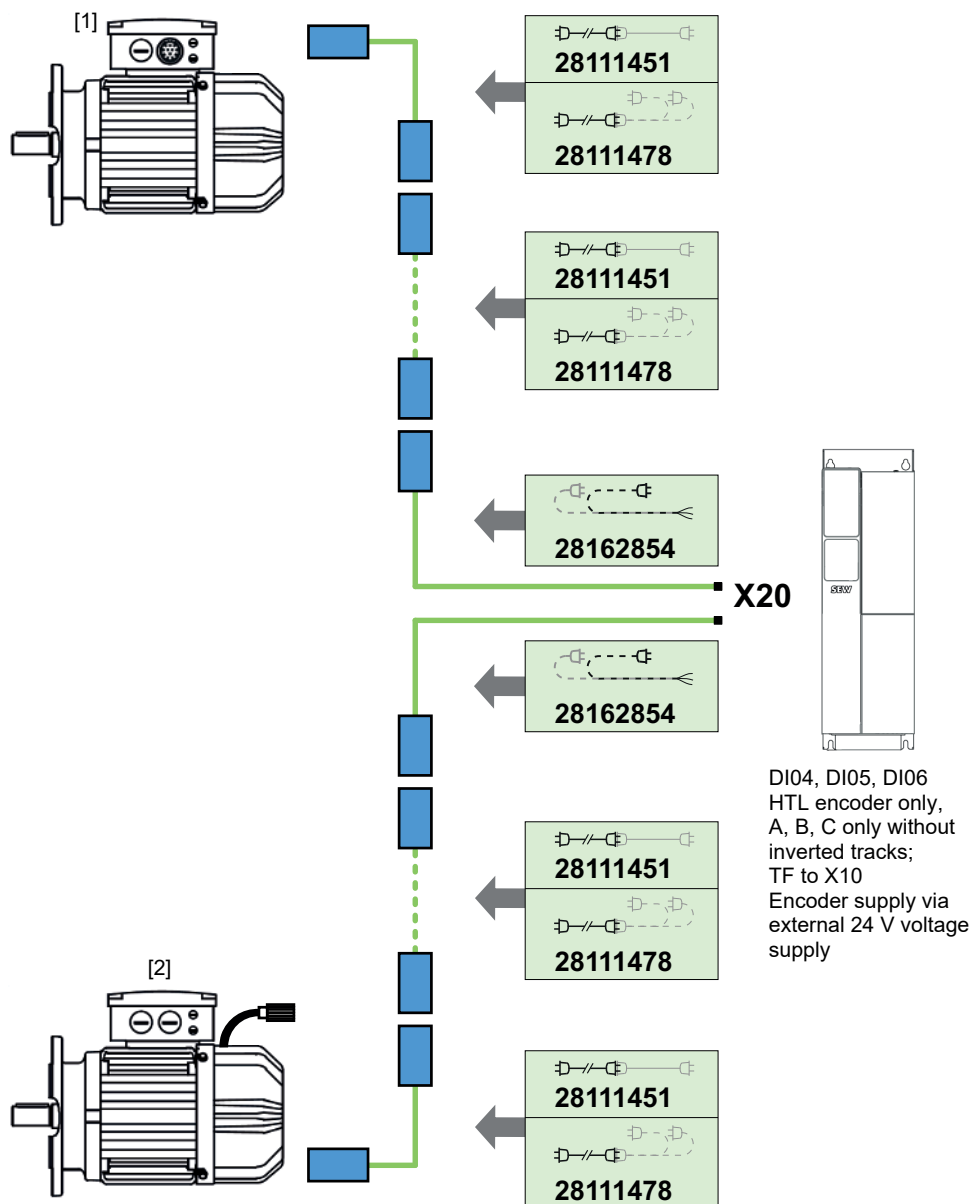
### 9.1.12 EK8C/EK8X encoder – Terminal strip in the terminal box – MOVITRAC® advanced



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|     |                                                                                                                                                                                                                            |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] | DR.. motors with terminal strip in the terminal box for encoder signals without TF thermal monitoring.<br>Encoder: EK8C, EK8X<br>The signals for thermal monitoring of the motor are not transmitted in the encoder cable. |
| [2] | DR.. motors with terminal strip in the terminal box for encoder signals with TF thermal monitoring.<br>Encoder: EK8C, EK8X<br>The signals for thermal monitoring of the motor are transmitted in the encoder cable.        |

### 9.1.13 EK8C/EV8C encoder – M23 on the encoder or terminal box – AIGA, AIGB, KIGA – MOVITRAC® advanced



9007249709756811

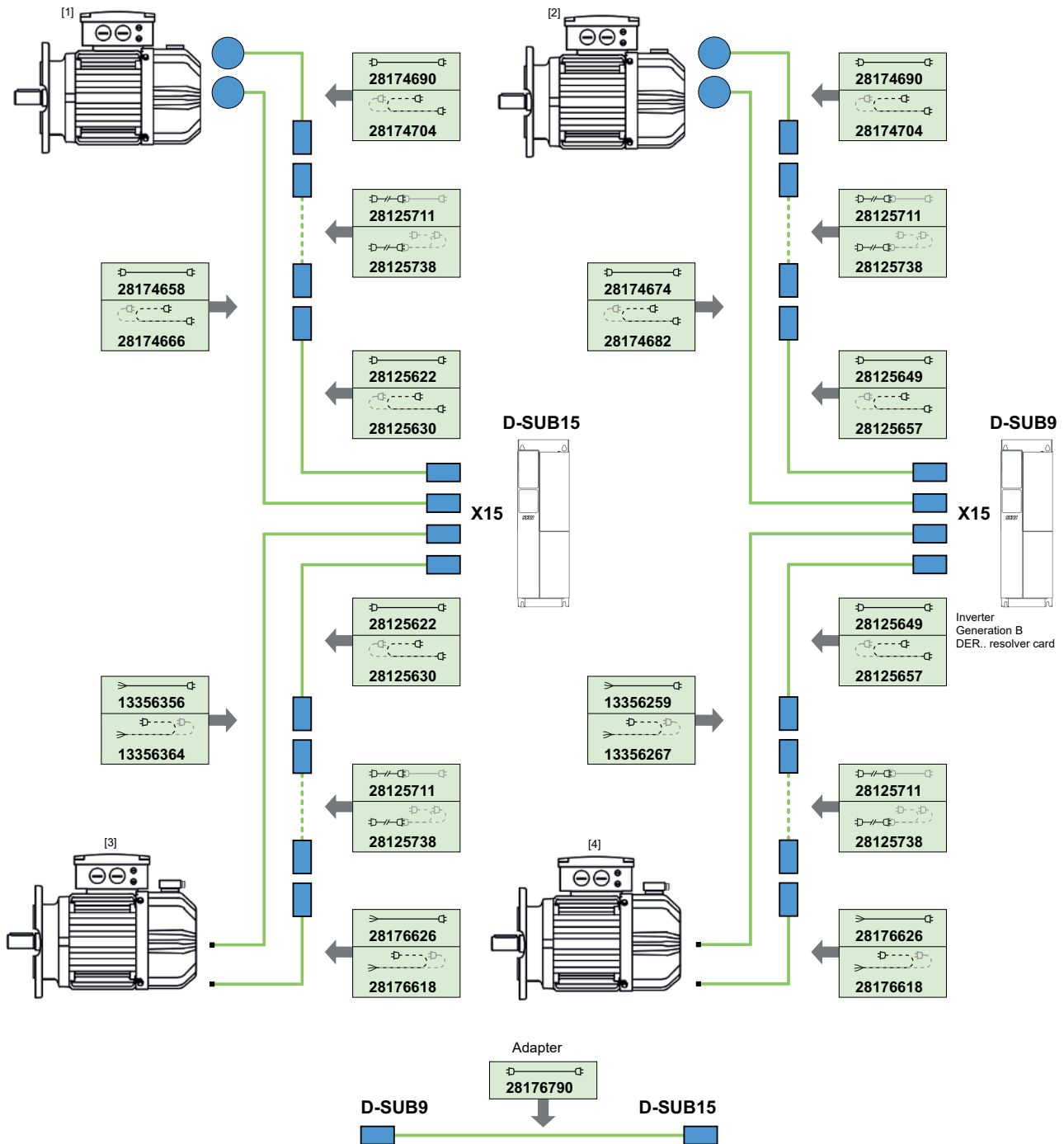
|     |                                                                                                                                                                                                                                             |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] | DR.. motors with M23 on the terminal box for encoder signals with or without TF thermal monitoring.<br>Connection type: AIGA/AIGB<br>Encoder: EK8C<br>The signals for thermal monitoring of the motor are transmitted in the encoder cable. |
| [2] | DR.. motors with M23 connector on the encoder for encoder signals.<br>Connection type: KIGA<br>Encoder: EK8C, EV8C<br>The signals for thermal monitoring of the motor are not transmitted in the encoder cable.                             |



## INFORMATION

The strain relief of the encoder connection cable for KIGA connection variant must be ensured by the customer.

### 9.1.14 RK8M encoder - Integrated encoder connector - A1GA, A2GA - MOVIDRIVE®



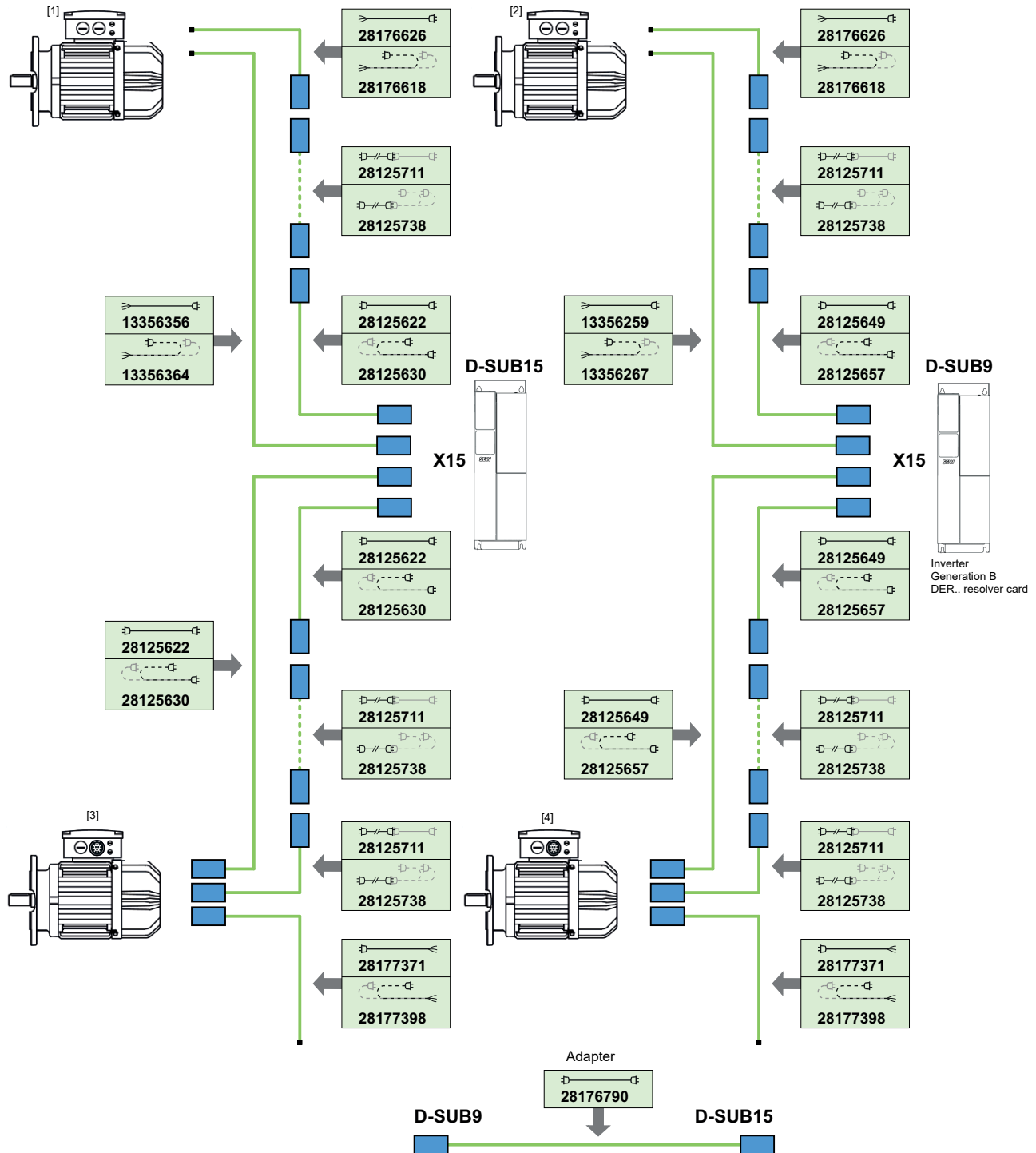
9007249709762955

|     |                                                                                                                                                                                                                                                                                                                    |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] | DR.. motors with integrated connector for encoder signals without connection cover on the motor, with connection cover on the cable.<br>Connection type: A2GA<br>Encoder: RK8M<br>Connector on the inverter: D-Sub15.<br>The signals for thermal monitoring of the motor are not transmitted in the encoder cable. |
| [2] | DR.. motors with integrated connector for encoder signals without connection cover on the motor, with connection cover on the cable.<br>Connection type: A2GA<br>Encoder: RK8M<br>Connector on the inverter: D-Sub9.<br>The signals for thermal monitoring of the motor are not transmitted in the encoder cable.  |



|     |                                                                                                                                                                                                                                                                                                        |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [3] | DR.. motors with integrated connector for encoder signals with connection cover on the motor and open ends on the cable.<br>Connection type: A1GA<br>Encoder: RK8M<br>Connector on the inverter: D-Sub15.<br>The signals for thermal monitoring of the motor are not transmitted in the encoder cable. |
| [4] | DR.. motors with integrated connector for encoder signals with connection cover on the motor and open ends on the cable.<br>Connection type: A1GA<br>Encoder: RK8M<br>Connector on the inverter: D-Sub9.<br>The signals for thermal monitoring of the motor are not transmitted in the encoder cable.  |

### 9.1.15 RK8M encoder – Terminal strip or M23 in the terminal box – AIGA, AIGB – MOVIDRIVE®

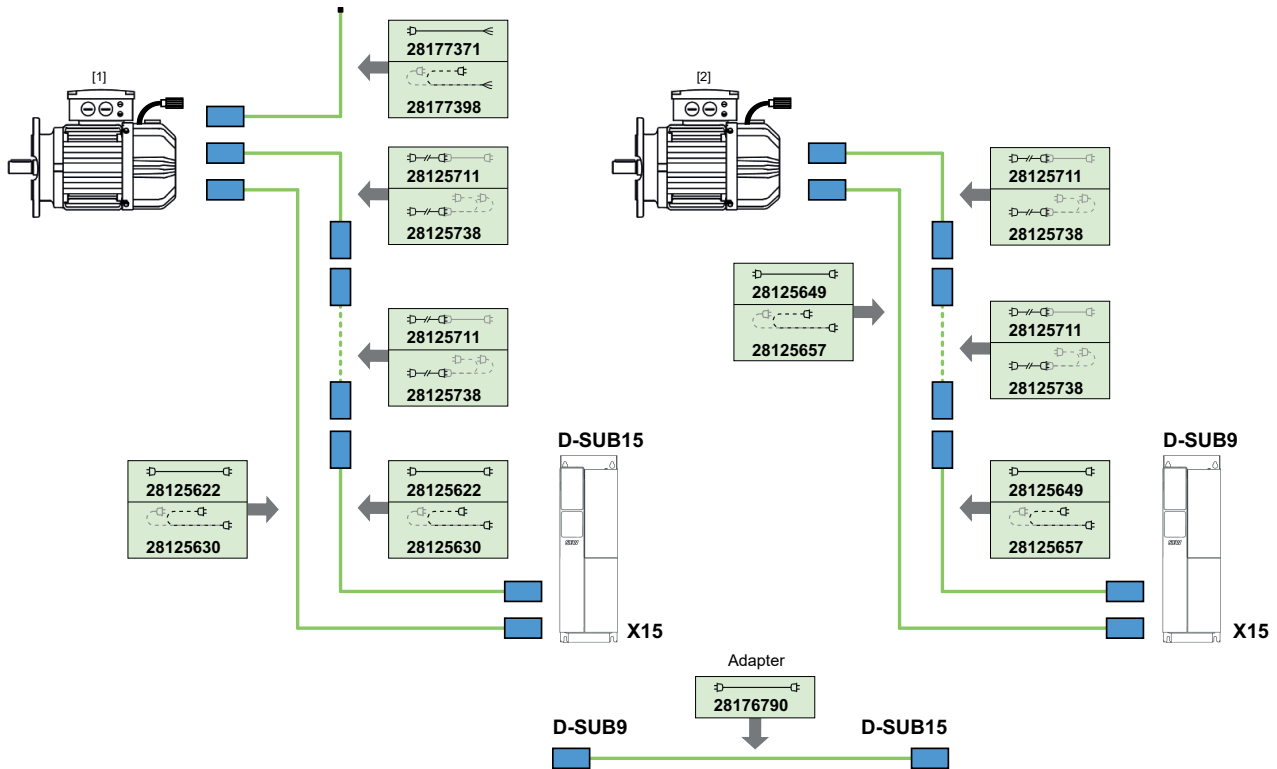


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|     |                                                                                                                                                                                                                                                              |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] | DR.. motors with terminal strip in the terminal box for encoder signals without/with TF thermal monitoring.<br>Encoder: RK8M<br>Connector on the inverter: D-Sub15.<br>The signals for thermal monitoring of the motor are transmitted in the encoder cable. |
| [2] | DR.. motors with terminal strip in the terminal box for encoder signals without/with TF thermal monitoring.<br>Encoder: RK8M<br>Connector on the inverter: D-Sub9.<br>The signals for thermal monitoring of the motor are transmitted in the encoder cable.  |

|     |                                                                                                                                                                                                                                                                                           |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [3] | DR.. motors with M23 connector on the terminal box for encoder signals without/with TF thermal monitoring.<br>Connection type: AIGA/AIGB<br>Encoder: RK8M<br>Connector on the inverter: D-Sub15.<br>The signals for thermal monitoring of the motor are transmitted in the encoder cable. |
| [4] | DR.. motors with M23 connector on the terminal box for encoder signals without/with TF thermal monitoring.<br>Connection type: AIGA/AIGB<br>Encoder: RK8M<br>Connector on the inverter: D-Sub9.<br>The signals for thermal monitoring of the motor are transmitted in the encoder cable.  |

### 9.1.16 RK8M encoder - M23 on encoder - KIGA - MOVIDRIVE®



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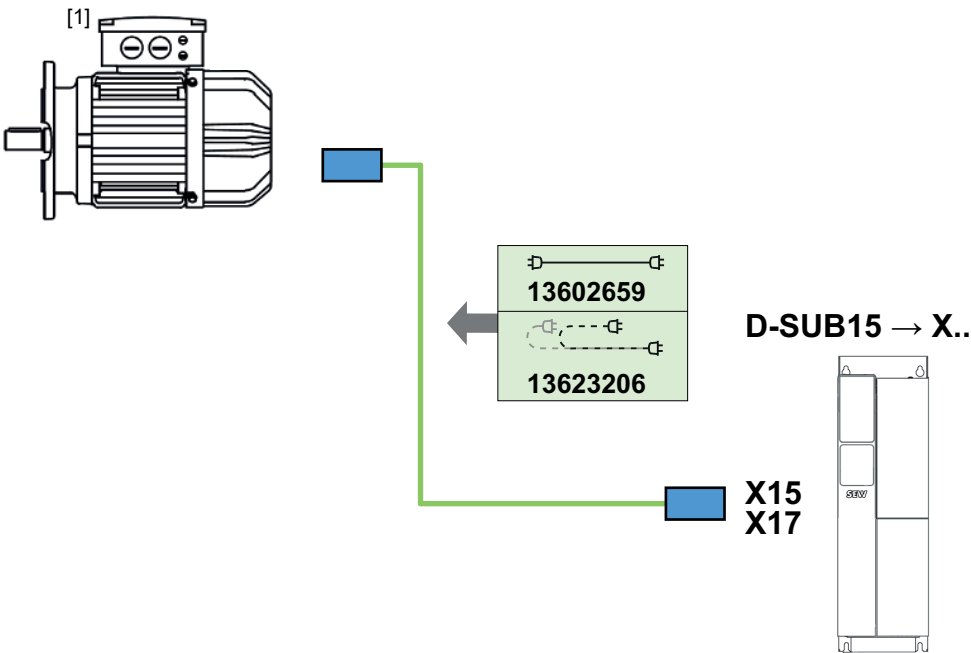
|     |                                                                                                                                                                                                                                                                                                                                                |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] | <p>DR.. motors with M23 connector on the encoder for encoder signals.<br/>                     Connection type: KIGA<br/>                     Encoder: RK8M<br/>                     Connector on the inverter: D-Sub15<br/>                     The signals for thermal monitoring of the motor are not transmitted in the encoder cable.</p> |
| [2] | <p>DR.. motors with M23 connector on the encoder for encoder signals.<br/>                     Connection type: KIGA<br/>                     Encoder: RK8M<br/>                     Connector on the inverter: D-Sub9<br/>                     The signals for thermal monitoring of the motor are not transmitted in the encoder cable.</p>  |

## INFORMATION



The strain relief of the encoder connection cable for KIGA connection variant must be ensured by the customer.

### 9.1.17 EH7. encoder – M23 on the encoder – KIGA – MOVIDRIVE®



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|             |                                                                                                                                                                                                           |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D-sub → X.. | X15: Connection of encoder/resolver to a MOVIDRIVE® modular/system/technology basic unit<br>X17: CES11A multi-encoder card                                                                                |
| [1]         | DR.. motors with M23 connector on the encoder for encoder signals.<br>Connection type: KIGA<br>Encoder: EH7.<br>The signals for thermal monitoring of the motor are not transmitted in the encoder cable. |

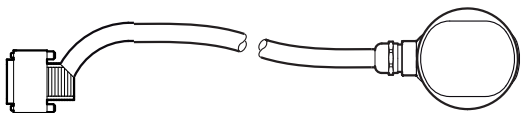
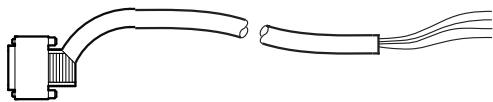
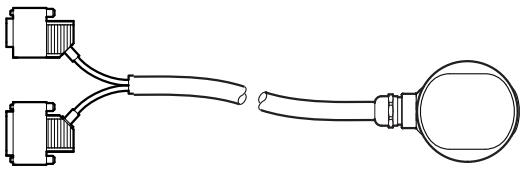
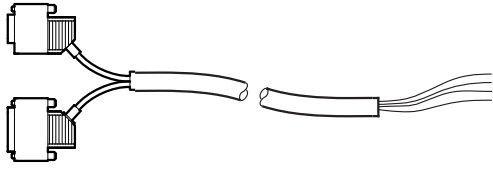
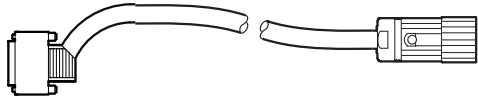
## 9.2 Information regarding functional safety and encoder connection options

Note that currently only the connection option with the integrated encoder connector is approved for use with safety encoders.

The connection options with an M23 connector on the encoder (short cable), M23 on the terminal box, and terminal strip in the terminal box are in preparation.

### 9.3 Overview of encoder cables for DR.. motors – MOVIDRIVE® B, MOVIAXIS®

#### 9.3.1 Overview of add-on encoder cables – MOVIDRIVE® B

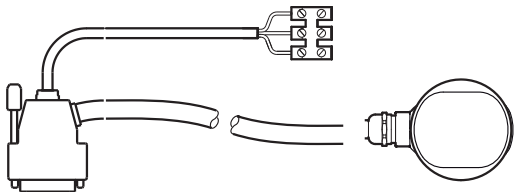
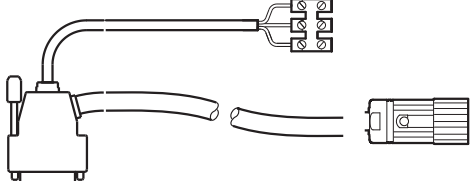
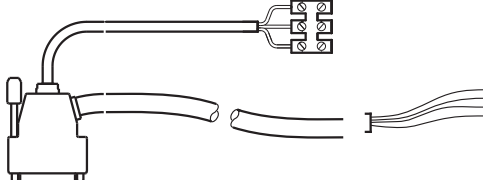
| Connection cable                                                                    |  |                                             | Length/installation type      | Specification                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------|--|---------------------------------------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Motor side                                                                          |  |                                             |                               |                                                                                                                                                                                                                                                                                                                                                                     |
|    |  |                                             | Set length<br>Variable length | If the encoder on the motor is ordered and delivered without an encoder connection cover, the prefabricated cable can be fitted with an encoder connection cover on the encoder end.                                                                                                                                                                                |
| D-sub (15-pin)                                                                      |  | Encoder connection cover                    |                               |                                                                                                                                                                                                                                                                                                                                                                     |
|    |  |                                             | Set length<br>Variable length | The customer is responsible for connecting the terminal strip in the encoder connection cover. The cable gland on the encoder connection cover is included in the encoder scope of delivery. Connection to MOVIDRIVE®: A 15-pin connector is available that matches the interface on the inverter.                                                                  |
| D-sub (15-pin)                                                                      |  | Open (core end sleeves and ring cable lugs) |                               |                                                                                                                                                                                                                                                                                                                                                                     |
|   |  |                                             | Set length<br>Variable length | If the encoder on the motor is ordered and delivered without an encoder connection cover, the prefabricated cable can be fitted with an encoder connection cover on the encoder end. "Encoder cable with connection cover and 2 D-sub"                                                                                                                              |
| D-sub (1 × 9-pin and 1 × 15-pin)                                                    |  | Encoder connection cover                    |                               |                                                                                                                                                                                                                                                                                                                                                                     |
|  |  |                                             | Set length<br>Variable length | The customer is responsible for connecting the terminal strip in the encoder connection cover. The cable gland on the encoder connection cover is included in the encoder scope of delivery. Connection to MOVIDRIVE®: A 9-pin and a 15-pin connector are available that match the interface on the inverter. "Encoder cable with conductor end sleeve and 2 D-sub" |
| D-sub (1 × 9-pin and 1 × 15-pin)                                                    |  | Open (core end sleeves and ring cable lugs) |                               |                                                                                                                                                                                                                                                                                                                                                                     |
|  |  |                                             | Set length<br>Variable length | Connection to MOVIDRIVE®: A 15-pin connector is available that matches the interface on the inverter. "Encoder cable with M23 and D-sub"                                                                                                                                                                                                                            |
| D-sub (15-pin)                                                                      |  | M23 connector                               |                               |                                                                                                                                                                                                                                                                                                                                                                     |

## INFORMATION



Refer to the inverter product manual for part number, structure, cross section and cable assignment.

### 9.3.2 Overview of add-on encoder cables – MOVIAxis®

| Connection cable                                                                   |  |                                             | Length/installation type      | Specification                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------|--|---------------------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Motor side                                                                         |  |                                             |                               |                                                                                                                                                                                                                                                                                                                                                                                        |
|   |  |                                             | Set length<br>Variable length | <p>If the encoder on the motor is ordered and delivered without an encoder connection cover, the prefabricated cable can be fitted with an encoder connection cover on the encoder end.</p> <p>Connection to MOVIAxis®: A 15-pin connector is available that matches the interface on the inverter.</p>                                                                                |
| D-sub (15-pin)                                                                     |  | Encoder connection cover                    |                               |                                                                                                                                                                                                                                                                                                                                                                                        |
|   |  |                                             | Set length<br>Variable length | <p>Connection to MOVIAxis®: A 15-pin connector is available that matches the interface on the inverter.</p> <p>The motor protection is routed from the D-sub connector.</p>                                                                                                                                                                                                            |
| D-sub (15-pin)                                                                     |  | M23 connector                               |                               |                                                                                                                                                                                                                                                                                                                                                                                        |
|  |  |                                             | Set length<br>Variable length | <p>The customer is responsible for connecting the terminal strip in the encoder connection cover.</p> <p>The cable gland on the encoder connection cover is included in the encoder scope of delivery.</p> <p>Connection to MOVIAxis®: A 15-pin connector is available that matches the interface on the inverter.</p> <p>The motor protection is routed from the D-sub connector.</p> |
| D-sub (15-pin)                                                                     |  | Open (core end sleeves and ring cable lugs) |                               |                                                                                                                                                                                                                                                                                                                                                                                        |

## INFORMATION



Refer to the inverter product manual for part number, structure, cross section and cable assignment.



## 9.4 Definition of the signal designations

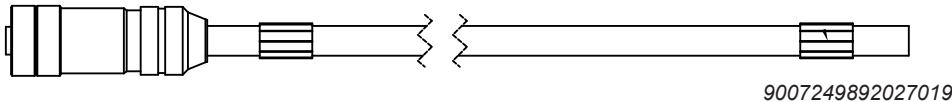
| Signal designation | Alternative signal designation    | Definition                                                                       |
|--------------------|-----------------------------------|----------------------------------------------------------------------------------|
| A+, cos+           | A, cos                            | A-track, TTL/HTL signal, cosine                                                  |
| A-, cos-           | /A, RefCos, $\bar{A}$             | Inverted A-track, inverted TTL/HTL signal, inverted cosine                       |
| B+, sin+           | B, sin                            | B-track, TTL/HTL signal, sine                                                    |
| B-, sin-           | /B, RefSin, $\bar{B}$             | Inverted B-track, inverted TTL/HTL signal, inverted sine                         |
| C+, clock+         | C, clock, clk, clk+               | C-track, TTL/HTL signal, clock or zero pulse                                     |
| C-, clock-         | /C, CLK-, $\bar{C}$               | Inverted C-track, inverted TTL/HTL signal, inverted clock or inverted zero pulse |
| D+, data+          | D, data, Daten, Daten+            | D-track, TTL signal, data                                                        |
| D-, data-          | /D, Daten-, $\bar{D}$             | Inverted D-track, inverted TTL signal, inverted data                             |
| S1, cos+           | Cos                               | Positive connection of the cosine secondary side                                 |
| S3, cos-           | –                                 | Negative connection of the cosine secondary side                                 |
| S2, sin+           | Sin                               | Positive connection of the sine secondary side                                   |
| S4, sin-           | –                                 | Negative connection of the sine secondary side                                   |
| R1, ref+           | Ref1, ref                         | Positive connection of the excitation signal primary side                        |
| R2, ref-           | Ref2                              | Negative connection of the excitation signal primary side                        |
| U <sub>B</sub>     | +U <sub>B</sub> , V <sub>CC</sub> | Supply voltage                                                                   |
| GND                | 0 V                               | Reference ground                                                                 |
| TF+                | –                                 | Positive connection of the temperature sensor                                    |
| TF-                | –                                 | Negative connection of the temperature sensor                                    |

Note that when using devices and encoder evaluation units from other manufacturers, the signal designations may be different. In this case, make sure the assignment matches the definitions in the table above.

9.5 Design of encoder cables for DR.. motors

9.5.1 EI7. encoder - M12, 4-pin to open end

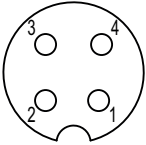
Figure



Types

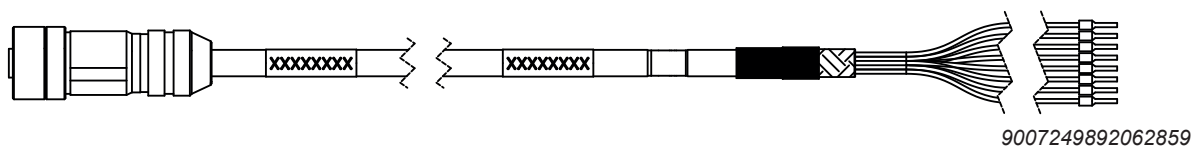
| Design and cable cross section | Part number | Installation type  | Encoder |
|--------------------------------|-------------|--------------------|---------|
| 5 × 2 × 0.25 mm <sup>2</sup>   | 18156746    | Fixed installation | EI7.    |

Pin assignment for EI71, EI72, EI76, EI7C

| Encoder connection                                                                                        |         |                |                      | Encoder evaluation |         |                                                                                                   |
|-----------------------------------------------------------------------------------------------------------|---------|----------------|----------------------|--------------------|---------|---------------------------------------------------------------------------------------------------|
| Connector view                                                                                            | Contact | Signal         | Cable/<br>Core color | Signal             | Contact | Connector view                                                                                    |
| M12, female, 4-pin<br> | 1       | U <sub>B</sub> | Gray (GY)            | U <sub>B</sub>     | —       | Open end<br> |
|                                                                                                           | 2       | B+, sin+       | Yellow (YE)          | B+, sin+           | —       |                                                                                                   |
|                                                                                                           | 3       | GND            | Pink (PK)            | GND                | —       |                                                                                                   |
|                                                                                                           | 4       | A+, cos+       | Brown (BN)           | A+, cos+           | —       |                                                                                                   |

## 9.5.2 EI7. encoder - M12, 8-pin to open end

Figure



## Types

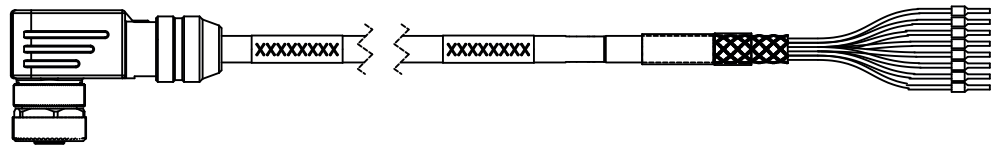
| Design and cable cross section        | Part number | Installation type          | Encoder |
|---------------------------------------|-------------|----------------------------|---------|
| $5 \times 2 \times 0.25 \text{ mm}^2$ | 13623273    | Fixed installation         | EI7.    |
| $4 \times 2 \times 0.25 \text{ mm}^2$ | 13623281    | Cable carrier installation | EI7.    |

## Pin assignment for EI71, EI72, EI76, EI7C

| Encoder connection     |         |                |                      | Encoder evaluation |         |                |
|------------------------|---------|----------------|----------------------|--------------------|---------|----------------|
| Connector view         | Contact | Signal         | Cable/<br>Core color | Signal             | Contact | Connector view |
| M12, female, 8-pin<br> | 3       | A+, cos+       | Brown (BN)           | A+, cos+           | —       | Open end<br>   |
|                        | 4       | A-, cos-       | White (WH)           | A-, cos-           | —       |                |
|                        | 5       | B+, sin+       | Yellow (YE)          | B+, sin+           | —       |                |
|                        | 6       | B-, sin-       | Green (GN)           | B-, sin-           | —       |                |
|                        | 7       | TF+            | Red (RD)             | TF+                | —       |                |
|                        | 8       | TF-            | Blue (BU)            | TF-                | —       |                |
|                        | 1       | U <sub>B</sub> | Gray (GY)            | U <sub>B</sub>     | —       |                |
|                        | 2       | GND            | Pink (PK)            | GND                | —       |                |

### 9.5.3 EI7. encoder - M12, 8-pin angled to open end

Figure



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#### Types

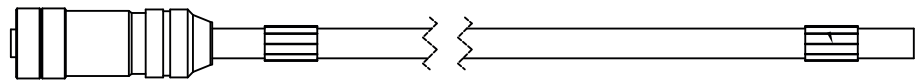
| Design and cable cross section | Part number | Installation type  | Encoder |
|--------------------------------|-------------|--------------------|---------|
| 5 × 2 × 0.25 mm <sup>2</sup>   | 28164881    | Fixed installation | EI7.    |

#### Pin assignment for EI71, EI72, EI76, EI7C

| Encoder connection         |         |                |                      | Encoder evaluation |         |                  |
|----------------------------|---------|----------------|----------------------|--------------------|---------|------------------|
| Connector view             | Contact | Signal         | Cable/<br>Core color | Signal             | Contact | Connector view   |
| M12, female, 8-pin<br><br> | 3       | A+, cos+       | Brown (BN)           | A+, cos+           | —       | Open end<br><br> |
|                            | 4       | A-, cos-       | White (WH)           | A-, cos-           | —       |                  |
|                            | 5       | B+, sin+       | Yellow (YE)          | B+, sin+           | —       |                  |
|                            | 6       | B-, sin-       | Green (GN)           | B-, sin-           | —       |                  |
|                            | 7       | TF+            | Red (RD)             | TF+                | —       |                  |
|                            | 8       | TF-            | Blue (BU)            | TF-                | —       |                  |
|                            | 1       | U <sub>B</sub> | Gray (GY)            | U <sub>B</sub>     | —       |                  |
|                            | 2       | GND            | Pink (PK)            | GND                | —       |                  |

## 9.5.4 EI7. encoder/EI7C FS safety encoder - M12, 8-pin to open end

Figure



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## Types

| Design and cable cross section        | Part number | Installation type                      | Encoder         |
|---------------------------------------|-------------|----------------------------------------|-----------------|
| $4 \times 2 \times 0.25 \text{ mm}^2$ | 18156754    | Cable carrier installation, without TF | EI7.<br>EI7C FS |
| $4 \times 2 \times 0.25 \text{ mm}^2$ | 18156770    | Cable carrier installation, with TF    | EI7.            |

## Pin assignment for EI71, EI72, EI76, EI7C

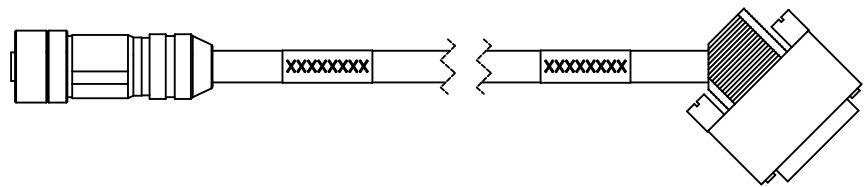
| Encoder connection     |         |                |                      | Encoder evaluation |         |                |
|------------------------|---------|----------------|----------------------|--------------------|---------|----------------|
| Connector view         | Contact | Signal         | Cable/<br>Core color | Signal             | Contact | Connector view |
| M12, female, 8-pin<br> | 3       | A+, cos+       | Brown (BN)           | A+, cos+           | —       | Open end<br>   |
|                        | 4       | A-, cos-       | White (WH)           | A-, cos-           | —       |                |
|                        | 5       | B+, sin+       | Yellow (YE)          | B+, sin+           | —       |                |
|                        | 6       | B-, sin-       | Green (GN)           | B-, sin-           | —       |                |
|                        | 7       | TF+            | Red (RD)             | TF+                | —       |                |
|                        | 8       | TF-            | Blue (BU)            | TF-                | —       |                |
|                        | 1       | U <sub>B</sub> | Gray (GY)            | U <sub>B</sub>     | —       |                |
|                        | 2       | GND            | Pink (PK)            | GND                | —       |                |

## Pin assignment for EI7C FS safety encoder

| Encoder connection     |         |                |                      | Encoder evaluation |         |                |
|------------------------|---------|----------------|----------------------|--------------------|---------|----------------|
| Connector view         | Contact | Signal         | Cable/<br>Core color | Signal             | Contact | Connector view |
| M12, female, 8-pin<br> | 3       | A+, cos+       | Brown (BN)           | A+, cos+           | —       | Open end<br>   |
|                        | 4       | A-, cos-       | White (WH)           | A-, cos-           | —       |                |
|                        | 5       | B+, sin+       | Yellow (YE)          | B+, sin+           | —       |                |
|                        | 6       | B-, sin-       | Green (GN)           | B-, sin-           | —       |                |
|                        | 7       | —              | Red (RD)             | —                  | —       |                |
|                        | 8       | —              | Blue (BU)            | —                  | —       |                |
|                        | 1       | U <sub>B</sub> | Gray (GY)            | U <sub>B</sub>     | —       |                |
|                        | 2       | GND            | Pink (PK)            | GND                | —       |                |

### 9.5.5 EI7C FS safety encoder - M12, 8-pin to D-Sub15

Figure

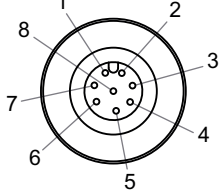
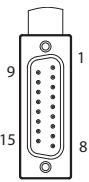


9007249892145163

#### Types

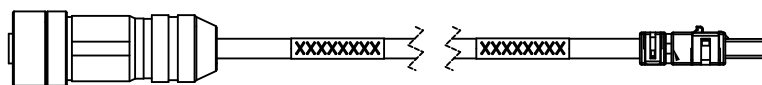
| Design and cable cross section | Part number | Installation type          | Encoder |
|--------------------------------|-------------|----------------------------|---------|
| 4 × 2 × 0.25 mm <sup>2</sup>   | 18191665    | Cable carrier installation | EI7C FS |

#### Pin assignment for EI7C FS safety encoder

| Encoder connection                                                                                        |         |                |                      | Encoder evaluation |         |                                                                                                              |
|-----------------------------------------------------------------------------------------------------------|---------|----------------|----------------------|--------------------|---------|--------------------------------------------------------------------------------------------------------------|
| Connector view                                                                                            | Contact | Signal         | Cable/<br>Core color | Signal             | Contact | Connector view                                                                                               |
| M12, female, 8-pin<br> | 1       | U <sub>B</sub> | Gray (GY)            | U <sub>B</sub>     | 13      | D-sub, male, 15-pin<br> |
|                                                                                                           | 2       | GND            | Blue (BU)            |                    | 8       |                                                                                                              |
|                                                                                                           | 3       | A+, cos+       | Pink (PK)            | GND                | 1       |                                                                                                              |
|                                                                                                           | 4       | A-, cos-       | Red (RD)             |                    | 9       |                                                                                                              |
|                                                                                                           | 5       | B+, sin+       | Brown (BN)           | A+, cos+           | 2       |                                                                                                              |
|                                                                                                           | 6       | B-, sin-       | White (WH)           | A-, cos-           | 10      |                                                                                                              |
|                                                                                                           |         |                | Yellow (YE)          | B+, sin+           |         |                                                                                                              |
|                                                                                                           |         |                | Green (GN)           | B-, sin-           |         |                                                                                                              |

## 9.5.6 EI7C FS safety encoder - M12, 8-pin to mini I/O

Figure

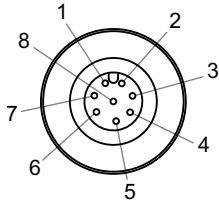
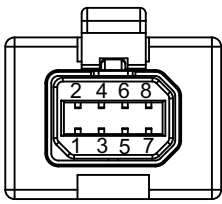


9007249892152971

## Types

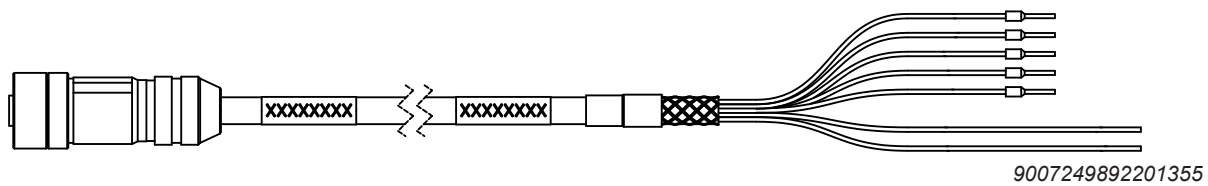
| Design and cable cross section        | Part number | Installation type          | Encoder |
|---------------------------------------|-------------|----------------------------|---------|
| $4 \times 2 \times 0.14 \text{ mm}^2$ | 28118804    | Cable carrier installation | EI7C FS |

## Pin assignment for EI7C FS safety encoder

| Encoder connection                                                                                       |         |          |                      | Encoder evaluation |         |                                                                                                               |
|----------------------------------------------------------------------------------------------------------|---------|----------|----------------------|--------------------|---------|---------------------------------------------------------------------------------------------------------------|
| Connector view                                                                                           | Contact | Signal   | Cable/<br>Core color | Signal             | Contact | Connector view                                                                                                |
| M12, female, 8-pin<br> | 1       | $U_B$    | Pink (PK)            | $U_B$              | 1       | Mini I/O, male, 8-pin<br> |
|                                                                                                          |         |          | Red (RD)             |                    | 4       |                                                                                                               |
|                                                                                                          | 2       | GND      | Gray (GY)            | GND                | 2       |                                                                                                               |
|                                                                                                          |         |          | Blue (BU)            |                    | 5       |                                                                                                               |
|                                                                                                          | 3       | A+, cos+ | Brown (BN)           | A+, cos+           | 3       |                                                                                                               |
|                                                                                                          | 4       | A-, cos- | White (WH)           | A-, cos-           | 6       |                                                                                                               |
|                                                                                                          | 5       | B+, sin+ | Yellow (YE)          | B+, sin+           | 7       |                                                                                                               |
|                                                                                                          | 6       | B-, sin- | Green (GN)           | B-, sin-           | 8       |                                                                                                               |

### 9.5.7 EI7./EI8C encoder - M12, 8-pin to open end

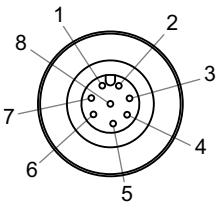
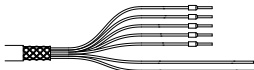
Figure



#### Types

| Design and cable cross section | Part number | Installation type          | Encoder    |
|--------------------------------|-------------|----------------------------|------------|
| 4 × 2 × 0.25 mm <sup>2</sup>   | 28162846    | Cable carrier installation | EI7., EI8C |

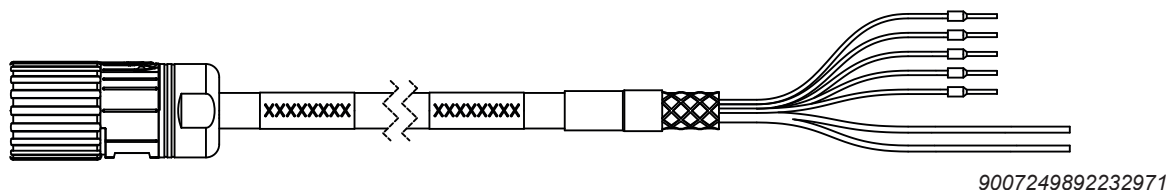
#### Pin assignment for EI71, EI72, EI76, EI7C, EI8C

| Encoder connection                                                                                        |         |                |                      | Encoder evaluation |         |                                                                                                   |
|-----------------------------------------------------------------------------------------------------------|---------|----------------|----------------------|--------------------|---------|---------------------------------------------------------------------------------------------------|
| Connector view                                                                                            | Contact | Signal         | Cable/<br>Core color | Signal             | Contact | Connector view                                                                                    |
| M12, female, 8-pin<br> | 3       | A+, cos+       | Brown (BN)           | A+, cos+           | —       | Open end<br> |
|                                                                                                           | 5       | B+, sin+       | Yellow (YE)          | B+, sin+           | —       |                                                                                                   |
|                                                                                                           | 6       | C+, clock+     | Green (GN)           | C+, clock+         | —       |                                                                                                   |
|                                                                                                           | 7       | TF+            | Red (RD)             | TF+                | —       |                                                                                                   |
|                                                                                                           | 8       | TF-            | Blue (BU)            | TF-                | —       |                                                                                                   |
|                                                                                                           | 1       | U <sub>B</sub> | Gray (GY)            | U <sub>B</sub>     | —       |                                                                                                   |
|                                                                                                           | 2       | GND            | Pink (PK)            | GND                | —       |                                                                                                   |



## 9.5.8 E.8C encoder - M23 to open end

Figure



## Types

| Design and cable cross section                                    | Part number | Installation type          | Encoder |
|-------------------------------------------------------------------|-------------|----------------------------|---------|
| $5 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28162854    | Cable carrier installation | E.8C    |

## Pin assignment for EK8C, EV8C, EI8C

| Encoder connection      |         |                |                      | Encoder evaluation |         |                |
|-------------------------|---------|----------------|----------------------|--------------------|---------|----------------|
| Connector view          | Contact | Signal         | Cable/<br>Core color | Signal             | Contact | Connector view |
| M23, female, 12-pin<br> | 3       | A+, cos+       | Red (RD)             | A+, cos+           | —       | Open end<br>   |
|                         | 5       | B+, sin+       | Yellow (YE)          | B+, sin+           | —       |                |
|                         | 1       | C+, clock+     | Brown (BN)           | C+, clock+         | —       |                |
|                         | 12      | U <sub>B</sub> | Gray (GY)            | U <sub>B</sub>     | —       |                |
|                         | 11      | GND            | Pink (PK)            | GND                | —       |                |
|                         | 9       | TF+            | Gray-pink (GYPK)     | TF+                | —       |                |
|                         | 10      | TF-            | Red-blue (RDBU)      | TF-                | —       |                |

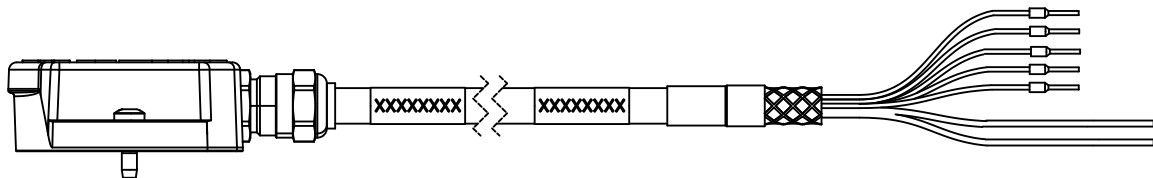
### 9.5.9 E.8C encoder – Connection cover to open end

## INFORMATION



This cable is not compatible with the EK8X encoder design. To prevent damage to the encoder, it must not be used with the EK8X encoder design.

Figure



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### Types

| Design and cable cross section                                    | Part number | Installation type          | Encoder |
|-------------------------------------------------------------------|-------------|----------------------------|---------|
| $5 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28162862    | Cable carrier installation | E.8C    |

### Pin assignment for EK8C, EV8C

| Encoder connection |                 |                |                      | Encoder evaluation |         |                 |
|--------------------|-----------------|----------------|----------------------|--------------------|---------|-----------------|
| Connector view     | Contact         | Signal         | Cable/<br>Core color | Signal             | Contact | Connector view  |
|                    | A               | A+, cos+       | Red (RD)             | A+, cos+           | —       | <p>Open end</p> |
|                    | B               | B+, sin+       | Yellow (YE)          | B+, sin+           | —       |                 |
|                    | C               | C+, clock+     | Brown (BN)           | C+, clock+         | —       |                 |
|                    | +U <sub>B</sub> | U <sub>B</sub> | Gray (GY)            | U <sub>B</sub>     | —       |                 |
|                    | GND             | GND            | Pink (PK)            | GND                | —       |                 |

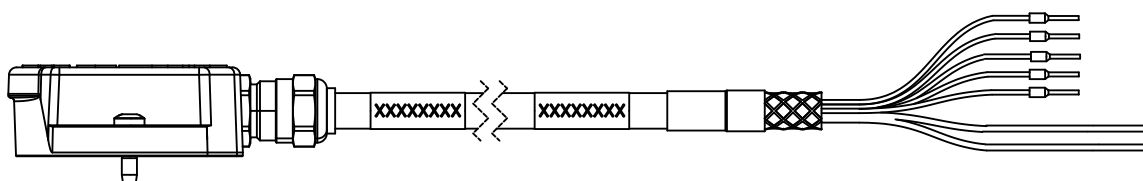
## 9.5.10 EK8X encoder – Connection cover with alignment to open end

## INFORMATION



This cable is compatible only with the EK8X encoder design. To prevent damage to the encoder, it must not be used with the .K8./V8. encoder designs.

Figure



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## Types

| Design and cable cross section                                    | Part number | Installation type          | Encoder |
|-------------------------------------------------------------------|-------------|----------------------------|---------|
| $5 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28193180    | Cable carrier installation | EK8X    |

## Pin assignment for EK8X

| Encoder connection |                 |                |                      | Encoder evaluation |         |                |
|--------------------|-----------------|----------------|----------------------|--------------------|---------|----------------|
| Connector view     | Contact         | Signal         | Cable/<br>Core color | Signal             | Contact | Connector view |
|                    | A               | A+, cos+       | Red (RD)             | A+, cos+           | —       | Open end<br>   |
|                    | B               | B+, sin+       | Yellow (YE)          | B+, sin+           | —       |                |
|                    | C               | C+, clock+     | Brown (BN)           | C+, clock+         | —       |                |
|                    | +U <sub>B</sub> | U <sub>B</sub> | Gray (GY)            | U <sub>B</sub>     | —       |                |
|                    | GND             | GND            | Pink (PK)            | GND                | —       |                |

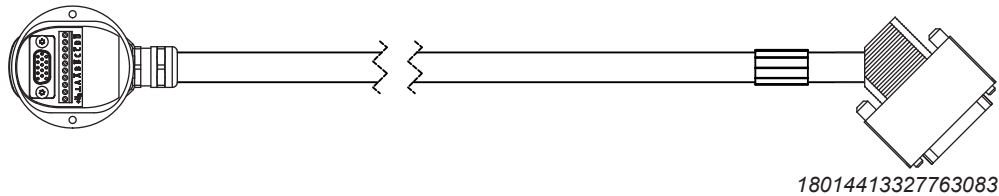
### 9.5.11 E.7./A.7./E.8./A.8. encoder - Connection cover to D-Sub15

## INFORMATION



This cable is not compatible with the EK8X encoder design. To prevent damage to the encoder, it must not be used with the EK8X encoder design.

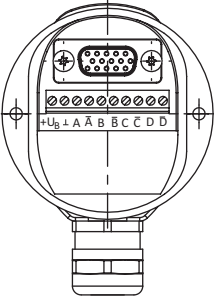
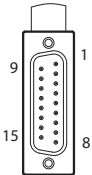
Figure



## Types

| Design and cable cross section                                    | Part number | Installation type          | Encoder                  |
|-------------------------------------------------------------------|-------------|----------------------------|--------------------------|
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 13617621    | Fixed installation         | E.7., A.7.<br>E.8., A.8. |
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 13617648    | Cable carrier installation | E.7., A.7.<br>E.8., A.8. |

Pin assignment for EK8R, EK8C, EK8S, EK8W, AK8W, AK8Y, AK8H EV8R, EV8C, EV8S, AV8W, AV8Y, AV8H ES7R, ES7C, ES7S, AS7W, AS7Y, AS7H EG7R, EG7C, EG7S, AG7W, AG7Y EV7R, EV7C, EV7S, AV7W, AV7Y

| Encoder connection                                                                  |           |                             |                            | Encoder evaluation |         |                                                                                                              |  |
|-------------------------------------------------------------------------------------|-----------|-----------------------------|----------------------------|--------------------|---------|--------------------------------------------------------------------------------------------------------------|--|
| Connector view                                                                      | Contact   | Signal                      | Cable/<br>Core color       | Signal             | Contact | Connector view                                                                                               |  |
|  | A         | A+, cos+                    | Red (RD)                   | A+, cos+           | 1       | D-sub, male, 15-pin<br> |  |
|                                                                                     | $\bar{A}$ | A-, cos-                    | Blue (BU)                  | A-, cos-           | 9       |                                                                                                              |  |
|                                                                                     | B         | B+, sin+                    | Yellow (YE)                | B+, sin+           | 2       |                                                                                                              |  |
|                                                                                     | $\bar{B}$ | B-, sin-                    | Green (GN)                 | B-, sin-           | 10      |                                                                                                              |  |
|                                                                                     | C         | C+, clock+                  | Brown (BN)                 | C+, clock+         | 3       |                                                                                                              |  |
|                                                                                     | $\bar{C}$ | C-, clock-                  | White (WH)                 | C-, clock-         | 11      |                                                                                                              |  |
|                                                                                     | D         | D+, data+                   | Black (BK)                 | D+, data+          | 4       |                                                                                                              |  |
|                                                                                     | $\bar{D}$ | D-, data-                   | Violet (VT)                | D-, data-          | 12      |                                                                                                              |  |
|                                                                                     | $+U_B$    | $U_B$                       | Gray (GY)                  | $U_B$              | 15      |                                                                                                              |  |
|                                                                                     |           |                             | Red-blue + gray (RD-BU+GY) |                    |         |                                                                                                              |  |
| GND                                                                                 | GND       | Pink (PK)                   | GND                        | 8                  |         |                                                                                                              |  |
|                                                                                     |           | Gray-pink + pink (GYP-K+PK) |                            |                    |         |                                                                                                              |  |

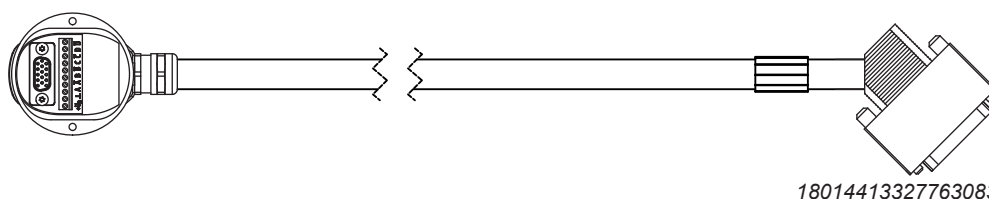
## 9.5.12 EK8X encoder – Connection cover with alignment to D-Sub15

## INFORMATION



This cable is compatible only with the EK8X encoder design. To prevent damage to the encoder, it must not be used with the .K8./.V8. encoder designs.

Figure



## Types

| Design and cable cross section                                    | Part number | Installation type          | Encoder |
|-------------------------------------------------------------------|-------------|----------------------------|---------|
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28193164    | Fixed installation         | EK8X    |
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28193172    | Cable carrier installation | EK8X    |

## Pin assignment for EK8X

| Encoder connection |                 |                |                             | Encoder evaluation |         |                         |
|--------------------|-----------------|----------------|-----------------------------|--------------------|---------|-------------------------|
| Connector view     | Contact         | Signal         | Cable/<br>Core color        | Signal             | Contact | Connector view          |
|                    | A               | A+, cos+       | Red (RD)                    | A+, cos+           | 1       | D-sub, male, 15-pin<br> |
|                    | Ā              | A-, cos-       | Blue (BU)                   | A-, cos-           | 9       |                         |
|                    | B               | B+, sin+       | Yellow (YE)                 | B+, sin+           | 2       |                         |
|                    | B̄              | B-, sin-       | Green (GN)                  | B-, sin-           | 10      |                         |
|                    | C               | C+, clock+     | Brown (BN)                  | C+, clock+         | 3       |                         |
|                    | C̄              | C-, clock-     | White (WH)                  | C-, clock-         | 11      |                         |
|                    | D               | D+, data+      | Black (BK)                  | D+, data+          | 4       |                         |
|                    | D̄              | D-, data-      | Violet (VT)                 | D-, data-          | 12      |                         |
|                    | +U <sub>B</sub> | U <sub>B</sub> | Gray (GY)                   | U <sub>B</sub>     | 15      |                         |
|                    | GND             | GND            | Red-blue + gray (RD-BU+GY)  | GND                | 8       |                         |
|                    |                 |                | Pink (PK)                   |                    |         |                         |
|                    |                 |                | Gray-pink + pink (GYP-K+PK) |                    |         |                         |

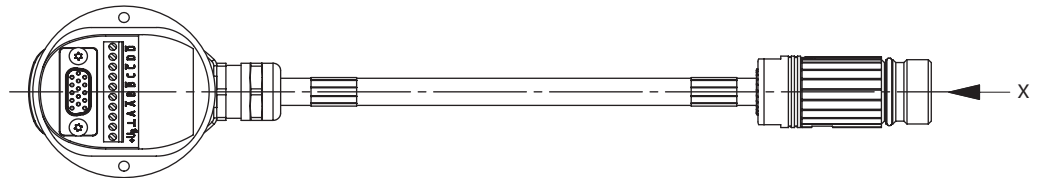
9.5.13 E.7./A.7./E.8./A.8. encoders – Connection cover to M23

## INFORMATION



This cable is not compatible with the EK8X encoder design. To prevent damage to the encoder, it must not be used with the EK8X encoder design.

Figure



18014413327862027

### Types

| Design and cable cross section                                    | Part number | Installation type          | Encoder                  |
|-------------------------------------------------------------------|-------------|----------------------------|--------------------------|
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 13621963    | Fixed installation         | E.7., A.7.<br>E.8., A.8. |
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 18140394    | Cable carrier installation | E.7., A.7.<br>E.8., A.8. |

Pin assignment for EK8R, EK8C, EK8S, EK8W, AK8W, AK8Y, AK8H EV8R, EV8C, EV8S, AV8W, AV8Y, AV8H ES7R, ES7C, ES7S, AS7W, AS7Y, AS7H EG7R, EG7C, EG7S, AG7W, AG7Y EV7R, EV7C, EV7S, AV7W, AV7Y

| Encoder connection |           |            |                                                | Encoder evaluation |         |                       |
|--------------------|-----------|------------|------------------------------------------------|--------------------|---------|-----------------------|
| Connector view     | Contact   | Signal     | Cable/<br>Core color                           | Signal             | Contact | Connector view        |
|                    | A         | A+, cos+   | Red (RD)                                       | A+, cos+           | 3       | M23, male, 12-pin<br> |
|                    | $\bar{A}$ | A-, cos-   | Blue (BU)                                      | A-, cos-           | 4       |                       |
|                    | B         | B+, sin+   | Yellow (YE)                                    | B+, sin+           | 5       |                       |
|                    | $\bar{B}$ | B-, sin-   | Green (GN)                                     | B-, sin-           | 6       |                       |
|                    | C         | C+, clock+ | Brown (BN)                                     | C+, clock+         | 1       |                       |
|                    | $\bar{C}$ | C-, clock- | White (WH)                                     | C-, clock-         | 2       |                       |
|                    | D         | D+, data+  | Black (BK)                                     | D+, data+          | 8       |                       |
|                    | $\bar{D}$ | D-, data-  | Violet (VT)                                    | D-, data-          | 7       |                       |
|                    | $+U_B$    | $U_B$      | Gray (GY)<br>Red-blue +<br>gray (RD-<br>BU+GY) | $U_B$              | 12      |                       |
|                    | GND       | GND        | Pink (PK)                                      | GND                | 11      |                       |

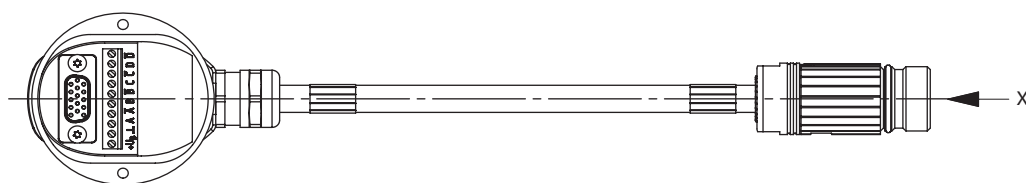
## 9.5.14 EK8X encoder – Connection cover with alignment to M23

## INFORMATION



This cable is compatible only with the EK8X encoder design. To prevent damage to the encoder, it must not be used with the .K8./.V8. encoder designs.

Figure



18014413327862027

## Types

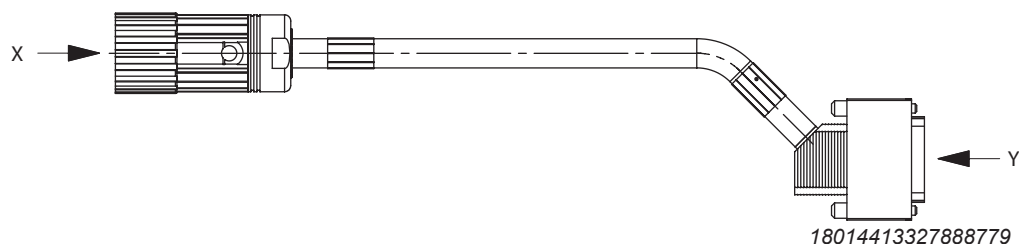
| Design and cable cross section                                    | Part number | Installation type          | Encoder |
|-------------------------------------------------------------------|-------------|----------------------------|---------|
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28193148    | Fixed installation         | EK8X    |
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28193156    | Cable carrier installation | EK8X    |

## Pin assignment for EK8X

| Encoder connection |           |            |                                   | Encoder evaluation |         |                       |
|--------------------|-----------|------------|-----------------------------------|--------------------|---------|-----------------------|
| Connector view     | Contact   | Signal     | Cable/<br>Core color              | Signal             | Contact | Connector view        |
|                    | A         | A+, cos+   | Red (RD)                          | A+, cos+           | 3       | M23, male, 12-pin<br> |
|                    | $\bar{A}$ | A-, cos-   | Blue (BU)                         | A-, cos-           | 4       |                       |
|                    | B         | B+, sin+   | Yellow (YE)                       | B+, sin+           | 5       |                       |
|                    | $\bar{B}$ | B-, sin-   | Green (GN)                        | B-, sin-           | 6       |                       |
|                    | C         | C+, clock+ | Brown (BN)                        | C+, clock+         | 1       |                       |
|                    | $\bar{C}$ | C-, clock- | White (WH)                        | C-, clock-         | 2       |                       |
|                    | D         | D+, data+  | Black (BK)                        | D+, data+          | 8       |                       |
|                    | $\bar{D}$ | D-, data-  | Violet (VT)                       | D-, data-          | 7       |                       |
|                    | $+U_B$    | $U_B$      | Gray (GY)                         | $U_B$              | 12      |                       |
|                    | GND       | GND        | Red-blue +<br>gray (RD-<br>BU+GY) | GND                | 11      |                       |
|                    |           |            | Pink (PK)                         |                    |         |                       |

9.5.15 E.7./A.7./E.8./A.8. encoder - M23 to D-Sub15

Figure

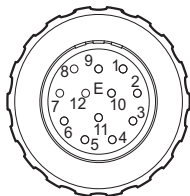
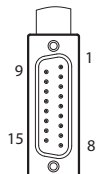


Types

| Design and cable cross section                                    | Part number | Installation type                      | Encoder                  |
|-------------------------------------------------------------------|-------------|----------------------------------------|--------------------------|
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 13621998    | Fixed installation, without TF         | E.7., A.7.<br>E.8., A.8. |
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 18195393    | Cable carrier installation, without TF | E.7., A.7.<br>E.8., A.8. |
| $5 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28111435    | Fixed installation, with TF            | E.7., A.7.<br>E.8., A.8. |
| $5 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28111443    | Cable carrier installation, with TF    | E.7., A.7.<br>E.8., A.8. |

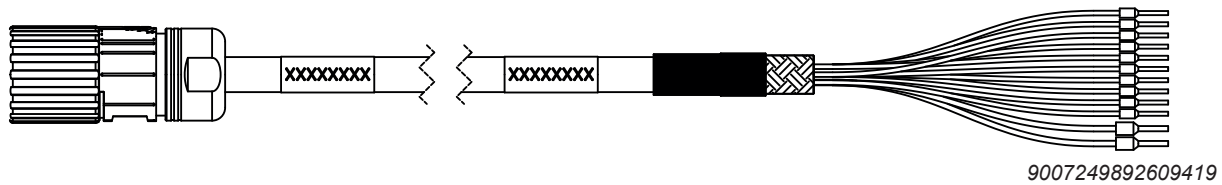


Pin assignment for EK8R, EK8C, EK8S, EK8W, AK8W, AK8Y, AK8H EV8R, EV8C, EV8S, AV8W, AV8Y, AV8H ES7R, ES7C, ES7S, AS7W, AS7Y, AS7H EG7R, EG7C, EG7S, AG7W, AG7Y EV7R, EV7C, EV7S, AV7W, AV7Y EI71, EI72, EI76, EI7C, EI8C, EI8R

| Encoder connection                                                                                                |         |                  |                             | Encoder evaluation |         |                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------|---------|------------------|-----------------------------|--------------------|---------|---------------------------------------------------------------------------------------------------------------------|
| Connector view                                                                                                    | Contact | Signal           | Cable/<br>Core color        | Signal             | Contact | Connector view                                                                                                      |
| <div>M23, female, 12-pin</div>  | 3       | A+, cos+         | Red (RD)                    | A+, cos+           | 1       | <div>D-sub, male, 15-pin</div>  |
|                                                                                                                   | 4       | A-, cos-         | Blue (BU)                   | A-, cos-           | 9       |                                                                                                                     |
|                                                                                                                   | 5       | B+, sin+         | Yellow (YE)                 | B+, sin+           | 2       |                                                                                                                     |
|                                                                                                                   | 6       | B-, sin-         | Green (GN)                  | B-, sin-           | 10      |                                                                                                                     |
|                                                                                                                   | 1       | C+, clock+       | Brown (BN)                  | C+, clock+         | 3       |                                                                                                                     |
|                                                                                                                   | 2       | C-, clock-       | White (WH)                  | C-, clock-         | 11      |                                                                                                                     |
|                                                                                                                   | 8       | D+, data+        | Black (BK)                  | D+, data+          | 4       |                                                                                                                     |
|                                                                                                                   | 7       | D-, data-        | Violet (VT)                 | D-, data-          | 12      |                                                                                                                     |
|                                                                                                                   | 12      | U <sub>B</sub>   | Gray (GY)                   | U <sub>B</sub>     | 15      |                                                                                                                     |
|                                                                                                                   |         |                  | Red-blue + gray (RD-BU+GY)  |                    |         |                                                                                                                     |
|                                                                                                                   | 11      | GND              | Pink (PK)                   | GND                | 8       |                                                                                                                     |
|                                                                                                                   |         |                  | Gray-pink + pink (GYP-K+PK) |                    |         |                                                                                                                     |
| 9                                                                                                                 | TF+     | Gray-pink (GYPK) | TF+                         | 14                 |         |                                                                                                                     |
| 10                                                                                                                | TF-     | Red-blue (RDBU)  | TF-                         | 6                  |         |                                                                                                                     |

### 9.5.16 E.7./A.7./E.8./A.8. encoder - M23 to open end

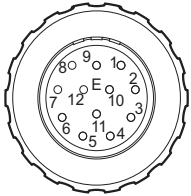
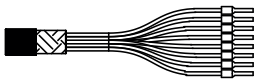
Figure



#### Types

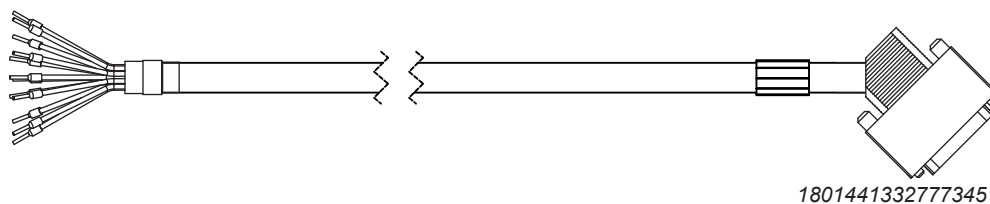
| Design and cable cross section                                    | Part number | Installation type          | Encoder                  |
|-------------------------------------------------------------------|-------------|----------------------------|--------------------------|
| $5 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28128982    | Fixed installation         | E.7., A.7.<br>E.8., A.8. |
| $5 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28140559    | Cable carrier installation | E.7., A.7.<br>E.8., A.8. |

Pin assignment for EK8R, EK8C, EK8S, EK8W, AK8W, AK8Y, AK8H EV8R, EV8C, EV8S, AV8W, AV8Y, AV8H ES7R, ES7C, ES7S, AS7W, AS7Y, AS7H EG7R, EG7C, EG7S, AG7W, AG7Y EV7R, EV7C, EV7S, AV7W, AV7Y EI71, EI72, EI76, EI7C, EI8C, EI8R

| Encoder connection                                                                                         |         |                |                      | Encoder evaluation |         |                                                                                                   |
|------------------------------------------------------------------------------------------------------------|---------|----------------|----------------------|--------------------|---------|---------------------------------------------------------------------------------------------------|
| Connector view                                                                                             | Contact | Signal         | Cable/<br>Core color | Signal             | Contact | Connector view                                                                                    |
| M23, female, 12-pin<br> | 3       | A+, cos+       | Red (RD)             | A+, cos+           | —       | Open end<br> |
|                                                                                                            | 4       | A-, cos-       | Blue (BU)            | A-, cos-           | —       |                                                                                                   |
|                                                                                                            | 5       | B+, sin+       | Yellow (YE)          | B+, sin+           | —       |                                                                                                   |
|                                                                                                            | 6       | B-, sin-       | Green (GN)           | B-, sin-           | —       |                                                                                                   |
|                                                                                                            | 1       | C+, clock+     | Brown (BN)           | C+, clock+         | —       |                                                                                                   |
|                                                                                                            | 2       | C-, clock-     | White (WH)           | C-, clock-         | —       |                                                                                                   |
|                                                                                                            | 8       | D+, data+      | Black (BK)           | D+, data+          | —       |                                                                                                   |
|                                                                                                            | 7       | D-, data-      | Violet (VT)          | D-, data-          | —       |                                                                                                   |
|                                                                                                            | 12      | U <sub>B</sub> | Gray (GY)            | U <sub>B</sub>     | —       |                                                                                                   |
|                                                                                                            | 11      | GND            | Pink (PK)            | GND                | —       |                                                                                                   |
|                                                                                                            | 9       | TF+            | Gray-pink (GYPK)     | TF+                | —       |                                                                                                   |
|                                                                                                            | 10      | TF-            | Red-blue (RDBU)      | TF-                | —       |                                                                                                   |

## 9.5.17 E.7., A.7., E.8., A.8. encoder - open end to D-Sub15

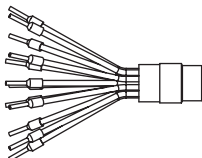
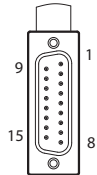
Figure



## Types

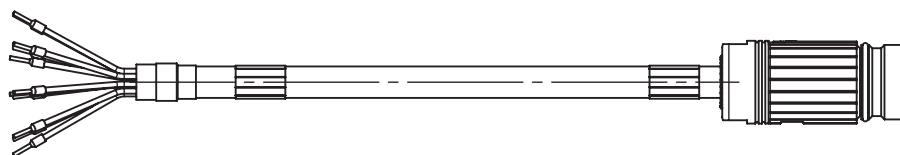
| Design and cable cross section                                    | Part number | Installation type          | Encoder                  |
|-------------------------------------------------------------------|-------------|----------------------------|--------------------------|
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 13622021    | Fixed installation         | E.7., A.7.<br>E.8., A.8. |
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 13622048    | Cable carrier installation | E.7., A.7.<br>E.8., A.8. |
| $5 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28111508    | Fixed installation         | E.7., A.7.<br>E.8., A.8. |
| $5 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28111516    | Cable carrier installation | E.7., A.7.<br>E.8., A.8. |

Pin assignment for EK8R, EK8C, EK8S, EK8W, AK8W, AK8Y, AK8H EV8R, EV8C, EV8S, AV8W, AV8Y, AV8H ES7R, ES7C, ES7S, AS7W, AS7Y, AS7H EG7R, EG7C, EG7S, AG7W, AG7Y EV7R, EV7C, EV7S, AV7W, AV7Y EI71, EI72, EI76, EI7C, EI8C, EI8R

| Encoder connection                                                                                     |         |                |                             | Encoder evaluation |         |                                                                                                                     |  |
|--------------------------------------------------------------------------------------------------------|---------|----------------|-----------------------------|--------------------|---------|---------------------------------------------------------------------------------------------------------------------|--|
| Connector view                                                                                         | Contact | Signal         | Cable/<br>Core color        | Signal             | Contact | Connector view                                                                                                      |  |
| <div>Open end</div>  | —       | A+, cos+       | Red (RD)                    | A+, cos+           | 1       | <div>D-sub, male, 15-pin</div>  |  |
|                                                                                                        | —       | A-, cos-       | Blue (BU)                   | A-, cos-           | 9       |                                                                                                                     |  |
|                                                                                                        | —       | B+, sin+       | Yellow (YE)                 | B+, sin+           | 2       |                                                                                                                     |  |
|                                                                                                        | —       | B-, sin-       | Green (GN)                  | B-, sin-           | 10      |                                                                                                                     |  |
|                                                                                                        | —       | C+, clock+     | Brown (BN)                  | C+, clock+         | 3       |                                                                                                                     |  |
|                                                                                                        | —       | C-, clock-     | White (WH)                  | C-, clock-         | 11      |                                                                                                                     |  |
|                                                                                                        | —       | D+, data+      | Black (BK)                  | D+, data+          | 4       |                                                                                                                     |  |
|                                                                                                        | —       | D-, data-      | Violet (VT)                 | D-, data-          | 12      |                                                                                                                     |  |
|                                                                                                        | —       | U <sub>B</sub> | Gray (GY)                   | U <sub>B</sub>     | 15      |                                                                                                                     |  |
|                                                                                                        | —       |                | Red-blue + gray (RD-BU+GY)  |                    |         |                                                                                                                     |  |
|                                                                                                        | —       | GND            | Pink (PK)                   | GND                | 8       |                                                                                                                     |  |
|                                                                                                        | —       |                | Gray-pink + pink (GYP-K+PK) |                    |         |                                                                                                                     |  |
|                                                                                                        | —       | TF+            | Gray-pink (GYPK)            | TF+                | 14      |                                                                                                                     |  |
|                                                                                                        | —       | TF-            | Red-blue (RDBU)             | TF-                | 6       |                                                                                                                     |  |

## 9.5.18 E.7./A.7./E.8./A.8. encoder - open end to M23

Figure

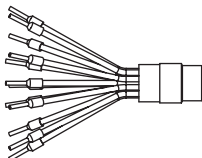
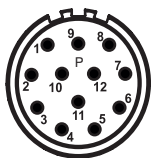


9007203412434187

## Types

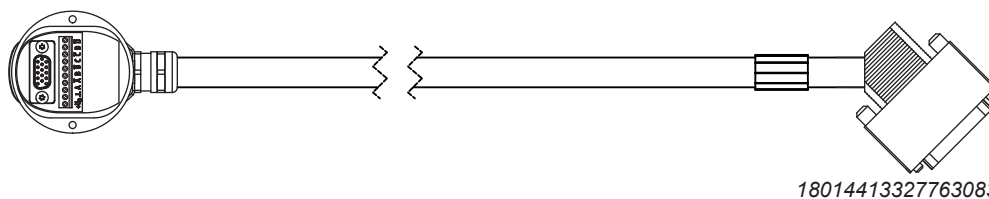
| Design and cable cross section                                    | Part number | Installation type                      | Encoder                  |
|-------------------------------------------------------------------|-------------|----------------------------------------|--------------------------|
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 13623184    | Fixed installation, without TF         | E.7., A.7.<br>E.8., A.8. |
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 18140408    | Cable carrier installation, without TF | E.7., A.7.<br>E.8., A.8. |
| $5 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28111486    | Fixed installation, with TF            | E.7., A.7.<br>E.8., A.8. |
| $5 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28111494    | Cable carrier installation, with TF    | E.7., A.7.<br>E.8., A.8. |

Pin assignment for EK8R, EK8C, EK8S, EK8W, AK8W, AK8Y, AK8H EV8R, EV8C, EV8S, AV8W, AV8Y, AV8H ES7R, ES7C, ES7S, AS7W, AS7Y, AS7H EG7R, EG7C, EG7S, AG7W, AG7Y EV7R, EV7C, EV7S, AV7W, AV7Y EI71, EI72, EI76, EI7C, EI8C, EI8R

| Encoder connection                                                                                     |         |                |                             | Encoder evaluation |         |                                                                                                                   |
|--------------------------------------------------------------------------------------------------------|---------|----------------|-----------------------------|--------------------|---------|-------------------------------------------------------------------------------------------------------------------|
| Connector view                                                                                         | Contact | Signal         | Cable/<br>Core color        | Signal             | Contact | Connector view                                                                                                    |
| <div>Open end</div>  | —       | A+, cos+       | Red (RD)                    | A+, cos+           | 3       | <div>M23, male, 12-pin</div>  |
|                                                                                                        | —       | A-, cos-       | Blue (BU)                   | A-, cos-           | 4       |                                                                                                                   |
|                                                                                                        | —       | B+, sin+       | Yellow (YE)                 | B+, sin+           | 5       |                                                                                                                   |
|                                                                                                        | —       | B-, sin-       | Green (GN)                  | B-, sin-           | 6       |                                                                                                                   |
|                                                                                                        | —       | C+, clock+     | Brown (BN)                  | C+, clock+         | 1       |                                                                                                                   |
|                                                                                                        | —       | C-, clock-     | White (WH)                  | C-, clock-         | 2       |                                                                                                                   |
|                                                                                                        | —       | D+, data+      | Black (BK)                  | D+, data+          | 8       |                                                                                                                   |
|                                                                                                        | —       | D-, data-      | Violet (VT)                 | D-, data-          | 7       |                                                                                                                   |
|                                                                                                        | —       | U <sub>B</sub> | Gray (GY)                   | U <sub>B</sub>     | 12      |                                                                                                                   |
|                                                                                                        | —       |                | Red-blue + gray (RD-BU+GY)  |                    |         |                                                                                                                   |
|                                                                                                        | —       | GND            | Pink (PK)                   | GND                | 11      |                                                                                                                   |
|                                                                                                        | —       |                | Gray-pink + pink (GYP-K+PK) |                    |         |                                                                                                                   |
|                                                                                                        | —       | TF+            | Gray-pink (GYPK)            | TF+                | 9       |                                                                                                                   |
|                                                                                                        | —       | TF-            | Red-blue (RDBU)             | TF-                | 10      |                                                                                                                   |

## 9.5.19 RK8M encoder - Connection cover to D-Sub15

Figure



## Types

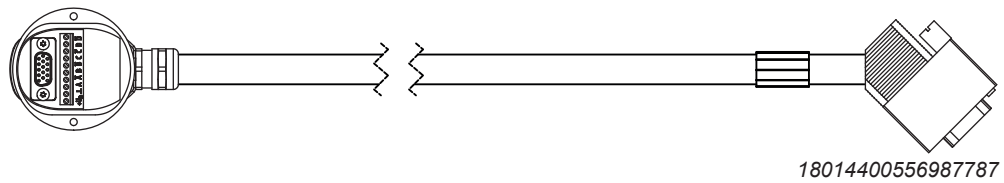
| Design and cable cross section                                    | Part number | Installation type          | Encoder |
|-------------------------------------------------------------------|-------------|----------------------------|---------|
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28174658    | Fixed installation         | RK8M    |
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28174666    | Cable carrier installation | RK8M    |

## Pin assignment for RK8M

| Encoder connection |                 |          |                      | Encoder evaluation |         |                         |
|--------------------|-----------------|----------|----------------------|--------------------|---------|-------------------------|
| Connector view     | Contact         | Signal   | Cable/<br>Core color | Signal             | Contact | Connector view          |
|                    | A               | S1, cos+ | Red (RD)             | S1, cos+           | 2       | D-sub, male, 15-pin<br> |
|                    | $\bar{A}$       | S3, cos- | Blue (BU)            | S3, cos-           | 10      |                         |
|                    | B               | S2, sin+ | Yellow (YE)          | S2, sin+           | 1       |                         |
|                    | $\bar{B}$       | S4, sin- | Green (GN)           | S4, sin-           | 9       |                         |
|                    | +U <sub>B</sub> | R1, ref+ | Pink (PK)            | R1, ref+           | 5       |                         |
|                    | GND             | R2, ref- | Gray (GY)            | R2, ref-           | 13      |                         |

### 9.5.20 RK8M encoder - Connection cover to D-Sub9

Figure



#### Types

| Design and cable cross section                                    | Part number | Installation type          | Encoder |
|-------------------------------------------------------------------|-------------|----------------------------|---------|
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28174674    | Fixed installation         | RK8M    |
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28174682    | Cable carrier installation | RK8M    |

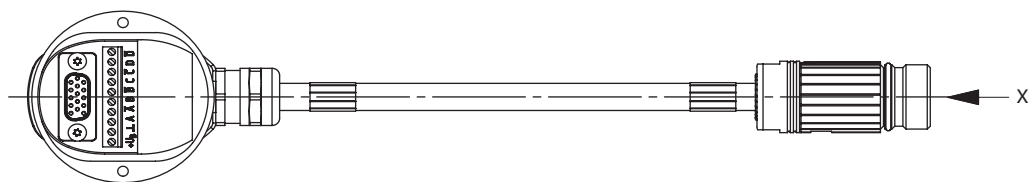
#### Pin assignment for RK8M

| Encoder connection |                 |          |                      | Encoder evaluation |         |                        |
|--------------------|-----------------|----------|----------------------|--------------------|---------|------------------------|
| Connector view     | Contact         | Signal   | Cable/<br>Core color | Signal             | Contact | Connector view         |
|                    | A               | S1, cos+ | Red (RD)             | S1, cos+           | 2       | D-sub, male, 9-pin<br> |
|                    | $\bar{A}$       | S3, cos- | Blue (BU)            | S3, cos-           | 7       |                        |
|                    | B               | S2, sin+ | Yellow (YE)          | S2, sin+           | 1       |                        |
|                    | $\bar{B}$       | S4, sin- | Green (GN)           | S4, sin-           | 6       |                        |
|                    | +U <sub>B</sub> | R1, ref+ | Pink (PK)            | R1, ref+           | 3       |                        |
|                    | GND             | R2, ref- | Gray (GY)            | R2, ref-           | 8       |                        |



## 9.5.21 RK8M encoder - Connection cover to M23

Figure



18014413327862027

## Types

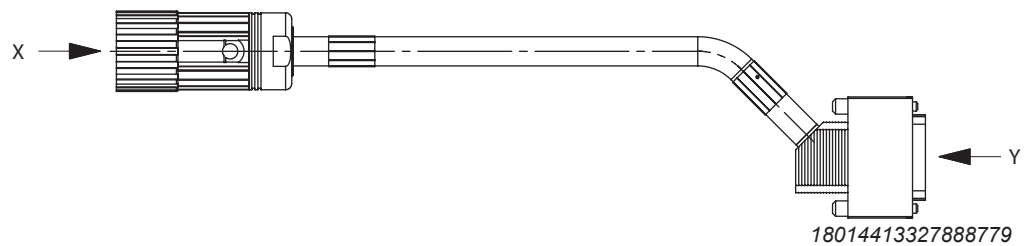
| Design and cable cross section                                    | Part number | Installation type          | Encoder |
|-------------------------------------------------------------------|-------------|----------------------------|---------|
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28174690    | Fixed installation         | RK8M    |
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28174704    | Cable carrier installation | RK8M    |

## Pin assignment for RK8M

| Encoder connection |                 |          |                      | Encoder evaluation |         |                       |
|--------------------|-----------------|----------|----------------------|--------------------|---------|-----------------------|
| Connector view     | Contact         | Signal   | Cable/<br>Core color | Signal             | Contact | Connector view        |
|                    | A               | S1, cos+ | Red (RD)             | S1, cos+           | 3       | M23, male, 12-pin<br> |
|                    | Ā              | S3, cos- | Blue (BU)            | S3, cos-           | 4       |                       |
|                    | B               | S2, sin+ | Yellow (YE)          | S2, sin+           | 5       |                       |
|                    | B̄              | S4, sin- | Green (GN)           | S4, sin-           | 6       |                       |
|                    | +U <sub>B</sub> | R1, ref+ | Pink (PK)            | R1, ref+           | 1       |                       |
|                    | GND             | R2, ref- | Gray (GY)            | R2, ref-           | 2       |                       |

### 9.5.22 RK8M encoder - M23 to D-Sub15

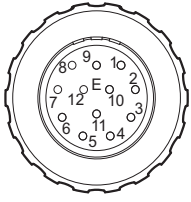
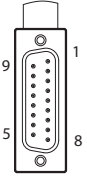
Figure



#### Types

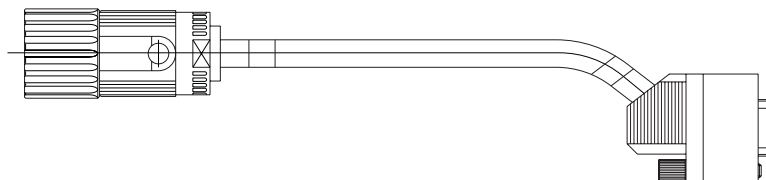
| Design and cable cross section                                    | Part number | Installation type          | Encoder |
|-------------------------------------------------------------------|-------------|----------------------------|---------|
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28125622    | Fixed installation         | RK8M    |
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28125630    | Cable carrier installation | RK8M    |

#### Pin assignment for RK8M

| Encoder connection                                                                                         |         |          |                      | Encoder evaluation |         |                                                                                                              |
|------------------------------------------------------------------------------------------------------------|---------|----------|----------------------|--------------------|---------|--------------------------------------------------------------------------------------------------------------|
| Connector view                                                                                             | Contact | Signal   | Cable/<br>Core color | Signal             | Contact | Connector view                                                                                               |
| M23, female, 12-pin<br> | 3       | S1, cos+ | Red (RD)             | S1, cos+           | 2       | D-sub, male, 15-pin<br> |
|                                                                                                            | 4       | S3, cos- | Blue (BU)            | S3, cos-           | 10      |                                                                                                              |
|                                                                                                            | 5       | S2, sin+ | Yellow (YE)          | S2, sin+           | 1       |                                                                                                              |
|                                                                                                            | 6       | S4, sin- | Green (GN)           | S4, sin-           | 9       |                                                                                                              |
|                                                                                                            | 1       | R1, ref+ | Pink (PK)            | R1, ref+           | 5       |                                                                                                              |
|                                                                                                            | 2       | R2, ref- | Gray (GY)            | R2, ref-           | 13      |                                                                                                              |
|                                                                                                            | 9       | TF+      | Brown (BN)           | TF+                | 14      |                                                                                                              |
|                                                                                                            | 10      | TF-      | White (WH)           | TF-                | 6       |                                                                                                              |

## 9.5.23 RK8M encoder - M23 to D-Sub9

Figure

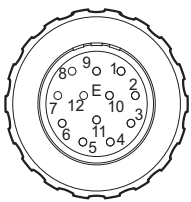
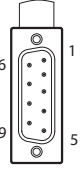


18014399985168267

## Types

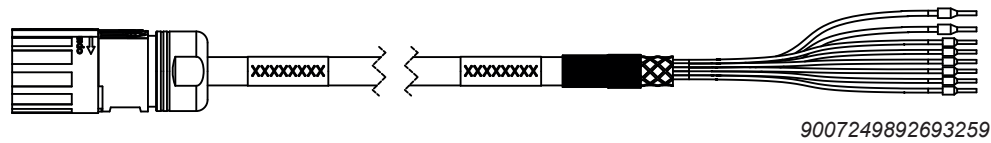
| Design and cable cross section                                    | Part number | Installation type          | Encoder |
|-------------------------------------------------------------------|-------------|----------------------------|---------|
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28125649    | Fixed installation         | RK8M    |
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28125657    | Cable carrier installation | RK8M    |

## Pin assignment for RK8M

| Encoder connection                                                                                         |         |          |                      | Encoder evaluation |         |                                                                                                             |
|------------------------------------------------------------------------------------------------------------|---------|----------|----------------------|--------------------|---------|-------------------------------------------------------------------------------------------------------------|
| Connector view                                                                                             | Contact | Signal   | Cable/<br>Core color | Signal             | Contact | Connector view                                                                                              |
| M23, female, 12-pin<br> | 3       | S1, cos+ | Red (RD)             | S1, cos+           | 2       | D-sub, male, 9-pin<br> |
|                                                                                                            | 4       | S3, cos- | Blue (BU)            | S3, cos-           | 7       |                                                                                                             |
|                                                                                                            | 5       | S2, sin+ | Yellow (YE)          | S2, sin+           | 1       |                                                                                                             |
|                                                                                                            | 6       | S4, sin- | Green (GN)           | S4, sin-           | 6       |                                                                                                             |
|                                                                                                            | 1       | R1, ref+ | Pink (PK)            | R1, ref+           | 3       |                                                                                                             |
|                                                                                                            | 2       | R2, ref- | Gray (GY)            | R2, ref-           | 8       |                                                                                                             |
|                                                                                                            | 9       | TF+      | Brown (BN)           | TF+                | 9       |                                                                                                             |
|                                                                                                            | 10      | TF-      | White (WH)           | TF-                | 5       |                                                                                                             |

#### 9.5.24 RK8M encoder - M23 to open end

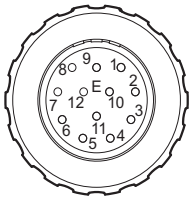
Figure



#### Types

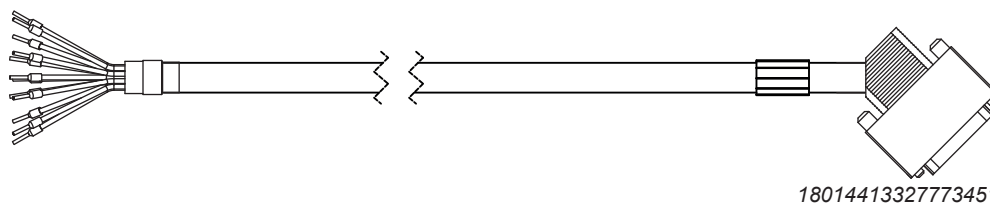
| Design and cable cross section                                    | Part number | Installation type          | Encoder |
|-------------------------------------------------------------------|-------------|----------------------------|---------|
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28177371    | Fixed installation         | RK8M    |
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28177398    | Cable carrier installation | RK8M    |

#### Pin assignment for RK8M

| Encoder connection                                                                                         |         |          |                      | Encoder evaluation |         |                                                                                                   |
|------------------------------------------------------------------------------------------------------------|---------|----------|----------------------|--------------------|---------|---------------------------------------------------------------------------------------------------|
| Connector view                                                                                             | Contact | Signal   | Cable/<br>Core color | Signal             | Contact | Connector view                                                                                    |
| M23, female, 12-pin<br> | 3       | S1, cos+ | Red (RD)             | S1, cos+           | —       | Open end<br> |
|                                                                                                            | 4       | S3, cos- | Blue (BU)            | S3, cos-           | —       |                                                                                                   |
|                                                                                                            | 5       | S2, sin+ | Yellow (YE)          | S2, sin+           | —       |                                                                                                   |
|                                                                                                            | 6       | S4, sin- | Green (GN)           | S4, sin-           | —       |                                                                                                   |
|                                                                                                            | 1       | R1, ref+ | Pink (PK)            | R1, ref+           | —       |                                                                                                   |
|                                                                                                            | 2       | R2, ref- | Gray (GY)            | R2, ref-           | —       |                                                                                                   |
|                                                                                                            | 9       | TF+      | Brown (BN)           | TF+                | —       |                                                                                                   |
|                                                                                                            | 10      | TF-      | White (WH)           | TF-                | —       |                                                                                                   |

## 9.5.25 RK8M encoder - open end to D-Sub15

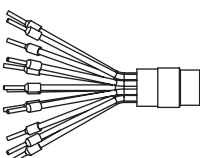
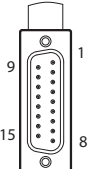
Figure



## Types

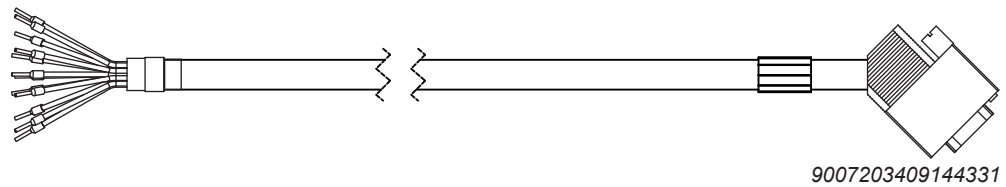
| Design and cable cross section                                    | Part number | Installation type          | Encoder |
|-------------------------------------------------------------------|-------------|----------------------------|---------|
| $5 \times 2 \times 0.25 \text{ mm}^2$                             | 13356356    | Fixed installation         | RK8M    |
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 13356364    | Cable carrier installation | RK8M    |

## Pin assignment for RK8M

| Encoder connection                                                                              |         |          |                         | Encoder evaluation |         |                                                                                                              |
|-------------------------------------------------------------------------------------------------|---------|----------|-------------------------|--------------------|---------|--------------------------------------------------------------------------------------------------------------|
| Connector view                                                                                  | Contact | Signal   | Cable/<br>Core color    | Signal             | Contact | Connector view                                                                                               |
| Open end<br> | —       | S1, cos+ | Red (RD)                | S1, cos+           | 2       | D-sub, male, 15-pin<br> |
|                                                                                                 | —       | S3, cos- | Blue (BU)               | S3, cos-           | 10      |                                                                                                              |
|                                                                                                 | —       | S2, sin+ | Yellow (YE)             | S2, sin+           | 1       |                                                                                                              |
|                                                                                                 | —       | S4, sin- | Green (GN)              | S4, sin-           | 9       |                                                                                                              |
|                                                                                                 | —       | R1, ref+ | Pink (PK)               | R1, ref+           | 5       |                                                                                                              |
|                                                                                                 | —       | R2, ref- | Gray (GY)               | R2, ref-           | 13      |                                                                                                              |
|                                                                                                 | —       | TF+      | Violet brown (VT+BN)    | TF+                | 14      |                                                                                                              |
|                                                                                                 | —       | TF-      | Black and white (BK+WH) | TF-                | 6       |                                                                                                              |

### 9.5.26 RK8M encoder - open end to D-Sub9

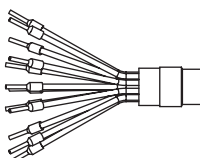
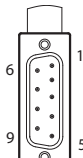
Figure



#### Types

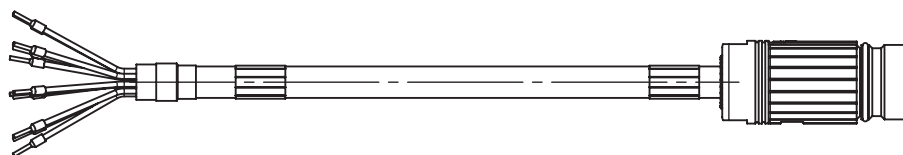
| Design and cable cross section                                    | Part number | Installation type          | Encoder |
|-------------------------------------------------------------------|-------------|----------------------------|---------|
| $5 \times 2 \times 0.25 \text{ mm}^2$                             | 13356259    | Fixed installation         | RK8M    |
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 13356267    | Cable carrier installation | RK8M    |

#### Pin assignment for RK8M

| Encoder connection                                                                                      |         |          |                         | Encoder evaluation |         |                                                                                                                     |
|---------------------------------------------------------------------------------------------------------|---------|----------|-------------------------|--------------------|---------|---------------------------------------------------------------------------------------------------------------------|
| Connector view                                                                                          | Contact | Signal   | Cable/<br>Core color    | Signal             | Contact | Connector view                                                                                                      |
| <div>Open end</div>  | —       | S1, cos+ | Red (RD)                | S1, cos+           | 2       | <div>D-sub, male, 9-pin</div>  |
|                                                                                                         | —       | S3, cos- | Blue (BU)               | S3, cos-           | 7       |                                                                                                                     |
|                                                                                                         | —       | S2, sin+ | Yellow (YE)             | S2, sin+           | 1       |                                                                                                                     |
|                                                                                                         | —       | S4, sin- | Green (GN)              | S4, sin-           | 6       |                                                                                                                     |
|                                                                                                         | —       | R1, ref+ | Pink (PK)               | R1, ref+           | 3       |                                                                                                                     |
|                                                                                                         | —       | R2, ref- | Gray (GY)               | R2, ref-           | 8       |                                                                                                                     |
|                                                                                                         | —       | TF+      | Brown (BN)              | TF+                | 9       |                                                                                                                     |
|                                                                                                         | —       |          | Violet brown (VT+BN)    |                    |         |                                                                                                                     |
|                                                                                                         | —       | TF-      | White (WH)              | TF-                | 5       |                                                                                                                     |
|                                                                                                         | —       |          | Black and white (BK+WH) |                    |         |                                                                                                                     |

## 9.5.27 RK8M encoder - open end to M23

Figure

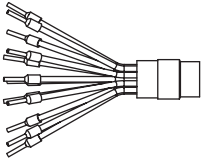
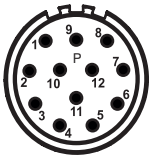


9007203412434187

## Types

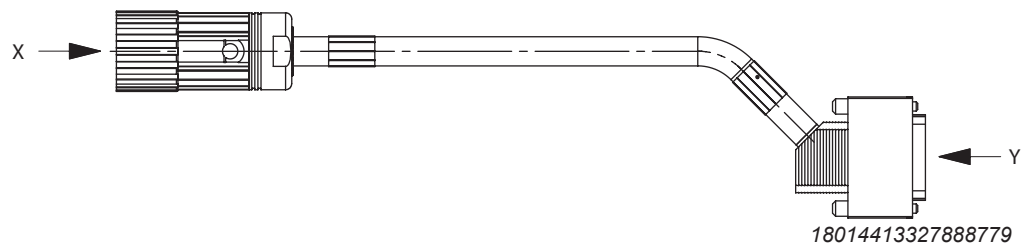
| Design and cable cross section                                    | Part number | Installation type          | Encoder |
|-------------------------------------------------------------------|-------------|----------------------------|---------|
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28176626    | Fixed installation         | RK8M    |
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28176618    | Cable carrier installation | RK8M    |

## Pin assignment for RK8M

| Encoder connection                                                                                  |         |          |                      |          | Encoder evaluation |                                                                                                                |
|-----------------------------------------------------------------------------------------------------|---------|----------|----------------------|----------|--------------------|----------------------------------------------------------------------------------------------------------------|
| Connector view                                                                                      | Contact | Signal   | Cable/<br>Core color | Signal   | Contact            | Connector view                                                                                                 |
| Open end<br><br> | —       | S1, cos+ | Red (RD)             | S1, cos+ | 3                  | M23, male, 12-pin<br><br> |
|                                                                                                     | —       | S3, cos- | Blue (BU)            | S3, cos- | 4                  |                                                                                                                |
|                                                                                                     | —       | S2, sin+ | Yellow (YE)          | S2, sin+ | 5                  |                                                                                                                |
|                                                                                                     | —       | S4, sin- | Green (GN)           | S4, sin- | 6                  |                                                                                                                |
|                                                                                                     | —       | R1, ref+ | Pink (PK)            | R1, ref+ | 1                  |                                                                                                                |
|                                                                                                     | —       | R2, ref- | Gray (GY)            | R2, ref- | 2                  |                                                                                                                |
|                                                                                                     | —       | TF+      | Brown (BN)           | TF+      | 9                  |                                                                                                                |
|                                                                                                     | —       | TF-      | White (WH)           | TF-      | 10                 |                                                                                                                |

### 9.5.28 EH7. encoder - M23 to D-Sub15

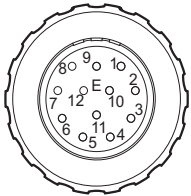
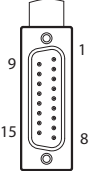
Figure



#### Types

| Design and cable cross section        | Part number | Installation type          | Encoder |
|---------------------------------------|-------------|----------------------------|---------|
| $5 \times 2 \times 0.25 \text{ mm}^2$ | 13602659    | Fixed installation         | EH7.    |
| $5 \times 2 \times 0.25 \text{ mm}^2$ | 13623206    | Cable carrier installation | EH7.    |

#### Pin assignment for EH7S, EH7R, EH7C, EH7T

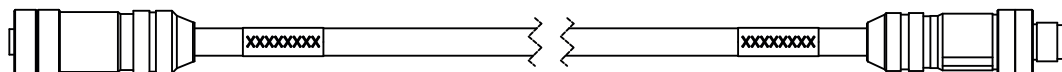
| Encoder connection                                                                                         |         |            |                       | Encoder evaluation |         |                                                                                                              |
|------------------------------------------------------------------------------------------------------------|---------|------------|-----------------------|--------------------|---------|--------------------------------------------------------------------------------------------------------------|
| Connector view                                                                                             | Contact | Signal     | Cable/<br>Core color  | Signal             | Contact | Connector view                                                                                               |
| M23, female, 12-pin<br> | 5       | A+, cos+   | Red (RD)              | A+, cos+           | 1       | D-sub, male, 15-pin<br> |
|                                                                                                            | 6       | A-, cos-   | Blue (BU)             | A-, cos-           | 9       |                                                                                                              |
|                                                                                                            | 8       | B+, sin+   | Yellow (YE)           | B+, sin+           | 2       |                                                                                                              |
|                                                                                                            | 1       | B-, sin-   | Green (GN)            | B-, sin-           | 10      |                                                                                                              |
|                                                                                                            | 3       | C+, clock+ | Brown (BN)            | C+, clock+         | 3       |                                                                                                              |
|                                                                                                            | 4       | C-, clock- | White (WH)            | C-, clock-         | 11      |                                                                                                              |
|                                                                                                            | 12      | $U_B$      | Black + gray (BK+GY)  | $U_B$              | 15      |                                                                                                              |
|                                                                                                            | 10      | GND        | Pink + violet (PK+VT) | GND                | 8       |                                                                                                              |



## 9.6 Design of encoder extension cables for DR.. motors

### 9.6.1 EI7. encoder - M12, 4-pin to M12, 4-pin

Figure

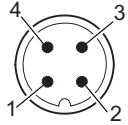


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#### Types

| Design and cable cross section | Part number | Installation type  | Encoder |
|--------------------------------|-------------|--------------------|---------|
| 5 × 2 × 0.25 mm <sup>2</sup>   | 18156738    | Fixed installation | EI7.    |

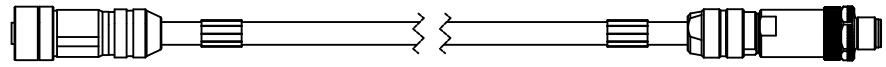
#### Pin assignment for EI71, EI72, EI76, EI7C

| Encoder connection                                                                                        |         |                       |                      | Encoder evaluation    |         |                                                                                                           |
|-----------------------------------------------------------------------------------------------------------|---------|-----------------------|----------------------|-----------------------|---------|-----------------------------------------------------------------------------------------------------------|
| Connector view                                                                                            | Contact | Signal                | Cable/<br>Core color | Signal                | Contact | Connector view                                                                                            |
| M12, female, 4-pin<br> | 1       | U <sub>B</sub>        | Gray (GY)            | U <sub>B</sub>        | 1       | M12, male, 4-pin<br> |
|                                                                                                           | 2       | B+, sin <sup>+1</sup> | Yellow (YE)          | B+, sin <sup>+1</sup> | 2       |                                                                                                           |
|                                                                                                           | 3       | GND                   | Pink (PK)            | GND                   | 3       |                                                                                                           |
|                                                                                                           | 4       | A+, cos <sup>+1</sup> | Brown (BN)           | A+, cos <sup>+1</sup> | 4       |                                                                                                           |

1) Without inverted signal tracks.

### 9.6.2 EI7./EI8C/EI7C-FS encoder - M12, 8-pin to M12, 8-pin

Figure



9007249892963595

#### Types

| Design and cable cross section | Part number | Installation type                      | Encoder       |
|--------------------------------|-------------|----------------------------------------|---------------|
| 5 × 2 × 0.25 mm <sup>2</sup>   | 18148670    | Fixed installation, without TF         | EI7., EI7C FS |
| 5 × 2 × 0.25 mm <sup>2</sup>   | 18156762    | Fixed installation, with TF            | EI7., EI8C    |
| 4 × 2 × 0.25 mm <sup>2</sup>   | 18158013    | Cable carrier installation, without TF | EI7., EI7C FS |

#### Pin assignment for EI71, EI72, EI76, EI7C, EI8C

| Encoder connection     |         |                |                      | Encoder evaluation |         |                      |
|------------------------|---------|----------------|----------------------|--------------------|---------|----------------------|
| Connector view         | Contact | Signal         | Cable/<br>Core color | Signal             | Contact | Connector view       |
| M12, female, 8-pin<br> | 3       | A+, cos+       | Brown (BN)           | A+, cos+           | 3       | M12, male, 8-pin<br> |
|                        | 4       | A-, cos-       | White (WH)           | A-, cos-           | 4       |                      |
|                        | 5       | B+, sin+       | Yellow (YE)          | B+, sin+           | 5       |                      |
|                        | 6       | B-, sin-       | Green (GN)           | B-, sin-           | 6       |                      |
|                        | 7       | TF+            | Red (RD)             | TF+                | 7       |                      |
|                        | 8       | TF-            | Blue (BU)            | TF-                | 8       |                      |
|                        | 1       | U <sub>B</sub> | Gray (GY)            | U <sub>B</sub>     | 1       |                      |
|                        | 2       | GND            | Pink (PK)            | GND                | 2       |                      |

#### Pin assignment for EI7C FS safety encoder

| Encoder connection     |         |                |                      | Encoder evaluation |         |                      |
|------------------------|---------|----------------|----------------------|--------------------|---------|----------------------|
| Connector view         | Contact | Signal         | Cable/<br>Core color | Signal             | Contact | Connector view       |
| M12, female, 8-pin<br> | 3       | A+, cos+       | Brown (BN)           | A+, cos+           | 3       | M12, male, 8-pin<br> |
|                        | 4       | A-, cos-       | White (WH)           | A-, cos-           | 4       |                      |
|                        | 5       | B+, sin+       | Yellow (YE)          | B+, sin+           | 5       |                      |
|                        | 6       | B-, sin-       | Green (GN)           | B-, sin-           | 6       |                      |
|                        | 7       | —              | Red (RD)             | —                  | 7       |                      |
|                        | 8       | —              | Blue (BU)            | —                  | 8       |                      |
|                        | 1       | U <sub>B</sub> | Gray (GY)            | U <sub>B</sub>     | 1       |                      |
|                        | 2       | GND            | Pink (PK)            | GND                | 2       |                      |

## 9.6.3 E.7./A.7./E.8./A.8. encoder - M23 to M23

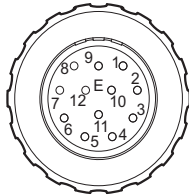
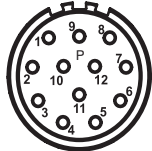
## Structure



## Types

| Design and cable cross section                                    | Part number | Installation type                      | Encoder                  |
|-------------------------------------------------------------------|-------------|----------------------------------------|--------------------------|
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 13623192    | Fixed installation, without TF         | E.7., A.7.<br>E.8., A.8. |
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 18191971    | Cable carrier installation, without TF | E.7., A.7.<br>E.8., A.8. |
| $5 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28111451    | Fixed installation, with TF            | E.7., A.7.<br>E.8., A.8. |
| $5 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28111478    | Cable carrier installation, with TF    | E.7., A.7.<br>E.8., A.8. |

Pin assignment for EK8R, EK8C, EK8S, EK8W, EK8X, AK8W, AK8Y, AK8H EV8R, EV8C, EV8S, AV8W, AV8Y, AV8H ES7R, ES7C, ES7S, AS7W, AS7Y, AS7H EG7R, EG7C, EG7S, AG7W, AG7Y EV7R, EV7C, EV7S, AV7W, AV7Y EI71, EI72, EI76, EI7C, EI8C, EI8R

| Encoder connection                                                                                                           |         |                  |                             | Encoder evaluation |         |                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------|---------|------------------|-----------------------------|--------------------|---------|------------------------------------------------------------------------------------------------------------------------------|
| Connector view                                                                                                               | Contact | Signal           | Cable/<br>Core color        | Signal             | Contact | Connector view                                                                                                               |
| <div>M23, female, 12-pin</div> <div></div> | 3       | A+, cos+         | Red (RD)                    | A+, cos+           | 3       | <div>M23, male, 12-pin</div> <div></div> |
|                                                                                                                              | 4       | A-, cos-         | Blue (BU)                   | A-, cos-           | 4       |                                                                                                                              |
|                                                                                                                              | 5       | B+, sin+         | Yellow (YE)                 | B+, sin+           | 5       |                                                                                                                              |
|                                                                                                                              | 6       | B-, sin-         | Green (GN)                  | B-, sin-           | 6       |                                                                                                                              |
|                                                                                                                              | 1       | C+, clock+       | Brown (BN)                  | C+, clock+         | 1       |                                                                                                                              |
|                                                                                                                              | 2       | C-, clock-       | White (WH)                  | C-, clock-         | 2       |                                                                                                                              |
|                                                                                                                              | 8       | D+, data+        | Black (BK)                  | D+, data+          | 8       |                                                                                                                              |
|                                                                                                                              | 7       | D-, data-        | Violet (VT)                 | D-, data-          | 7       |                                                                                                                              |
|                                                                                                                              | 12      | U <sub>B</sub>   | Gray (GY)                   | U <sub>B</sub>     | 12      |                                                                                                                              |
|                                                                                                                              |         |                  | Red-blue + gray (RD-BU+GY)  |                    |         |                                                                                                                              |
|                                                                                                                              | 11      | GND              | Pink (PK)                   | GND                | 11      |                                                                                                                              |
|                                                                                                                              |         |                  | Gray-pink + pink (GYP-K+PK) |                    |         |                                                                                                                              |
| 9                                                                                                                            | TF+     | Gray-pink (GYPK) | TF+                         | 9                  |         |                                                                                                                              |
| 10                                                                                                                           | TF-     | Red-blue (RDBU)  | TF-                         | 10                 |         |                                                                                                                              |

## 9.6.4 RK8M encoder - M23 to M23

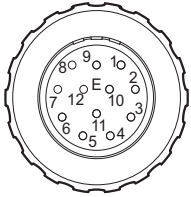
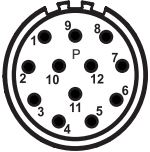
Figure



## Types

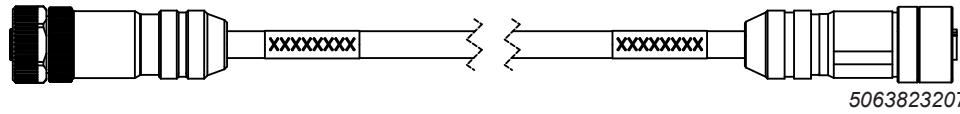
| Design and cable cross section                                    | Part number | Installation type          | Encoder |
|-------------------------------------------------------------------|-------------|----------------------------|---------|
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28125711    | Fixed installation         | RK8M    |
| $4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$ | 28125738    | Cable carrier installation | RK8M    |

## Pin assignment for RK8M

| Encoder connection                                                                                         |         |          |                      | Encoder evaluation |         |                                                                                                            |
|------------------------------------------------------------------------------------------------------------|---------|----------|----------------------|--------------------|---------|------------------------------------------------------------------------------------------------------------|
| Connector view                                                                                             | Contact | Signal   | Cable/<br>Core color | Signal             | Contact | Connector view                                                                                             |
| M23, female, 12-pin<br> | 3       | S1, cos+ | Red (RD)             | S1, cos+           | 3       | M23, male, 12-pin<br> |
|                                                                                                            | 4       | S3, cos- | Blue (BU)            | S3, cos-           | 4       |                                                                                                            |
|                                                                                                            | 5       | S2, sin+ | Yellow (YE)          | S2, sin+           | 5       |                                                                                                            |
|                                                                                                            | 6       | S4, sin- | Green (GN)           | S4, sin-           | 6       |                                                                                                            |
|                                                                                                            | 1       | R1, ref+ | Pink (PK)            | R1, ref+           | 1       |                                                                                                            |
|                                                                                                            | 2       | R2, ref- | Gray (GY)            | R2, ref-           | 2       |                                                                                                            |
|                                                                                                            | 9       | TF+      | Brown (BN)           | TF+                | 9       |                                                                                                            |
|                                                                                                            | 10      | TF-      | White (WH)           | TF-                | 10      |                                                                                                            |

### 9.6.5 EI7. encoder - M12, 8-pin to M12, 4-pin

#### Structure



#### Types

| Design and cable cross section        | Part number | Installation type                      | Encoder |
|---------------------------------------|-------------|----------------------------------------|---------|
| $4 \times 2 \times 0.25 \text{ mm}^2$ | 28111591    | Cable carrier installation, without TF | EI7.    |

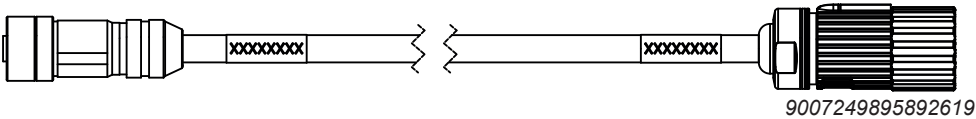
#### Pin assignment for EI71, EI72, EI76, EI7C

| Encoder connection     |         |                        |                      | Encoder evaluation     |         |                        |
|------------------------|---------|------------------------|----------------------|------------------------|---------|------------------------|
| Connector view         | Contact | Signal                 | Cable/<br>Core color | Signal                 | Contact | Connector view         |
| M12, female, 8-pin<br> | 3       | A+, cos+ <sup>1)</sup> | Brown (BN)           | A+, cos+ <sup>1)</sup> | 4       | M12, female, 4-pin<br> |
|                        | 5       | B+, sin+ <sup>1)</sup> | Yellow (YE)          | B+, sin+ <sup>1)</sup> | 2       |                        |
|                        | 1       | U <sub>B</sub>         | Gray (GY)            | U <sub>B</sub>         | 1       |                        |
|                        | 2       | GND                    | Pink (PK)            | GND                    | 3       |                        |

1) Without inverted signal tracks.

9.6.6 EI7C FS safety encoder - M12, 8-pin to M23

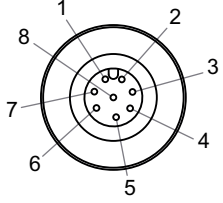
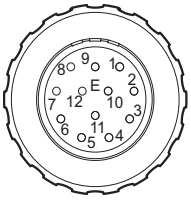
Figure



Types

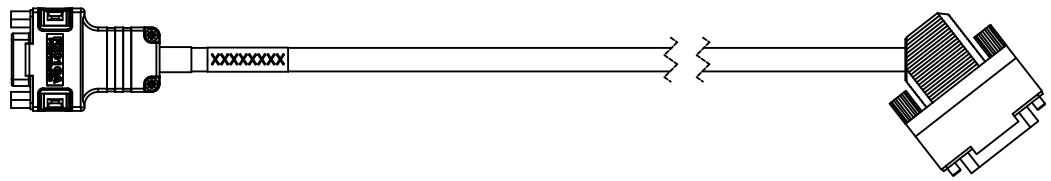
| Design and cable cross section | Part number | Installation type          | Encoder |
|--------------------------------|-------------|----------------------------|---------|
| 4 × 2 × 0.25 mm <sup>2</sup>   | 18121950    | Cable carrier installation | EI7C FS |

Pin assignment for EI7C FS

| Encoder connection                                                                                               |         |                |                      | Encoder evaluation |         |                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------|---------|----------------|----------------------|--------------------|---------|-------------------------------------------------------------------------------------------------------------------|
| Connector view                                                                                                   | Contact | Signal         | Cable/<br>Core color | Signal             | Contact | Connector view                                                                                                    |
| <div>M12, female, 8-pin</div>  | 1       | U <sub>B</sub> | Gray (GY)            | U <sub>B</sub>     | 12      | <div>M23, male, 12-pin</div>  |
|                                                                                                                  |         |                | Blue (BU)            |                    | 11      |                                                                                                                   |
|                                                                                                                  | 2       | GND            | Pink (PK)            | GND                | 3       |                                                                                                                   |
|                                                                                                                  |         |                | Red (RD)             |                    | 4       |                                                                                                                   |
|                                                                                                                  | 3       | A+, cos+       | Brown (BN)           | A+, cos+           | 5       |                                                                                                                   |
|                                                                                                                  | 4       | A-, cos-       | White (WH)           | A-, cos-           | 6       |                                                                                                                   |

### 9.6.7 RK8M encoder - D-Sub9 to D-Sub15

Figure

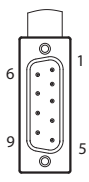
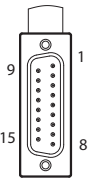


9007249895897483

#### Types

| Design and cable cross section | Part number | Installation type  | Encoder |
|--------------------------------|-------------|--------------------|---------|
| 5 × 2 × 0.25 mm <sup>2</sup>   | 13356259    | Fixed installation | RK8M    |

#### Pin assignment for RK8M

| Encoder connection                                                                                          |         |          |                      | Encoder evaluation |         |                                                                                                              |
|-------------------------------------------------------------------------------------------------------------|---------|----------|----------------------|--------------------|---------|--------------------------------------------------------------------------------------------------------------|
| Connector view                                                                                              | Contact | Signal   | Cable/<br>Core color | Signal             | Contact | Connector view                                                                                               |
| D-sub, female, 9-pin<br> | 2       | S1, cos+ | Red (RD)             | S1, cos+           | 2       | D-sub, male, 15-pin<br> |
|                                                                                                             | 7       | S3, cos- | Blue (BU)            | S3, cos-           | 10      |                                                                                                              |
|                                                                                                             | 1       | S2, sin+ | Yellow (YE)          | S2, sin+           | 1       |                                                                                                              |
|                                                                                                             | 6       | S4, sin- | Green (GN)           | S4, sin-           | 9       |                                                                                                              |
|                                                                                                             | 3       | R1, ref+ | Pink (PK)            | R1, ref+           | 5       |                                                                                                              |
|                                                                                                             | 8       | R2, ref- | Gray (GY)            | R2, ref-           | 13      |                                                                                                              |
|                                                                                                             | 9       | TF+      | Brown (BN)           | TF+                | 14      |                                                                                                              |
|                                                                                                             | 5       | TF-      | White (WH)           | TF-                | 6       |                                                                                                              |



## 9.7 Cable specification of encoder cables

### 9.7.1 Fixed installation

|                                            |      |                                                                                                                                                                                                                                                |                                                                                                |                                         |
|--------------------------------------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------------------------|
| Encoder identification                     |      | EK8R, EK8C, EK8S,<br>EK8W, EK8X, AK8W,<br>AK8Y, AK8H<br><br>EV8R, EV8C, EV8S,<br>AV8W, AV8Y, AV8H<br><br>ES7R, ES7C, ES7S,<br>AS7W, AS7Y, AS7H<br><br>EG7R, EG7C, EG7S,<br>AG7W, AG7Y<br><br>EV7R, EV7C, EV7S,<br>AV7W, AV7Y<br><br>EI8C, EI8R | EH7C, EH7R, EH7S,<br>AH7Y                                                                      | EI71, EI72, EI76,<br>EI7C <sup>1)</sup> |
| Cable cross section                        |      | Cable with part num-<br>ber from<br>SEW-EURODRIVE<br><br>19065434 – (6 × 2 ×<br>0.25 mm <sup>2</sup> )<br><br>25633090 – (4 × 2 ×<br>0.25 + 2 × 0.5 mm <sup>2</sup> )<br><br>13251724 – (5 × 2 ×<br>0.25 + 2 × 0.5 mm <sup>2</sup> )           | Cable with part number from<br>SEW-EURODRIVE<br><br>13251724 – (5 × 2 × 0.25 mm <sup>2</sup> ) |                                         |
| Manufacturer                               |      | HELUKABEL/Leoni                                                                                                                                                                                                                                |                                                                                                |                                         |
| Manufacturer's designa-<br>tion            |      | Li9YCY/LEHC 005307                                                                                                                                                                                                                             |                                                                                                |                                         |
| Operating voltage U <sub>0</sub> /<br>U AC | V    | 230/350 VDE / 300 UL                                                                                                                                                                                                                           |                                                                                                |                                         |
| Temperature range                          | °C   | Fixed installation -40 to +80                                                                                                                                                                                                                  |                                                                                                |                                         |
| Maximum temperature                        | °C   | + 80                                                                                                                                                                                                                                           |                                                                                                |                                         |
| Minimum bending radius                     | mm   | 19065434: 6 × D (HELUKABEL), 5 × D (Leoni)<br>25633090: 3 × D (once), 6 × D<br>13251724: 5 x D                                                                                                                                                 |                                                                                                |                                         |
| Outer diameter D                           | mm   | 7.3 ± 0.2                                                                                                                                                                                                                                      |                                                                                                |                                         |
| Core identification                        |      | DIN 47 100                                                                                                                                                                                                                                     |                                                                                                |                                         |
| Sheath color                               |      | Green, similar to RAL6018                                                                                                                                                                                                                      |                                                                                                |                                         |
| Approval(s)                                |      | DESINA/VDE/UL/CSA/CE                                                                                                                                                                                                                           |                                                                                                |                                         |
| Capacitance core/shield-<br>ing            | pF/m | Max. 95                                                                                                                                                                                                                                        |                                                                                                |                                         |
| Capacitance core/core                      | pF/m | Max. 65                                                                                                                                                                                                                                        |                                                                                                |                                         |
| Halogen-free                               |      | No                                                                                                                                                                                                                                             |                                                                                                |                                         |
| Silicone-free                              |      | Yes                                                                                                                                                                                                                                            |                                                                                                |                                         |

|                                         |       |                                                                                                                                                                                                                                                |                                                                                   |                                         |
|-----------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------|
| Encoder identification                  |       | EK8R, EK8C, EK8S,<br>EK8W, EK8X, AK8W,<br>AK8Y, AK8H<br><br>EV8R, EV8C, EV8S,<br>AV8W, AV8Y, AV8H<br><br>ES7R, ES7C, ES7S,<br>AS7W, AS7Y, AS7H<br><br>EG7R, EG7C, EG7S,<br>AG7W, AG7Y<br><br>EV7R, EV7C, EV7S,<br>AV7W, AV7Y<br><br>EI8C, EI8R | EH7C, EH7R, EH7S,<br>AH7Y                                                         | EI71, EI72, EI76,<br>EI7C <sup>1)</sup> |
| Cable cross section                     |       | Cable with part num-<br>ber from<br>SEW-EURODRIVE<br><br>19065434 – (6 × 2 ×<br>0.25 mm²)<br><br>25633090 – (4 × 2 ×<br>0.25 + 2 × 0.5 mm²)<br><br>13251724 – (5 × 2 ×<br>0.25 + 2 × 0.5 mm²)                                                  | Cable with part number from<br>SEW-EURODRIVE<br><br>13251724 – (5 × 2 × 0.25 mm²) |                                         |
| Manufacturer                            |       | HELUKABEL/Leoni                                                                                                                                                                                                                                |                                                                                   |                                         |
| CFC-free                                |       | Yes                                                                                                                                                                                                                                            |                                                                                   |                                         |
| Insulation internal (core)              |       | PP                                                                                                                                                                                                                                             |                                                                                   |                                         |
| Insulation external<br>(sheath)         |       | PVC                                                                                                                                                                                                                                            |                                                                                   |                                         |
| Flame retardant/self-extin-<br>guishing |       | Flame retardant according to VDE0472, Part 802, Test type B, accord-<br>ing to IEC 60332-1                                                                                                                                                     |                                                                                   |                                         |
| Conductor material                      |       | Cu blank                                                                                                                                                                                                                                       |                                                                                   |                                         |
| Shielding                               |       | Braided copper, tinned                                                                                                                                                                                                                         |                                                                                   |                                         |
| Weight (cable)                          | kg/km | 19065434: 96.2<br><br>25633090: 93<br><br>13251724: 73.4                                                                                                                                                                                       |                                                                                   |                                         |

1) EI7C encoders require a maximum of 8 cores, additional cores for potential temperature sensors.

## 9.7.2 Cable carrier installation

|                                            |       |                                                                                                                                                                                                                                             |                                                                                   |                                         |
|--------------------------------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------|
| Accessory identification                   |       | EK8R, EK8C, EK8S, EK8W,<br>EK8X, AK8W, AK8Y, AK8H<br><br>EV8R, EV8C, EV8S, AV8W,<br>AV8Y, AV8H<br><br>ES7R, ES7C, ES7S, AS7W,<br>AS7Y, AS7H<br><br>EG7R, EG7C, EG7S, AG7W,<br>AG7Y<br><br>EV7R, EV7C, EV7S, AV7W,<br>AV7Y<br><br>EI8C, EI8R | EH7C, EH7R,<br>EH7S, AH7Y                                                         | EI71, EI72, EI76,<br>EI7C <sup>1)</sup> |
| Cable cross section                        |       | Cable with part number<br>from SEW-EURODRIVE<br><br>19065442 – (4 × 0.25 + 2 ×<br>0.5 mm²)<br><br>25633104 –<br>(4 × 0.25 + 2 × 0.5 mm²)<br><br>13289284 – (4 × 2 ×<br>0.25 mm²)                                                            | Cable with part number from<br>SEW-EURODRIVE<br><br>13289284 – (4 × 2 × 0.25 mm²) |                                         |
| Manufacturer                               |       | HELUKABEL/Leoni                                                                                                                                                                                                                             |                                                                                   |                                         |
| Manufacturer's designa-<br>tion            |       | Li9YC11Y-HF, LEHC 005308, TOPGEBER 503<br>(74419)                                                                                                                                                                                           |                                                                                   | TOPGEBER 503<br>(74419)                 |
| Operating voltage U <sub>0</sub> / U<br>AC | V     | 350 VDE / 300 UL                                                                                                                                                                                                                            |                                                                                   |                                         |
| Temperature range                          | °C    | -20 to +60                                                                                                                                                                                                                                  |                                                                                   | -20 to +80                              |
| Maximum temperature                        | °C    | +60 (at the conductor)                                                                                                                                                                                                                      | +60                                                                               | +80                                     |
| Minimum bending radius                     | mm    | 19065442: 10 × D<br>25633104: 8 × D<br>13289284: 7.5 × D                                                                                                                                                                                    |                                                                                   |                                         |
| Outer diameter D                           | mm    | 19065442: 8.8 ± 0.2<br>25633104: 9.4 ± 0.2<br>13289284: 7.1 ± 0.2                                                                                                                                                                           |                                                                                   | 7.1 ± 0.2                               |
| Maximum acceleration                       | m/s²  | 19065442: 5<br>25633104: 20<br>13289284: 50                                                                                                                                                                                                 |                                                                                   | 50                                      |
| Maximum speed                              | m/min | 19065442: 180<br>25633104: 180<br>13289284: 300                                                                                                                                                                                             |                                                                                   | 300                                     |
| Core identification                        |       | DIN 47100                                                                                                                                                                                                                                   |                                                                                   |                                         |
| Sheath color                               |       | Green, similar to RAL6018                                                                                                                                                                                                                   |                                                                                   |                                         |

|                                         |       |                                                                                                                                                                                                                                             |                                                                                                |                                         |
|-----------------------------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------------------------|
| Accessory identification                |       | EK8R, EK8C, EK8S, EK8W,<br>EK8X, AK8W, AK8Y, AK8H<br><br>EV8R, EV8C, EV8S, AV8W,<br>AV8Y, AV8H<br><br>ES7R, ES7C, ES7S, AS7W,<br>AS7Y, AS7H<br><br>EG7R, EG7C, EG7S, AG7W,<br>AG7Y<br><br>EV7R, EV7C, EV7S, AV7W,<br>AV7Y<br><br>EI8C, EI8R | EH7C, EH7R,<br>EH7S, AH7Y                                                                      | EI71, EI72, EI76,<br>EI7C <sup>1)</sup> |
| Cable cross section                     |       | Cable with part number<br>from SEW-EURODRIVE<br><br>19065442 – (4 × 0.25 + 2 ×<br>0.5 mm <sup>2</sup> )<br><br>25633104 –<br>(4 × 0.25 + 2 × 0.5 mm <sup>2</sup> )<br><br>13289284 – (4 × 2 ×<br>0.25 mm <sup>2</sup> )                     | Cable with part number from<br>SEW-EURODRIVE<br><br>13289284 – (4 × 2 × 0.25 mm <sup>2</sup> ) |                                         |
| Manufacturer                            |       | HELUKABEL/Leoni                                                                                                                                                                                                                             |                                                                                                |                                         |
| Approval(s)                             |       | DESINA/VDE/UL/CE                                                                                                                                                                                                                            | DESINA/VDE/UL/<br>CE                                                                           | DESINA/VDE/UL/<br>CSA/CE                |
| Capacitance core/shield-<br>ing         | pF/m  | 19065442: max. 100<br>25633104: max. 95<br>13289284: max. 110                                                                                                                                                                               |                                                                                                |                                         |
| Capacitance core/core                   | pF/m  | 19065442: max. 65<br>25633104: max. 60<br>13289284: max. 55                                                                                                                                                                                 | 70                                                                                             |                                         |
| Halogen-free                            |       | Yes                                                                                                                                                                                                                                         |                                                                                                |                                         |
| Silicone-free                           |       | Yes                                                                                                                                                                                                                                         |                                                                                                |                                         |
| CFC-free                                |       | Yes                                                                                                                                                                                                                                         |                                                                                                |                                         |
| Insulation internal (core)              |       | PP                                                                                                                                                                                                                                          |                                                                                                |                                         |
| Insulation external<br>(sheath)         |       | PUR                                                                                                                                                                                                                                         |                                                                                                |                                         |
| Flame retardant/self-extin-<br>guishing |       | Flame retardant according to VDE0472, Part 802, Test type B, accord-<br>ing to IEC 60332-1                                                                                                                                                  |                                                                                                |                                         |
| Conductor material                      |       | E-Cu blank                                                                                                                                                                                                                                  |                                                                                                |                                         |
| Shielding                               |       | Braided copper, tinned                                                                                                                                                                                                                      |                                                                                                |                                         |
| Weight                                  | kg/km | 19065442: 108<br>25633104: 90<br>13289284: 68                                                                                                                                                                                               |                                                                                                |                                         |
| Minimum bending cycles                  |       | ≥ 5 million                                                                                                                                                                                                                                 |                                                                                                |                                         |

1) EI7C encoders require a maximum of 8 cores, additional cores for potential temperature sensors.

## 10 Operation

### 10.1 General information



#### ⚠ WARNING

Risk of injury if the drive starts up unintentionally.

Severe or fatal injuries.

- Before you start working on the unit, disconnect the motor and all connected options from the power supply.
- Secure the motor against unintended power-up.



#### ⚠ CAUTION

The surfaces on the drive can be very hot during operation.

Risk of burns.

- Let the motor cool down sufficiently before you start working on it.



#### INFORMATION

- Monitor encoders using electronic temperature detection in order to prevent malfunctions.
- In the event of an emergency stop or heavy braking, electronic encoders will report a fault that must be acknowledged in the encoder evaluation or control unit. A new reference travel may be required.

### 10.2 Condition monitoring of EK8Z, EK9Z, and AK8Z safety encoders

The safety encoders determine the following measured values:

- Forecast of remaining service life

The time remaining until the end of service life is determined.

- Runtime in temperature ranges (histogram)

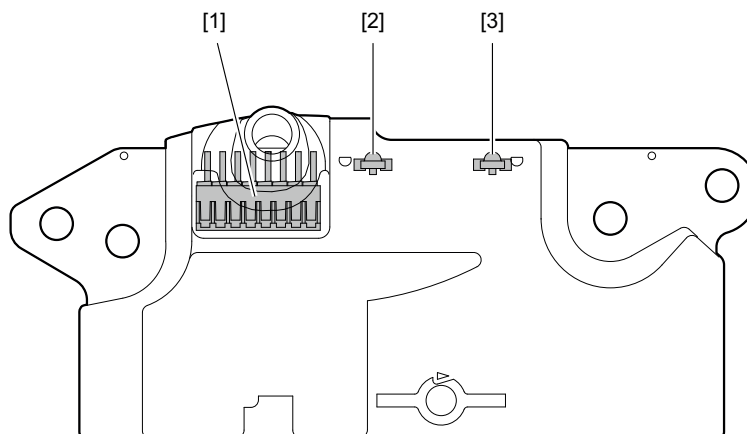
The runtime is determined for each of the following temperature ranges. This is then provided as a histogram for condition monitoring of the operating temperatures.

- Runtime at < 90 °C
- Runtime at 90 °C – 95 °C
- Runtime at 95 °C – 100 °C
- Runtime at 100 °C – 105 °C
- Runtime at 105 °C – 110 °C
- Runtime at 110 °C – 115 °C
- Runtime at < 115 °C

## 10.3 Visual feedback of EI7., EI8. built-in encoders

### 10.3.1 Visual feedback of EI7. built-in encoders

The EI7. encoders use 2 duo LEDs (red + green in each case) to provide visual feedback on the operating state.



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- [1] Connector
- [2] Duo LED - H1
- [3] Duo LED - H2

#### LED H1 – Status and fault

The green LED indicates the status or the configuration of the encoder. It is designed to be flashing. The flashing frequency indicates the set number of periods.

| LED H1 green        |                                   |
|---------------------|-----------------------------------|
| Flash code          | Status/configuration              |
| LED off             | Encoder de-energized or defective |
| 0.6 Hz              | EI71 (1 period per revolution)    |
| 1.2 Hz              | EI72 (2 periods per revolution)   |
| 3 Hz                | EI76 (6 periods per revolution)   |
| 15 Hz               | EI7C (24 periods per revolution)  |
| LED continuously on | Defective encoder                 |

Faults detected by the encoder activate the red LED.

| LED H1 red                          |                                                                             |
|-------------------------------------|-----------------------------------------------------------------------------|
| Flash code                          | Meaning                                                                     |
| 10 s with 1 Hz and 2 s continuously | No valid period number can be set                                           |
| Miscellaneous                       | Output driver reports an fault (e.g. due to short circuit, overtemperature) |

**LED H2 - Signal track state**

| LED color              | Track A | Track B | Track /A | Track /B |
|------------------------|---------|---------|----------|----------|
| Orange (green and red) | 0       | 0       | 1        | 1        |
| Red                    | 0       | 1       | 1        | 0        |
| Green                  | 1       | 0       | 0        | 1        |
| Off                    | 1       | 1       | 0        | 0        |

**10.3.2 EI7C FS visual feedback**

The LED display, visible when the fan guard is removed, provides visual feedback about the signal track state.

A red LED and a green LED are used as a status display for the EI7C FS safety encoder.

- The **green** LED indicates the current status.
- The **red** LED is used to display a fault history by means of a flash code.

The last fault that occurred since the last switch-on process is always shown in the fault history.

**Indicating the normal state**

During normal operation, the green status LED lights up constantly. Usually, no fault has occurred and the red fault history LED is off. If a fault already occurred before the current normal operating state, this is indicated by the flash code on the red LED described below.

**Indicating an internal diagnostics fault**

Encoder EI7C FS has its own diagnostics system. If this diagnostics system has a fault, the encoder enters a fault status. The fault can be reset by switching off the supply voltage of the encoder and then switching it back on.

**Indicating service mode**

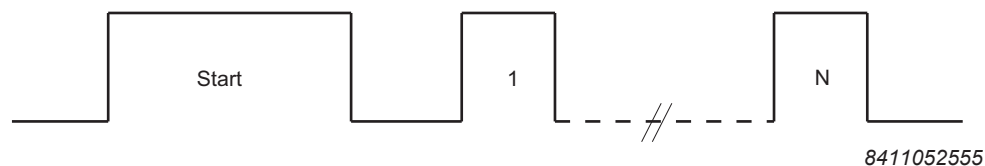
If the encoder is supplied with a voltage lower than that specified in chapter "EI7C FS" (→ 94) when it is switched on, it will automatically switch to the service mode. The service mode is used to configure and adjust the encoder. It may not be used as a safety encoder in this operating state.

During the process, the output drivers are disabled. The red fault history LED indicates the service mode by lighting up constantly. The green status LED reports the distance between the encoder module and the fan wheel.

Pending service work on the encoder may be performed only by SEW-EURODRIVE.

### Indicating fault statuses

The start of a fault code is indicated by a long pulse (START). The number of brief flash pulses indicates the most recent fault since the encoder was switched on. The long START signal does not count as part of this number. The figure shows the structure of the flash code. The "Normal operation" (→ [348](#)) table provides an overview of possible fault statuses and the defined LED signals for these statuses.





## LED codes for the operating statuses

*Normal operation*

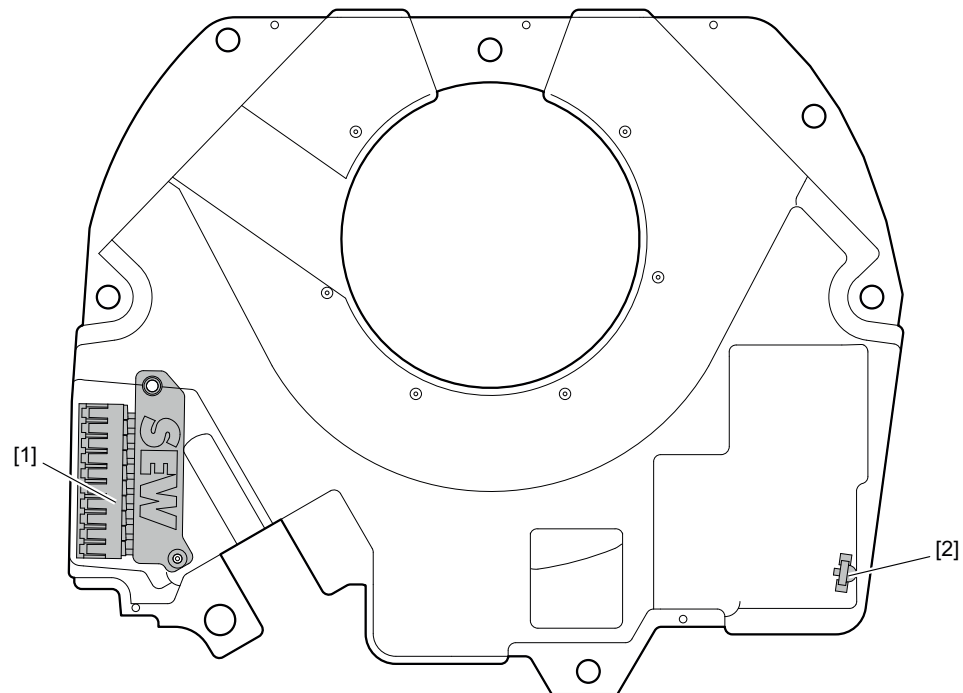
| Displayed status                                            | Green LED (status)            | Red LED (fault) |
|-------------------------------------------------------------|-------------------------------|-----------------|
| No voltage or defective                                     | OFF                           | OFF             |
| Internal diagnostics fault                                  | ON                            | ON              |
| No fault                                                    | ON                            | OFF             |
| Currently no fault<br>Last fault is displayed.              | ON                            | Fault code      |
| A fault is currently present<br>Current fault is displayed. | OFF                           | Fault code      |
|                                                             | Temperature fault             | 1×              |
|                                                             | Supply voltage fault          | 2×              |
|                                                             | Analog signal fault           | 3×              |
|                                                             | Error in digital track A or B | 4×              |
|                                                             | Travel distance fault         | 5×              |
|                                                             | Output driver fault           | 6×              |

*Service operation/setup mode*

| Status                                     | Meaning               | Green LED                | Red LED |
|--------------------------------------------|-----------------------|--------------------------|---------|
| Service operation/setup mode               | Amplitude OK          | OFF                      | ON      |
| (Defined voltage range while switching on) | Amplitude is too high | Flashes (approx. 2 Hz)   | ON      |
|                                            | Amplitude is too low  | Flashes (approx. 0.5 Hz) | ON      |

### 10.3.3 Visual feedback of EI8C, EI8R built-in encoders

The EI8. built-in encoders report their operating state visually via a duo LED.



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[1] Connector

[2] Duo LED

| Flash code                        | Meaning                                                                                                        |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------|
| Off                               | Encoder not supplied or defective                                                                              |
| Permanently green                 | Encoder operational, no faults                                                                                 |
| Red/orange, permanent or flashing | Encoder reports self-diagnostic information or a fault.<br>The meaning depends on the color and the frequency. |

| Diagnostics<br>LED color orange/red | Meaning and measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Red                                 | <p>Encoder diagnostics has detected a fault.</p> <p>Permanently lit: Fault regarding the internal encoder sensors (incremental sensors)</p> <p>Flashes 5 Hz: Fault regarding the internal encoder sensors (index sensors):</p> <ul style="list-style-type: none"> <li>• Check the encoder and pole ring for damage or magnetizable contamination. Replace or clean the fan if necessary.</li> <li>• Check the fan to ensure it is seated correctly and check the distance between the pole ring and encoder. If necessary, adjust and secure the fan and pole ring (see chapter "Removing and mounting built-in encoder EI8.").</li> </ul> <p>Flashes 1 Hz: Fault regarding the encoder module electrical interface:</p> <ul style="list-style-type: none"> <li>• Short circuit/overcurrent of the signal tracks: Eliminate the short circuit or limit the output current of the encoder module.</li> <li>• Interference on the signal tracks: Eliminate the external interference. Observe the information regarding connection technology.</li> </ul> |
| Orange                              | <p>Encoder diagnostics signals a warning (function of the encoder is given, maintenance may be required).</p> <p>Permanently lit: Warning regarding the internal encoder sensors (incremental sensors).</p> <ul style="list-style-type: none"> <li>• If necessary, implement any necessary measures; see "Diagnostics red" as maintenance measures.</li> </ul> <p>Flashes 1 Hz: Warning regarding the internal memory (encoder signal correction).</p> <ul style="list-style-type: none"> <li>• The encoder signal correction is reinitialized every time the encoder is started.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

If none of the measures are successful, contact SEW-EURODRIVE Service. In this case, decommission the built-in encoder.

### 10.3.4 Visual feedback of the EI8Z built-in encoder

The EI8. built-in encoders report their operating state visually via a duo LED. The feedback depends on the version of the firmware of the MOVILINK® DDI communication unit together with the EI8Z encoder.

The firmware version can be determined with the MOVISUITE® engineering software from SEW-EURODRIVE under the device and option characteristics of the motor with MOVILINK® DDI.

If none of the measures are successful, contact SEW-EURODRIVE Service. In this case, decommission the built-in encoder.

#### EI8Z visual feedback with firmware version 2.00 or later

| LED color                                                                                       | Meaning and measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Off                                                                                             | Encoder not supplied or defective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Permanently green                                                                               | Encoder operational, no faults                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Permanently yellow                                                                              | <p>The encoder is reporting self-diagnostic information. The function of the encoder is given without restriction.</p> <p>The mechanical adjustment of the encoder is within the permitted tolerance range.</p> <ul style="list-style-type: none"> <li>• No measures are required.</li> <li>• In the case of applications with vibration stress or highly fluctuating ambient temperatures, we recommend a mechanical adjustment of the fan and of the distance between the pole ring and the encoder if there are functional faults, see chapter "Installing EI8. – DRN../DRU../DR2..71 – 132S motors, with connection unit" (→ 188).</li> </ul>          |
| Permanently red<br>Inverter fault message; fault 13.26, 13.27 on the inverter and in MOVISUITE® | <p>Encoder reports self-diagnostic information or a fault.</p> <p>The mechanical adjustment of the encoder is outside the permitted tolerance range. This fault is also reported on the inverter.</p> <ul style="list-style-type: none"> <li>• Check the encoder and pole ring for damage or magnetizable contamination. Replace or clean the fan if necessary.</li> <li>• Check the fan to ensure it is seated correctly and check the distance between the pole ring and encoder. If necessary, readjust and resecure the fan and pole ring, see chapter "Installing EI8. – DRN../DRU../DR2..71 – 132S motors, with connection unit" (→ 188).</li> </ul> |

**EI8Z visual feedback with firmware version 1.00**

In firmware version 1.00, the visual feedback of the EI8Z encoder is exclusively for product support. Note that, regardless of the LED color, a fault will only be reported via a fault message from the inverter as described below:

| Diagnostics                                                                  | Meaning and measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inverter fault message; fault 13.26, 13.27 on the inverter and in MOVISUITE® | <p>The encoder diagnostics has detected a fault or the encoder is defective.</p> <p>The mechanical adjustment of the encoder is outside the permitted tolerance range. This fault is also reported on the inverter.</p> <ul style="list-style-type: none"> <li>• Check the encoder and pole ring for damage or magnetizable contamination. Replace or clean the fan if necessary.</li> <li>• Check the fan to ensure it is seated correctly and check the distance between the pole ring and encoder. If necessary, readjust and resecure the fan and pole ring, see chapter "Installing EI8. – DRN../DRU../DR2..71 – 132S motors, with connection unit" (→ 188).</li> </ul> |

## 11 Inspection/maintenance

### 11.1 Before you start

- Observe the 5 safety rules before commencing the work: Disconnect. Secure the device against a restart. Check that no voltage is applied. Ground and short-circuit it. Cover or cordon off neighboring live parts.
- Let the unit cool down sufficiently before you start working on it.
- Use only genuine spare parts in accordance with the valid spare parts list.
- Maintenance and replacement as well as retrofitting of an inverter may be performed only by trained specialists. Contact SEW-EURODRIVE Service in case of maintenance work or when retrofitting.

Observe the following points when using functionally safe motor options:

- Replacing an existing encoder with a safety encoder is not permitted. If necessary, contact SEW-EURODRIVE Service.
- Improperly carried out work on drives with functionally safe motor options can result in loss of the safety functions. This can cause injuries and damage.
- Only qualified specialists are allowed to carry out work on drives with functionally safe motor options.
- With the EI7C FS built-in encoder, no work may be performed on the encoder. Place an order with SEW-EURODRIVE Service to have any necessary work on the encoder performed.
- For EK8Z, EK9Z, AK8Z safety encoders, work on the MOVILINK® DDI communication unit is not permitted. Place an order with SEW-EURODRIVE Service to have any necessary work on the encoder performed.
- When using an encoder mounting adapter to retrofit a safety encoder, the retrofitting of the FS motor option is not identifiable on the motor, e.g. by the FS logo on the motor nameplate. If retrofitting of a safety encoder is performed by the user, the user accepts responsibility and liability. Retrofitting by SEW-EURODRIVE Service is recommended.

## 11.2 Service

**Please have the following information available if you require customer service assistance:**

- Nameplate data (complete)
- Type and extent of the failure
- Time the failure occurred and any accompanying circumstances
- Assumed cause
- Ambient conditions such as
  - Ambient temperature
  - Air humidity
  - Installation altitude
  - Dirt
  - etc.

In case of service, also use the checklist "Service and maintenance checklist" (→  377).

## 11.3 Spare parts

### 11.3.1 EI7. Service kits and retrofit sets

#### Retrofit set

The retrofit set includes the materials required to add an EI7. encoder onto an existing motor.

The following main components are included in the retrofit sets:

- Encoder module
- Fan
- Connection unit
- Fastening material

The following pieces of information are required for the selection of the correct material:

- Motor size
- Brakemotor or motor with backstop (relevant for motor sizes 71 – 132 – not relevant for size 63)
- Connection option with or without M12 connector

#### *EI7. retrofit set with connection unit*

AE = Connection unit

FS = functional safety

| Type | Motor size              | Brake        | Connection | FS | Material short text | Part number |
|------|-------------------------|--------------|------------|----|---------------------|-------------|
| EI7. | DRN/DRU../DR2.71        | Not relevant | AE         | -  | Retrofit set        | 28212185    |
| EI7. | DRN/DRU../DR2.80        | Not relevant | AE         | -  | Retrofit set        | 28212207    |
| EI7. | DR.90 – 100<br>DR2.90   | Not relevant | AE         | -  | Retrofit set        | 28212223    |
| EI7. | DR2.100                 | Not relevant | AE         | -  | Retrofit set        | 28225538    |
| EI7. | DRN/DRU../DR2.112 – 132 | Not relevant | AE         | -  | Retrofit set        | 28212258    |



*EI7. retrofit set with M12 connector connection option*

FS = functional safety

| Type | Motor size                  | Brake         | Connection | FS | Material short text | Part number |
|------|-----------------------------|---------------|------------|----|---------------------|-------------|
| EI7C | DRN63                       | Without brake | M12        | -  | Retrofit set        | 28251822    |
| EI7C | DRN63                       | BE03          | M12        | -  | Retrofit set        | 28251830    |
| EI7. | DRN/DRU../DR2.71            | Not relevant  | M12        | -  | Retrofit set        | 28214315    |
| EI7. | DRN/DRU../DR2.80            | Not relevant  | M12        | -  | Retrofit set        | 28214323    |
| EI7. | DR.90 – 100<br>DR2.90       | Not relevant  | M12        | -  | Retrofit set        | 28214331    |
| EI7. | DR2.100                     | Not relevant  | M12        | -  | Retrofit set        | 28225546    |
| EI7. | DRN/DRU../<br>DR2.112 – 132 | Not relevant  | M12        | -  | Retrofit set        | 28214358    |

**Service kits**

The service kit includes all of the materials required to replace a defective encoder.

The following main components are included in the service kits:

- Encoder module
- Fan
- Connection unit
- Fasteners

The following pieces of information are required for the selection of the correct material:

- Motor size
- Brakemotor or motor with backstop (relevant for motor sizes 71 – 132 – not relevant for size 63)
- Connection option with or without M12 connector

*EI7. service kits with connection unit*

AE = Connection unit

FS = functional safety

| Type | Motor size                  | Brake        | Connection | FS | Material short text | Part number |
|------|-----------------------------|--------------|------------|----|---------------------|-------------|
| EI7. | DRN/DRU../DR2.71            | Not relevant | AE         | -  | Service kit         | 28214404    |
| EI7. | DRN/DRU../DR2.80            | Not relevant | AE         | -  | Service kit         | 28214420    |
| EI7. | DR..90 – 100<br>DR2.90      | Not relevant | AE         | -  | Service kit         | 28214447    |
| EI7. | DR2.100                     | Not relevant | AE         | -  | Service kit         | 28225554    |
| EI7. | DRN/DRU../<br>DR2.112 – 132 | Not relevant | AE         | -  | Service kit         | 28214463    |

*EI7. service kits with M12 connector as connection option*

FS = functional safety

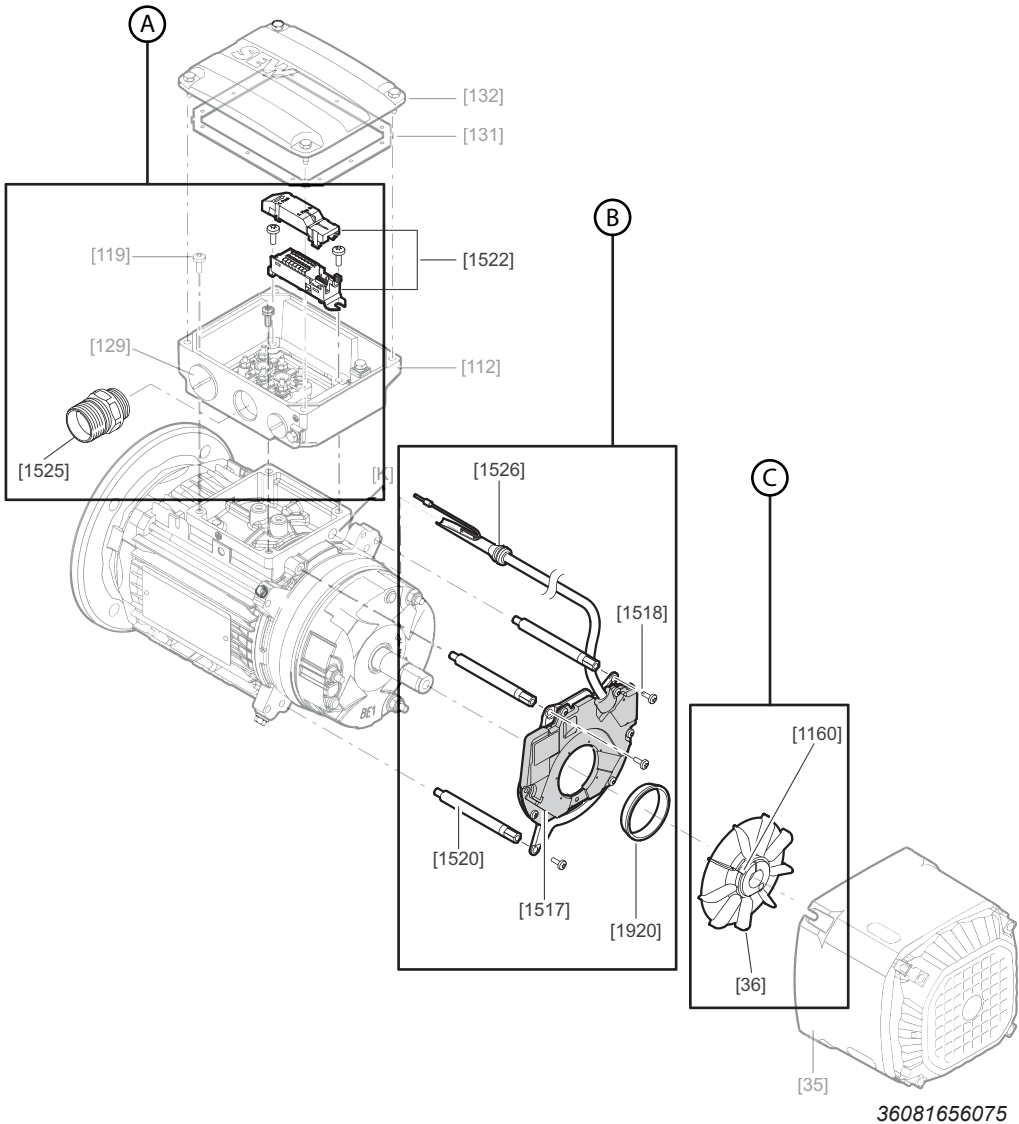
| Type | Motor size              | Brake         | Connec-<br>tion | FS | Material<br>short text | Part number |
|------|-------------------------|---------------|-----------------|----|------------------------|-------------|
| EI7C | DRN63                   | Without brake | M12             | –  | Service kit            | 28254295    |
| EI7C | DRN63                   | BE03          | M12             | –  | Service kit            | 28254309    |
| EI7. | DRN/DRU../DR2.71        | Not relevant  | M12             | –  | Service kit            | 28214366    |
| EI7. | DRN/DRU../DR2.80        | Not relevant  | M12             | –  | Service kit            | 28214374    |
| EI7. | DR.90 – 100<br>DR2.90   | Not relevant  | M12             | –  | Service kit            | 28214382    |
| EI7. | DR2.100                 | Not relevant  | M12             | –  | Service kit            | 28225562    |
| EI7. | DRN/DRU../DR2.112 – 132 | Not relevant  | M12             | –  | Service kit            | 28214390    |
| EI7C | DRN/DRU../DR2.71        | Not relevant  | M12             | ✓  | Service kit            | 28214412    |
| EI7C | DRN/DRU../DR2.80        | Not relevant  | M12             | ✓  | Service kit            | 28214439    |
| EI7C | DRN/DRU../DR2.90 – 100  | Not relevant  | M12             | ✓  | Service kit            | 28214455    |
| EI7C | DRN/DRU../DR2.112 – 132 | Not relevant  | M12             | ✓  | Service kit            | 28214471    |

11.3.2 EI8. Service kits

Currently, the EI8Z encoders cannot be retrofitted by the customer. Contact SEW-EURODRIVE if necessary.

The service kit includes all of the materials required to replace a defective encoder.

Three individual service kits A, B and C are required for the installation of a complete EI8R, EI8C, or EI8Z encoder system.



**A** EI8. connection set service kit

- [1522] Connection unit
- [1525] M23 connector

**B** EI8. encoder service kit

- [1517] Encoder module
- [1518] Screw
- [1520] Spacer

**C** EI8. fan service kit

- [36] Fan guard
- [1160] Cap screw

- [1526] Grommet
- [1920] Centering ring (aid)

The following information is required for the selection of the encoder service kit:

- Motor size

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- Brakemotor or motor with backstop
- Encoder type EI8C(HTL), EI8R(TTL), or EI8Z

The following information is required for the selection of the fan service kit:

- Motor size

The following information is required for the selection of the connection set service kit:

- Type of connection (M23 connector or connection unit)

No service kits are currently planned for the encoder type EI8Z.

### Encoder service kits

#### *EI8C encoder service kits*

| Part number | Material short text | Motor size            | Brake         | Type |
|-------------|---------------------|-----------------------|---------------|------|
| 28254627    | Encoder service kit | DRN/DRU../DR2.71      | Without brake | EI8C |
| 28254635    | Encoder service kit | DRN/DRU../DR2.71      | BE            | EI8C |
| 28254643    | Encoder service kit | DRN/DRU../DR2.80      | Without brake | EI8C |
| 28254651    | Encoder service kit | DRN/DRU../DR2.80      | BE            | EI8C |
| 28254678    | Encoder service kit | DRN/DRU../DR2.90      | Without brake | EI8C |
| 28254686    | Encoder service kit | DRN/DRU../DR2.90      | BE            | EI8C |
| 28254694    | Encoder service kit | DRN100                | Without brake | EI8C |
| 28254708    | Encoder service kit | DRN100                | BE            | EI8C |
| 28254716    | Encoder service kit | DRN/DRU../DR2.112/132 | Without brake | EI8C |
| 28254724    | Encoder service kit | DRN/DRU../DR2.112/132 | BE            | EI8C |

#### *EI8R encoder service kits*

| Part number | Material short text | Motor size            | Brake         | Type |
|-------------|---------------------|-----------------------|---------------|------|
| 28254732    | Encoder service kit | DRN/DRU../DR2.71      | Without brake | EI8R |
| 28254740    | Encoder service kit | DRN/DRU../DR2.71      | BE            | EI8R |
| 28254759    | Encoder service kit | DRN/DRU../DR2.80      | Without brake | EI8R |
| 28254767    | Encoder service kit | DRN/DRU../DR2.80      | BE            | EI8R |
| 28254775    | Encoder service kit | DRN/DRU../DR2.90      | Without brake | EI8R |
| 28254783    | Encoder service kit | DRN/DRU../DR2.90      | BE            | EI8R |
| 28254791    | Encoder service kit | DRN100                | Without brake | EI8R |
| 28254805    | Encoder service kit | DRN100                | BE            | EI8R |
| 28254813    | Encoder service kit | DRN/DRU../DR2.112/132 | Without brake | EI8R |
| 28254821    | Encoder service kit | DRN/DRU../DR2.112/132 | BE            | EI8R |

**Fan service kits***EI8C, EI8R fan service kits*

| Part number | Material short text         | Motor size            |
|-------------|-----------------------------|-----------------------|
| 22658491    | Fan for encoder service kit | DRN/DRU../DR2.71      |
| 22658505    | Fan for encoder service kit | DRN/DRU../DR2.80      |
| 22658513    | Fan for encoder service kit | DRN90/100             |
| 22658521    | Fan for encoder service kit | DRN/DRU../DR2.112/132 |

**Connection set service kits***EI8C, EI8R connection set service kits*

| Part number                                  | Material short text                | Type        |
|----------------------------------------------|------------------------------------|-------------|
| 28261607                                     | AE connection unit, connection set | EI8R / EI8C |
| 28261615                                     | M23 connection set                 | EI8R / EI8C |
| 28170938<br>13295950<br>00134147<br>28261607 | M12 connection components          | EI8R / EI8C |

**11.3.3 .8. / .9. / .V8. service kits**

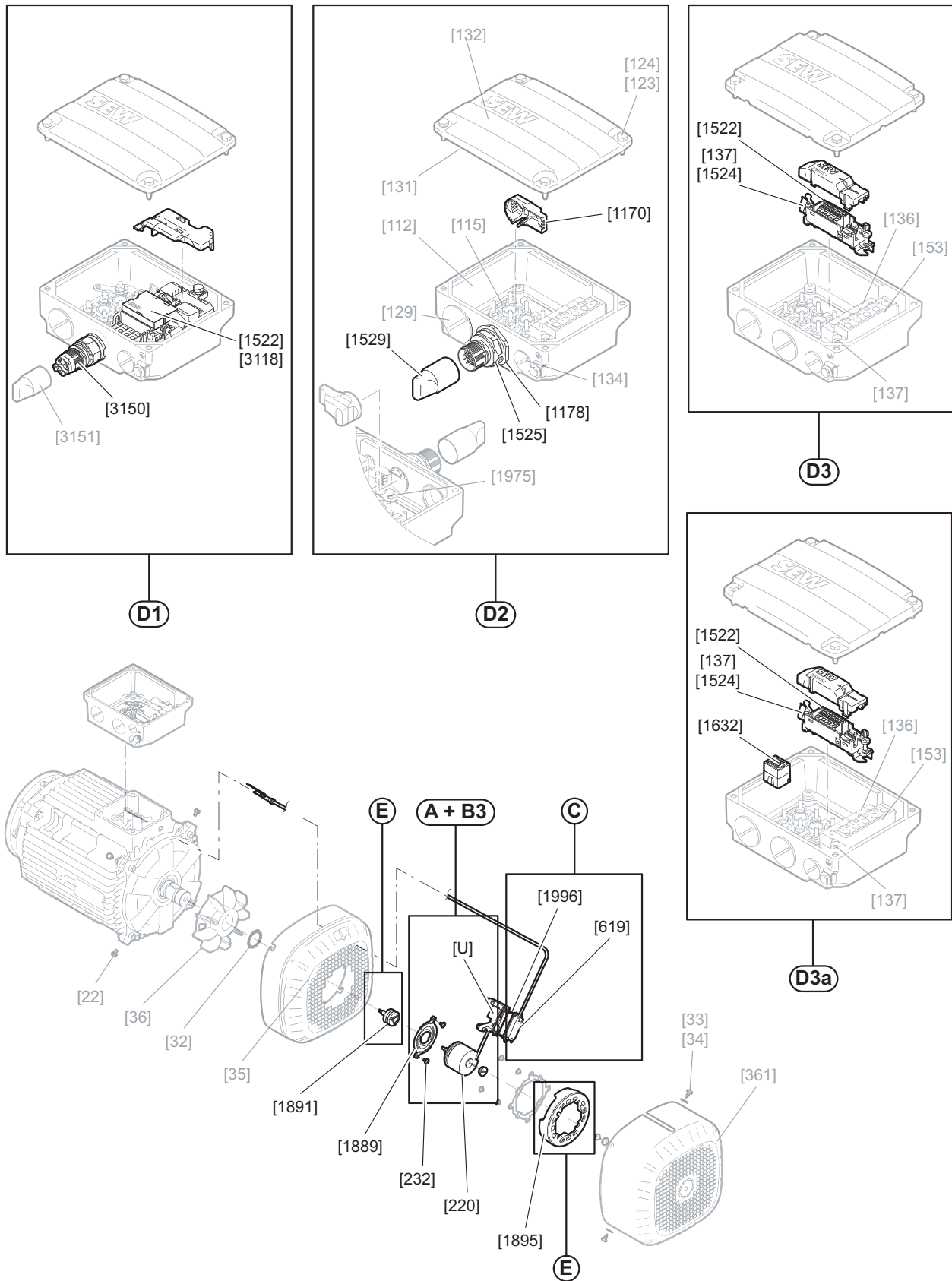
Currently, the EK8Z, AK8Z and EK9Z encoders cannot be retrofitted by the customer. Contact SEW-EURODRIVE if necessary.

Service kits are available to retrofit an encoder and to provide spare parts.

For the retrofit, kits from the following groups A – G are selected with the connection variant, suitable for the motor and encoder design.

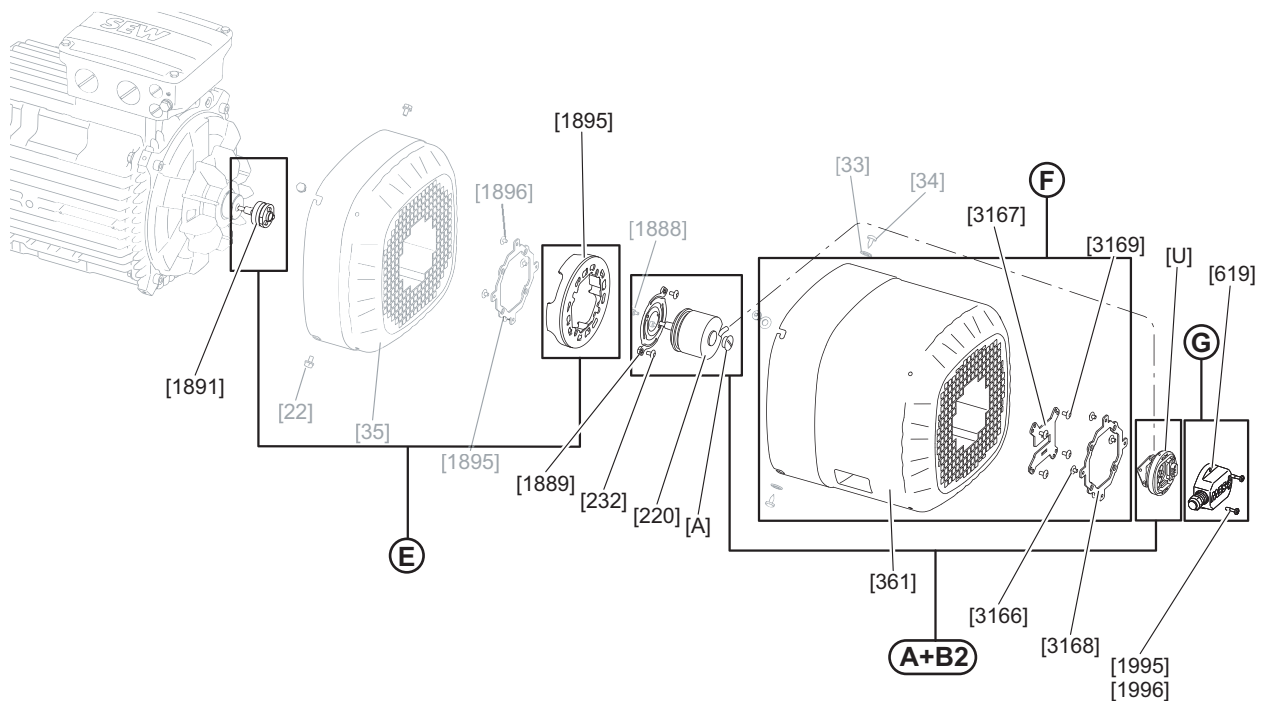
Note that kits from groups C and D are necessary only if the encoder is connected to the terminal strip or M23 connector on the terminal box by the customer.

|   |                                                                                                                                                                                                                                                                                       |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A | Encoder incl. connection cable on the encoder                                                                                                                                                                                                                                         |
| B | Torque bracket for installing the encoder and additional connection components for the customer connection (integrated encoder connector or M23 connector with short cable on the encoder) or lower housing part connection unit for the cable connection in the motor terminal boxes |
| C | Upper housing part connection unit with cable for connection to the motor terminal boxes                                                                                                                                                                                              |
| D | Connection components for the customer connection in/on the terminal box (M23 on the terminal box or terminal strip)                                                                                                                                                                  |
| E | Encoder insulation coupling and spacer ring for installing the encoder (only for certain motor installation variants)                                                                                                                                                                 |
| F | Integrated encoder connector on the rear of the fan guard                                                                                                                                                                                                                             |
| G | Connection cover of the integrated encoder connector                                                                                                                                                                                                                                  |

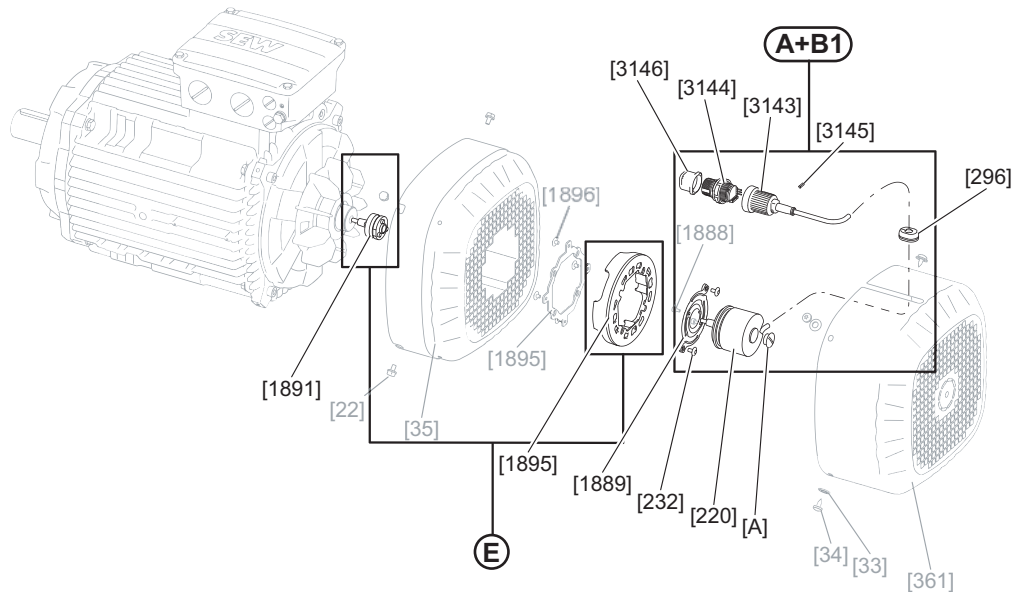


54841135115

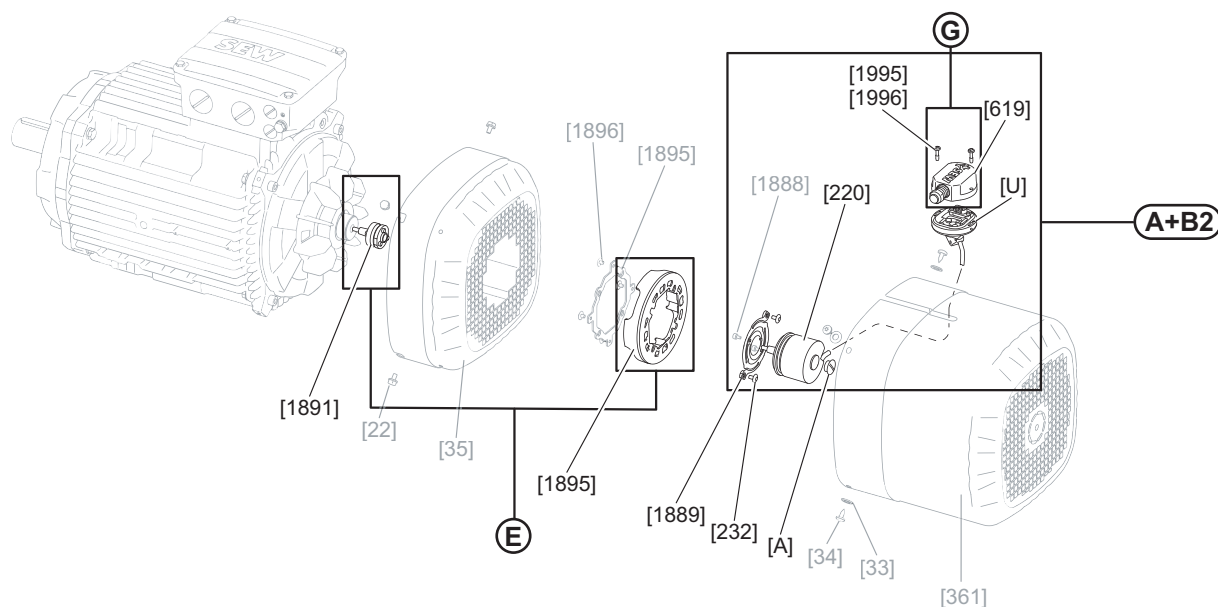




54841107723



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54841112587

|        |                    |        |                     |
|--------|--------------------|--------|---------------------|
| [137]  | Connection unit    | [1525] | Connector           |
| [220]  | Rotary encoder set | [1529] | Protection cap      |
| [232]  | Round head screw   | [1889] | Torque bracket      |
| [619]  | Connection cover   | [1891] | Insulation coupling |
| [1170] | Protective cap     | [1996] | Flat head screw     |
| [1178] | Thread reduction   | [3118] | Connection module   |
| [1522] | Connection unit    | [3146] | Cap                 |
| [1524] | Terminal washer    |        |                     |

### Selection of a service kit

Various service kits are required for the installation of a complete .K8./.K9. encoder system. This chapter describes how to select the appropriate service kit.

#### 1. Selection of the encoder

| Selection of the encoder | Serial letter |  |
|--------------------------|---------------|--|
| EK8R                     | A             |  |
| EK8C                     |               |  |
| EK8X                     |               |  |
| EK8S                     |               |  |
| AK8W                     |               |  |
| AK8Y                     |               |  |
| AK8H                     |               |  |
| EK8W                     |               |  |
| EK8Z                     |               |  |
| AK8Z                     |               |  |
| EK9Z                     |               |  |
| RK8M                     |               |  |

#### 2. Selection of the connection variant

| Connection variant                                                                        | Serial letters       |  |
|-------------------------------------------------------------------------------------------|----------------------|--|
| Encoder with M23 on the encoder and torque bracket                                        | A + B1               |  |
| Encoder with integrated encoder connector and torque bracket                              | A + B2 + G           |  |
| Encoder with integrated encoder connector on the rear of the fan guard and torque bracket | A + B2 + F + G       |  |
| Encoder with MOVILINK® DDI in the terminal box and torque bracket                         | A + B3 + Cx + D1     |  |
| Encoder with M23 on the terminal box and torque bracket                                   | A + B3 + Cx + D2     |  |
| Encoder with connection unit in the terminal box and torque bracket                       | A + B3 + Cx + D3/D3a |  |

Serial letters A + B1

**.K8./.K9./.V8. M23 connection on the encoder [A+B1]**

| Type | Motor size                  | Material short text          | Part number |
|------|-----------------------------|------------------------------|-------------|
| AK8H | (E)DRN../DRU../DR2.63 – 355 | Absolute encoder SET-KIGA    | 21023352    |
| AV8H | (E)DRN../DRU../DR2.71 – 355 | Absolute encoder SET-KIGA    | 21023352    |
| AK8W | (E)DRN../DRU../DR2.63 – 355 | Absolute encoder SET-KIGA    | 21023271    |
| AV8W | (E)DRN../DRU../DR2.71 – 355 | Absolute encoder SET-KIGA    | 21023271    |
| AK8Y | (E)DRN../DRU../DR2.63 – 355 | Absolute encoder SET-KIGA    | 21023328    |
| AV8Y | (E)DRN../DRU../DR2.71 – 355 | Absolute encoder SET-KIGA    | 21023328    |
| EK8C | (E)DRN../DRU../DR2.63 – 355 | Incremental encoder SET-KIGA | 21023247    |
| EV8C | (E)DRN../DRU../DR2.71 – 355 | Incremental encoder SET-KIGA | 21023247    |
| EK8R | (E)DRN../DRU../DR2.63 – 355 | Incremental encoder SET-KIGA | 21023212    |
| EV8R | (E)DRN../DRU../DR2.71 – 355 | Incremental encoder SET-KIGA | 21023212    |
| EK8S | (E)DRN../DRU../DR2.63 – 355 | Incremental encoder SET-KIGA | 21023182    |
| EV8S | (E)DRN../DRU../DR2.71 – 355 | Incremental encoder SET-KIGA | 21023182    |
| EK8W | (E)DRN../DRU../DR2.63 – 355 | Absolute encoder SET-KIGA    | 21024413    |
| RK8M | (E)DRN../DRU../DR2.63 – 355 | Resolver SET-KIGA            | 21024022    |

Serial letters A + B2 and A + B2 + F

#### Integrated .K8./K9./V8. encoder connector (A1GA/A2GA) [A+B2]

| Type | Motor size                  | Material short text          | Part number |
|------|-----------------------------|------------------------------|-------------|
| AK8H | (E)DRN../DRU../DR2.63 – 355 | Absolute encoder SET-A.GA    | 21018510    |
| AV8H | (E)DRN../DRU../DR2.71 – 355 | Absolute encoder SET-A.GA    | 21018510    |
| AK8W | (E)DRN../DRU../DR2.63 – 355 | Absolute encoder SET-A.GA    | 21018502    |
| AV8W | (E)DRN../DRU../DR2.71 – 355 | Absolute encoder SET-A.GA    | 21018502    |
| AK8Y | (E)DRN../DRU../DR2.63 – 355 | Absolute encoder SET-A.GA    | 21018499    |
| AV8Y | (E)DRN../DRU../DR2.71 – 355 | Absolute encoder SET-A.GA    | 21018499    |
| EK8C | (E)DRN../DRU../DR2.63 – 355 | Incremental encoder SET-A.GA | 21018480    |
| EV8C | (E)DRN../DRU../DR2.71 – 355 | Incremental encoder SET-A.GA | 21018480    |
| EK8X | (E)DRN../DRU../DR2.63 – 355 | Incremental encoder SET-A.GA | 13665979    |
| EK8R | (E)DRN../DRU../DR2.63 – 355 | Incremental encoder SET-A.GA | 21018472    |
| EV8R | (E)DRN../DRU../DR2.71 – 355 | Incremental encoder SET-A.GA | 21018472    |
| EK8S | (E)DRN../DRU../DR2.63 – 355 | Incremental encoder SET-A.GA | 21018464    |
| EV8S | (E)DRN../DRU../DR2.71 – 355 | Incremental encoder SET-A.GA | 21018464    |
| EK8W | (E)DRN../DRU../DR2.63 – 355 | Absolute encoder SET-A.GA    | 21024448    |
| RK8M | (E)DRN../DRU../DR2.63 – 355 | Resolver SET-A.GA            | 21023581    |

A mounting panel [F] is additionally required for the encoder with integrated encoder connector on the rear of the fan guard and torque bracket.

| Type                 | Motor size                  | Material short text                         | Part number |
|----------------------|-----------------------------|---------------------------------------------|-------------|
| Safety cover [361]   | (E)DRN../DRU../DR2.71       | Fan guard DRN71/BE/RS/EK8./AK8.             | 21016461    |
| Safety cover [361]   | (E)DRN../DRU../DR2.80       | Fan guard DRN80/BE/RS/EK8./AK8.             | 21016887    |
| Safety cover [361]   | (E)DRN../DRU../DR2.90       | Fan guard DRN90/+ BE/RS/.K8./+DMI           | 28923294    |
| Safety cover [361]   | (E)DRN../DRU../DR2.100      | Fan guard DRN100/BE/RS/EK8./AK8.            | 21017425    |
| Safety cover [361]   | (E)DRN../DRU../DR2.112-132S | Fan guard DRN112/132S/BE/RS/EK8./AK8.       | 21016534    |
| Safety cover [361]   | (E)DRN../DRU../DR2.132M/L   | Fan guard DRN132M/L/BE/RS/EG7./AG7.         | 21004137    |
| Safety cover [361]   | (E)DRN../DRU../DR2.160      | Fan guard DR180/BE/.G7.                     | 13634801    |
| Safety cover [361]   | (E)DRN../DRU../DR2.180      | Fan guard DRN180/BE/RS/EG7./AG7.            | 21015856    |
| Safety cover [361]   | (E)DRN../DRU../DR2.200      | Fan guard DRN200/BE/RS/EK8./AK8.            | 21017255    |
| Safety cover [361]   | (E)DRN../DRU../DR2.225      | Fan guard DRN225/BE/RS/EK8./AK8.            | 21017344    |
| Safety cover [361]   | (E)DRN../DRU../DR2.250-280  | Fan guard DRN250/280/BE/RS/EK8./AK8.        | 21017298    |
| Safety cover [657]   | (E)DRN../DRU../DR2.315-355  | Fan guard DRN132M/L/EG7./AG7.               | 21004080    |
| Support plate [3167] | (E)DRN../DRU../DR2.71 – 355 | Support plate DR2.71 – 355/.K8./K9. variant | 13604686    |

| Type                               | Motor size                    | Material short text                  | Part number |
|------------------------------------|-------------------------------|--------------------------------------|-------------|
| 4x screws for support plate [3169] | (E)DRN../DRU../DR2.71 – 132S  | Round head screw W4049,M5×5-08.8-A2F | 25631284    |
| 4x screws for support plate [3169] | (E)DRN../DRU../DR2.132M – 355 | Round head screw W4049 M5x8-08.8-A2F | 25631292    |
| Support ring [3168]                | (E)DRN../DRU../DR2.132M – 355 | Support ring DRN132M-180/.K8         | 21016674    |
| 4x screws for support ring [3166]  | (E)DRN../DRU../DR2.132M – 355 | Round head screw W4049,M5×5-08.8-A2F | 25631284    |

Serial letters A+B3+Cx+D1, A+B3+Cx+D2 and A+B3+Cx+D3

**.K8./K9./V8. Lower housing part connection unit - Encoder connection in the terminal box [A+B3]**

| Type      | Motor size                  | Material short text             | Part number |
|-----------|-----------------------------|---------------------------------|-------------|
| AK8H      | (E)DRN../DRU../DR2.71 – 180 | Absolute encoder SET-A-Box-U    | 21023530    |
| AK8W/AK8Z | (E)DRN../DRU../DR2.71 – 180 | Absolute encoder SET-A-Box-U    | 21023484    |
| AK8Y      | (E)DRN../DRU../DR2.71 – 180 | Absolute encoder SET-A-Box-U    | 21023506    |
| EK8C      | (E)DRN../DRU../DR2.71 – 180 | Incremental encoder SET-A-Box-U | 21023417    |
| EK8X      | (E)DRN../DRU../DR2.71 – 180 | Incremental encoder SET-A-Box-U | 13665987    |
| EK8R      | (E)DRN../DRU../DR2.71 – 180 | Incremental encoder SET-A-Box-U | 21023441    |
| EK8S/EK8Z | (E)DRN../DRU../DR2.71 – 180 | Incremental encoder SET-A-Box-U | 21023395    |
| EK8W/EK9Z | (E)DRN../DRU../DR2.71 – 180 | Absolute encoder SET-A-Box-U    | 21024421    |
| RK8M      | (E)DRN../DRU../DR2.71 – 180 | Resolver SET-A-Box-U            | 21024030    |

*Serial letter C*

To select the "Upper housing part connection unit" service kit with cable for connection to the motor terminal boxes, the motor size and the type of connection variant are required.

| Motor size                                                     | Connection variant                                                                                                                                                                                                | Serial letter | Service kit                                              | Part number |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------------------------------|-------------|
| DRN../DRU../DR2.71 –<br>132S motors without brake              | MOVILINK® DDI in the<br>terminal box [D1]                                                                                                                                                                         | C1            | Cover cpl.<br>DRN../K8Z/.K9Z<br>L = 410<br>MOVILINK® DDI | 28924290    |
| DRN../DRU../DR2.71 –<br>132S motors with brake                 |                                                                                                                                                                                                                   | C2            | Cover cpl.<br>DRN../K8Z/.K9Z<br>L = 525<br>MOVILINK® DDI | 28924150    |
| DRN../DRU../DR2.132M –<br>180 motors with and<br>without brake |                                                                                                                                                                                                                   | C3            | Cover cpl.<br>DRN../K8Z/.K9Z<br>L = 725<br>MOVILINK® DDI | 28924304    |
| DRN../DRU../DR2.71 –<br>132S motors without brake              | <ul style="list-style-type: none"> <li>M23 connector for connection in the terminal box [D2]</li> <li>Connection unit (terminal strip in the terminal box) for connection in the terminal box [D3/D3a]</li> </ul> | C4            | Cover cpl.<br>DRN../K8. L = 410                          | 13606832    |
| DRN../DRU../DR2.71 –<br>132S motors with brake                 |                                                                                                                                                                                                                   | C5            | Cover cpl.<br>DRN../K8. L = 525                          | 13608640    |
| DRN../DRU../DR2.132M –<br>180 motors with and<br>without brake |                                                                                                                                                                                                                   | C6            | Cover cpl.<br>DRN../K8. L = 725                          | 13606808    |

*Serial letter D1*

The serial letter D1 relates to the .K8. and .K9. MOVILINK® DDI communication unit. You can find more information on MOVILINK® DDI in the "Digital motor integration" manual and the respective addenda to the motor operating instructions.



*Serial letter D2***.K8./K9. M23 connector for connection in the terminal box [D2]**

| Type                                               | Motor size                                             | Material short text               | Part number |
|----------------------------------------------------|--------------------------------------------------------|-----------------------------------|-------------|
| Connector DRN../DR../AIG. M23 [1525]               | (E)DRN../DRU../DR2.71 – 132S (M23 in the terminal box) | Connector DRN/DR/AIG. M23         | 21017719    |
| Connector W4601 CBN-F-3-SCR-MR                     | (E)DRN../DRU../DR2.71 – 132S (M23 in the terminal box) | Connector W4601 CBN-F-3-SCR-MR    | 17994837    |
| Thread reduction AIG. M32 × 1.5 - M25 × 1.5 [1178] | (E)DRN../DRU../DR2.71 – 132S (M23 in the terminal box) | Thread reduction                  | 21020280    |
| Protective cap DRN71 – 132S/ EI8. [1170]           | (E)DRN../DRU../DR2.71 – 132S (M23 in the terminal box) | Protective cap DRN71-132S/EI8     | 21020159    |
| Protection cap W4299 2-19.1-PE-BK [1529]           | (E)DRN../DRU../DR2.71 – 132S (M23 in the terminal box) | Protection cap W4299 2-19.1-PE-BK | 13320874    |

*Serial letter D3***.K8./K9. Connection unit (terminal strip in the terminal box) for connection in the terminal box [D3]**

| Type                                      | Motor size                                                        | Material short text                    | Part number |
|-------------------------------------------|-------------------------------------------------------------------|----------------------------------------|-------------|
| Connection unit DRN71 – 132S/ EI8. [1522] | (E)DRN../DRU../DR2.71 – 180 (connection unit in the terminal box) | Connection unit DRN71 – 132S/EI8. Size | 22659153    |
| Screw DIN7500 CE-A-M4 × 8-A2F-GM1 [137]   | (E)DRN../DRU../DR2.71 – 180 (connection unit in the terminal box) | Screw DIN7500 CE-A-M4 × 8-A2F-GM1      | 00131032    |
| Terminal washer W4726 5.14-CB-STO [1524]  | (E)DRN../DRU../DR2.71 – 180 (connection unit in the terminal box) | Terminal washer W4726 5.14-CB-STO      | 13262130    |

Serial letter D3a

**EK8X Connection unit (terminal strip in the terminal box) for connection in the terminal box [D3a]**

| Type                                                     | Motor size                                                              | Material short text                          | Part number |
|----------------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|-------------|
| Connection unit<br>DRN71 – 132S/<br>EI8../K8. [1522]     | (E)DRN../DRU../DR2.71 – 180<br>(connection unit in the terminal<br>box) | Connection unit DR2.71 – 180/<br>EI8../K8.BG | 13605364    |
| Configuration box<br>EK8X<br>DR71-315/EK8X<br>[1632]     | (E)DRN../DRU../DR2.71 – 180<br>(connection unit in the terminal<br>box) | Connection unit DR71 – 315/EK8X              | 13666185    |
| Connection unit<br>litz wire set =><br>configuration box | (E)DRN../DRU../DR2.71 – 180<br>(connection unit in the terminal<br>box) | E-connector ZZ2C-<br>S2CS000-02A26L200       | 28192877    |
| Screw DIN7500<br>CE-A-M4 × 8-<br>A2F-GM1 [137]           | (E)DRN../DRU../DR2.71 – 180<br>(connection unit in the terminal<br>box) | Screw DIN7500 CE-A-M4 × 8-A2F-<br>GM1        | 00131032    |
| Terminal washer<br>W4726 5.14-CB-<br>STO [1524]          | (E)DRN../DRU../DR2.71 – 180<br>(connection unit in the terminal<br>box) | Terminal washer W4726 5.14-CB-<br>STO        | 13262130    |
| Clamp W4521<br>A11-3.2-Al                                | (E)DRN../DRU../DR2.71 – 180<br>(connection unit in the terminal<br>box) | Cable clamp d=3.2, B=5.2 Aluminum<br>blank   | 29702356    |

*Serial letter E*

The motor size is required to select the insulation coupling.

| Motor size                     | Service kit              | Material short text                  | Part number |
|--------------------------------|--------------------------|--------------------------------------|-------------|
| DRN../DRU../<br>DR2. 63 – 200  | No insulation coupling   | –                                    | –           |
| DRN../DRU../<br>DR2. 225 – 315 | With insulation coupling | Insulation coupling DR2../K8../K9.   | 21018022    |
|                                | Spacer ring              | Spacer ring DRN160 – 315/K8../K9.    | 21018278    |
|                                | 4 screws M5×10           | Screw W4033 PEB-A-M5x10-10.9-ADB8-BK | 19122012    |
| DR2S180 – 225<br>with FS       | With insulation coupling | Insulation coupling DR2../K8../K9.   | 21018022    |
|                                | Spacer ring              | Spacer ring DRN160 - 315/K8../K9.    | 21018278    |
|                                | 4 screws M5×10           | Screw W4033 PEB-A-M5x10-10.9-ADB8-BK | 19122012    |
| DR2L160 – 225<br>with FS       | With insulation coupling | Insulation coupling DR2../K8../K9.   | 21018022    |
|                                | Spacer ring              | Spacer ring DRN160 – 315/K8../K9.    | 21018278    |
|                                | 4 screws M5×10           | Screw W4033 PEB-A-M5x10-10.9-ADB8-BK | 19122012    |

*Serial letter G***.K8../V8. Connection cover on integrated connectors [G]**

| Type                               | Material short text                          | Part number |
|------------------------------------|----------------------------------------------|-------------|
| Connection cover .K8../V8.         | Connection cover DRN71-315/K8../V8.          | 21017530    |
| Connection cover .K8../V8. (OS3/4) | Connection cover DRN71-315/K8../V8.<br>OS3/4 | 21020965    |
| Connection cover EK8X              | Connection cover DRN63-315/EK8X              | 13665782    |
| Connection cover EK8X (OS3/4)      | Connection cover DRN63-315/EK8X OS3/4        | 13666738    |

## 11.3.4 .S7./G7. Service kits

## Service kits for .S7./G7. encoders

| Type | Motor size                                                              | Material short text | Part number |
|------|-------------------------------------------------------------------------|---------------------|-------------|
| AS7Y | DR../(E)DRN../DRU../DR2.71 – 132<br>DR../(E)DRN../DRU../DR2.80 – 132S   | Encoder service kit | 13642847    |
| AS7W | DR../(E)DRN../DRU../DR2.71 – 132<br>DR../(E)DRN../DRU../DR2.80 – 132S   | Encoder service kit | 13642855    |
| ES7C | DR../(E)DRN../DRU../DR2.71 – 132<br>DR../(E)DRN../DRU../DR2.80 – 132S   | Encoder service kit | 13642863    |
| ES7R | DR../(E)DRN../DRU../DR2.71 – 132<br>DR../(E)DRN../DRU../DR2.80 – 132S   | Encoder service kit | 13642871    |
| ES7S | DR../(E)DRN../DRU../DR2.71 – 132<br>DR../(E)DRN../DRU../DR2.80 – 132S   | Encoder service kit | 13642898    |
| XS7S | DR../(E)DRN../DRU../DR2.71 – 132<br>DR../(E)DRN../DRU../DR2.80 – 132S   | Encoder service kit | 13642987    |
| XS7C | DR../(E)DRN../DRU../DR2.71 – 132<br>(DR../(E)DRN../DRU../DR2.80 – 132S  | Encoder service kit | 13643002    |
| AG7W | DR../(E)DRN../DRU../DR2.160 – 280<br>DR../(E)DRN../DRU../DR2.132M – 280 | Encoder service kit | 13642901    |
| AG7Y | DR../(E)DRN../DRU../DR2.160 – 280<br>DR../(E)DRN../DRU../DR2.132M – 280 | Encoder service kit | 13642928    |
| EG7C | DR../(E)DRN../DRU../DR2.160 – 280<br>DR../(E)DRN../DRU../DR2.132M – 280 | Encoder service kit | 13642936    |
| EG7R | DR.160-280<br>DRN132M – 2800                                            | Encoder service kit | 13642944    |
| EG7S | DR.160-280<br>DRN132M – 2800                                            | Encoder service kit | 13642952    |

## 11.4 Waste disposal

Dispose of the product and all parts separately in accordance with their material structure and the national regulations. Put the product through a recycling process or contact a specialist waste disposal company. If possible, divide the product into the following categories:

- Iron, steel or cast iron
- Stainless steel
- Magnets
- Aluminum
- Copper
- Electronic parts
- Plastics

The following materials are hazardous to health and the environment. These materials must be collected and disposed of separately:

- Oil and grease

Collect used oil and grease separately according to type. Ensure that the used oil is not mixed with solvent. Dispose of used oil and grease correctly.

- Screens
- Capacitors



### Waste disposal according to WEEE Directive 2012/19/EU

This product and its accessories may fall within the scope of the country-specific application of the WEEE Directive. Dispose of the product and its accessories according to the national regulations of your country.

For further information, contact the responsible SEW-EURODRIVE branch or an authorized partner of SEW-EURODRIVE.

## 11.5 Service and maintenance checklist

| SEW-EURODRIVE: Data recording/processing                                                                                                       |  |
|------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Date                                                                                                                                           |  |
| Name, department                                                                                                                               |  |
| Information about the customer                                                                                                                 |  |
| Company name, contact person                                                                                                                   |  |
| Customer number                                                                                                                                |  |
| Complaint number/GCom                                                                                                                          |  |
| Service case number                                                                                                                            |  |
| Industry/operating location of the customer:<br>e.g. automotive, food, transport and logistics, raw<br>material processing (stone, wood, etc.) |  |
| Information about the motor and its options                                                                                                    |  |
| Type designation                                                                                                                               |  |
| Serial number(s) of the affected drives                                                                                                        |  |
| Delivery date                                                                                                                                  |  |
| Control of the motor (frequency inverter (SEW-<br>EURODRIVE, third party)/supply system)                                                       |  |
| Brake control?                                                                                                                                 |  |
| FS motor option available (FS logo)? If so, which<br>one?                                                                                      |  |
| Are other options or retrofits available? If so, which<br>ones?                                                                                |  |
| Grounding concept of the motor: How is the ground-<br>ing carried out?                                                                         |  |
| Description of the electrical environment of the motor<br>(other drives, switches, contactors, robots, safety<br>technology, etc.)             |  |
| Information about the encoder                                                                                                                  |  |
| Type (see labeling)                                                                                                                            |  |
| Part number (see labeling)                                                                                                                     |  |
| Batch number (see labeling)                                                                                                                    |  |
| Delivery date (if different from the motor)                                                                                                    |  |
| Are other encoders/sensor components than the<br>complained object in use? Are there any known<br>problems with these other systems?           |  |
| Fault description                                                                                                                              |  |
| Is there a defect or is there a functional failure<br>without a component defect?                                                              |  |
| Explanation: How does the fault manifest itself?                                                                                               |  |

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|                                                                                                                                                                                                                                    |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Measurements: Attach measuring results indicating the fault, if available.                                                                                                                                                         |  |
| Include photos/videos of use case/fault case (encoder system, cabling, system, motor, etc.)                                                                                                                                        |  |
| Repeated fault in this application? Details on frequency?                                                                                                                                                                          |  |
| <b>Information about operating conditions</b>                                                                                                                                                                                      |  |
| Supply voltage <ul style="list-style-type: none"> <li>Nominal value and tolerance</li> <li>Number of additionally connected units to the encoder, type of units</li> </ul>                                                         |  |
| Cable length                                                                                                                                                                                                                       |  |
| Cable types <ul style="list-style-type: none"> <li>Basic technical data (cross section, material, etc.)</li> <li>Shielding? If so, what kind?</li> <li>Are twisted pair signal cores present?</li> <li>Connector types?</li> </ul> |  |
| Cable routing <ul style="list-style-type: none"> <li>Description of the routing</li> <li>Distance to power cables</li> <li>Are cable ducts present?</li> </ul>                                                                     |  |
| Vibrations and shocks, internal to the motor <ul style="list-style-type: none"> <li>Is a brake present?</li> <li>If so, what type?</li> </ul>                                                                                      |  |
| Vibrations and shocks, external to the motor <ul style="list-style-type: none"> <li>Total vibration of the drive?</li> <li>Vibrations through the motor shaft?</li> </ul>                                                          |  |
| Thermal operating conditions:<br>Operating temperature range                                                                                                                                                                       |  |
| Thermal operating conditions:<br>Course/temperature gradient during use?                                                                                                                                                           |  |
| Humidity values?                                                                                                                                                                                                                   |  |
| Humidity:<br>Course/gradient during use?                                                                                                                                                                                           |  |
| Media in the environment <ul style="list-style-type: none"> <li>Is the encoder exposed to special media such as cleaning agents?</li> <li>Course of exposure (permanent, 1x per week, 10 min, etc.)</li> </ul>                     |  |
| <b>Information about operating states in the application</b>                                                                                                                                                                       |  |

|                                                                                                                                                                                                                                                              |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p>Start of the system</p> <ul style="list-style-type: none"> <li>• Course of the supply voltage</li> <li>• Chronological order/profile of connecting the sensor technology and power of the drive</li> <li>• Other special features?</li> </ul>             |  |
| <p>Ongoing operation of the system</p> <ul style="list-style-type: none"> <li>• Course of the supply voltage</li> <li>• Chronological order/profile of connecting the sensor technology and power of the drive</li> <li>• Other special features?</li> </ul> |  |
| <p>Switching off the system</p> <ul style="list-style-type: none"> <li>• Course of the supply voltage</li> <li>• Chronological order/profile of connecting the sensor technology and power of the drive</li> <li>• Other special features?</li> </ul>        |  |
| <b>Encoder evaluation</b>                                                                                                                                                                                                                                    |  |
| Evaluation device, type                                                                                                                                                                                                                                      |  |
| Have other units been evaluated on this device? If so, which ones?                                                                                                                                                                                           |  |
| What load current is present through evaluation inputs?                                                                                                                                                                                                      |  |
| What query cycle time/polling rate is there for encoder information?                                                                                                                                                                                         |  |
| In the case of incremental encoders: Are all signal tracks evaluated, or just individual ones? If applicable, which signal tracks?                                                                                                                           |  |
| <b>Other?</b>                                                                                                                                                                                                                                                |  |
| Are there any other occurrences that may be significant for the functional failure or defect? What is your presumption regarding a cause?                                                                                                                    |  |



## 12 Approvals

The encoders described in this document are only approved as options for motors from SEW-EURODRIVE.

The approvals of the respective motor are observed when selecting the encoder. The encoders are only selectable and approved for motors if the approvals of the motor are supported by the encoder.

The encoders are approved as spare parts for the selected motors and are not permitted to be used on other motors or motors from third-party suppliers.

For details on the approvals of the motors with the encoders, refer to the respective applicable catalogs and operating instructions of the motor in question.

### 12.1 CE

All encoders are listed in the certificates of conformity of the respective motor.

### 12.2 UL and CSA

All encoders are approved for use and operation in accordance with UL and CSA. The UL and CSA reports for each motor contain the encoders, including their respective connection options.

### 12.3 UKCA

| Encoder type | Manufacturer  | Address of contact person in UK                                                                 |
|--------------|---------------|-------------------------------------------------------------------------------------------------|
| EI71         | SEW-EURODRIVE | SEW-EURODRIVE Ltd<br>DeVilliers Way<br>Normanton<br>West Yorkshire<br>WF6 1GX<br>United Kingdom |
| EI72         |               |                                                                                                 |
| EI76         |               |                                                                                                 |
| EI7C         |               |                                                                                                 |
| EI7C FS      |               |                                                                                                 |
| EI8C         |               |                                                                                                 |
| EI8R         |               |                                                                                                 |
| EI8Z         |               |                                                                                                 |
| EK8Z         |               |                                                                                                 |
| EK9Z         |               |                                                                                                 |
| AK8Z         |               |                                                                                                 |

| Encoder type                                                 | Manufacturer | Address of contact person in UK                                                                                       |
|--------------------------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------|
| EK8R<br>EK8C<br>EK8S<br>EV8.<br>RK8M<br>AK8W<br>AK8Y<br>AV8. | Baumer Group | Baumer Ltd<br>Shrivenham Hundred, Business<br>Park Majors Road 33/36<br>SN6 8TZ Watchfield, Swindon<br>United Kingdom |
| EK8R<br>EK8C<br>EK8S<br>EK8W<br>AK8W<br>AK8Y                 | Kübler Group | OEM Automatic Ltd.<br>Whiteacres<br>Whetstone<br>Leicester LE8 6ZG, England<br>United Kingdom                         |
| AK8H                                                         | Sick         | SICK (UK) Ltd.<br>Waldkirch House<br>39 Hedley Road,<br>St. Albans<br>Hertfordshire<br>AL1 5BN<br>United Kingdom      |

## 13 Contacting SEW-EURODRIVE

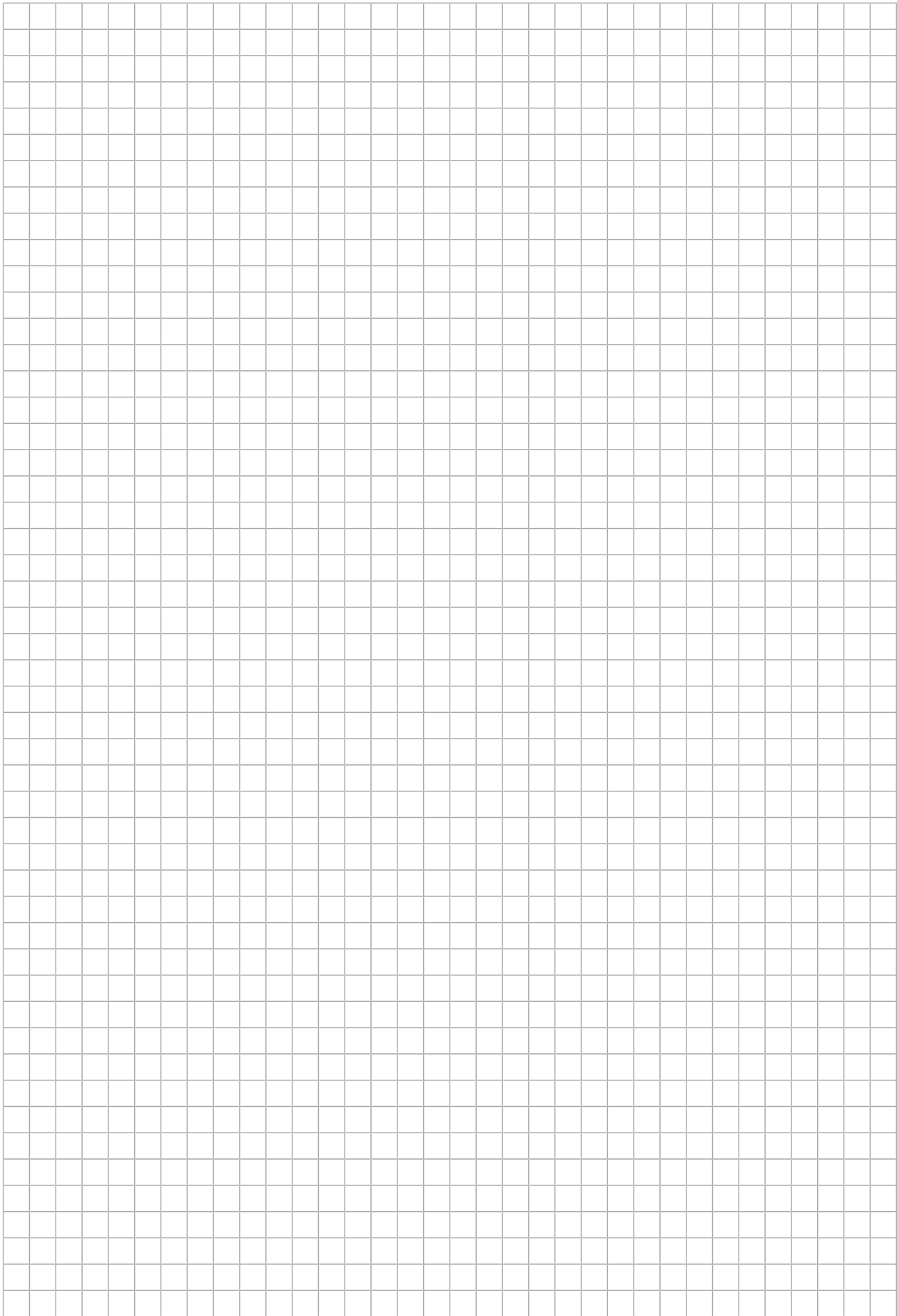
You can find the worldwide contact data and locations on the **SEW-EURODRIVE website** via the following link or the QR code shown below.

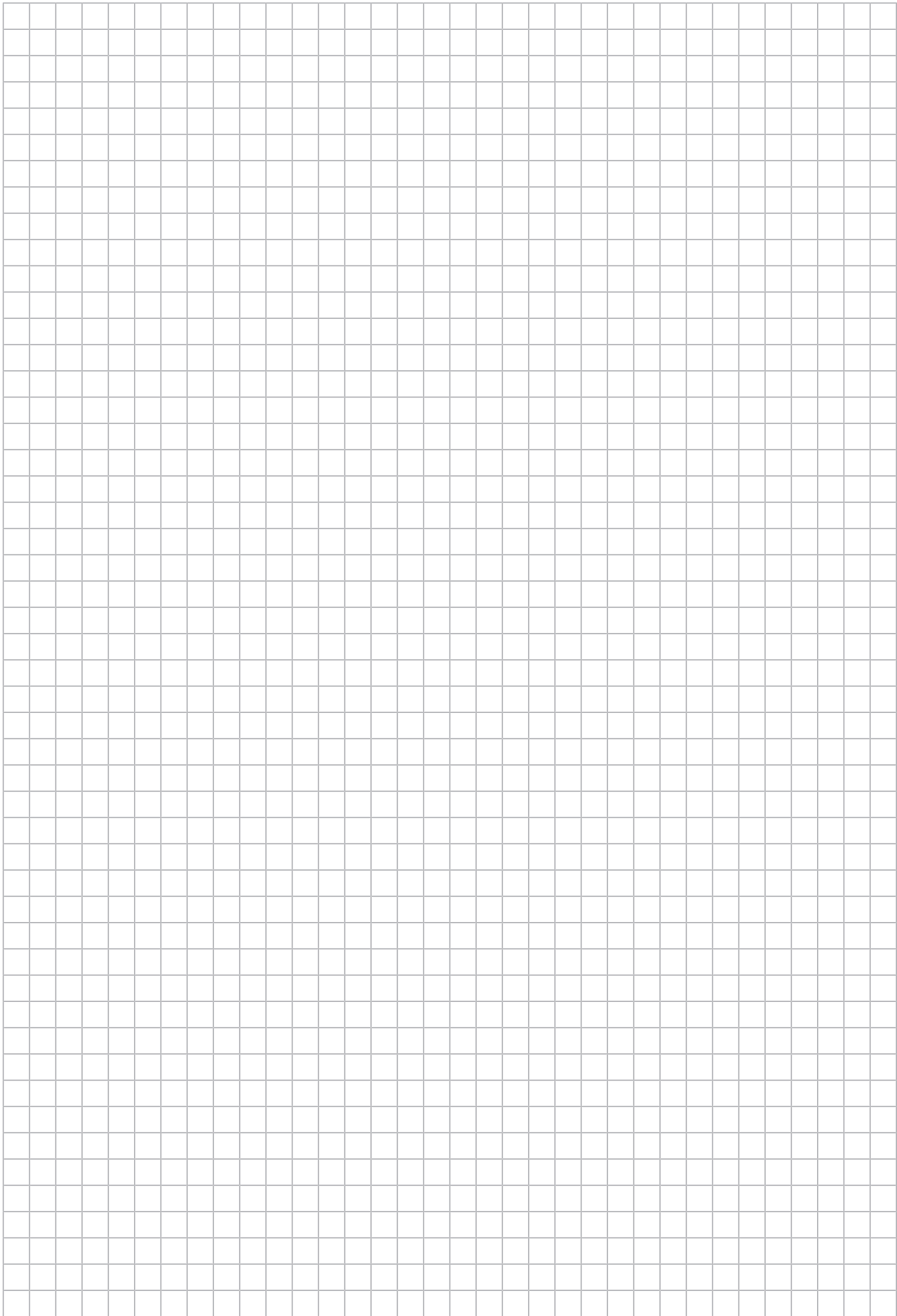
<https://www.sew-eurodrive.de/contacts-worldwide>

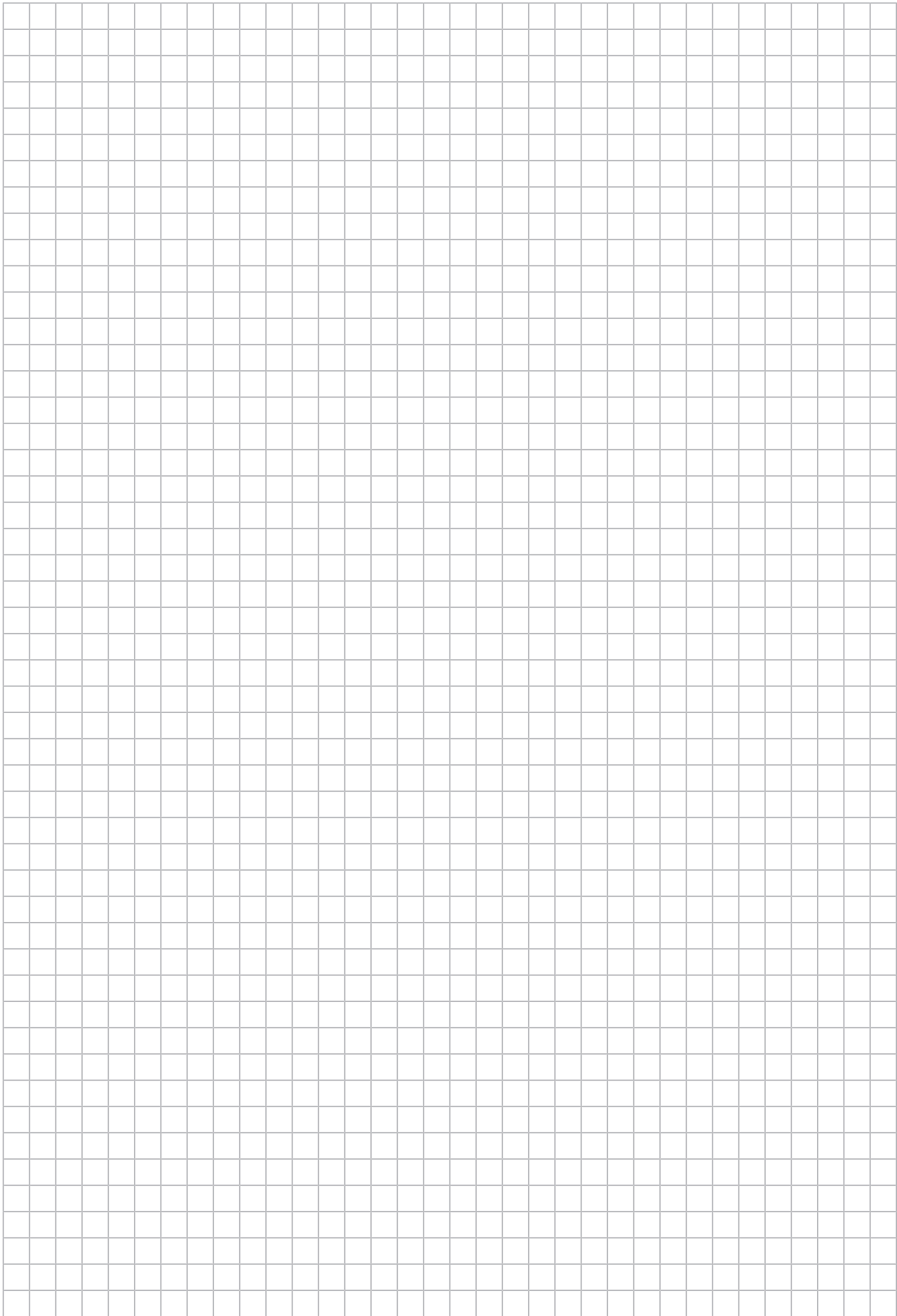


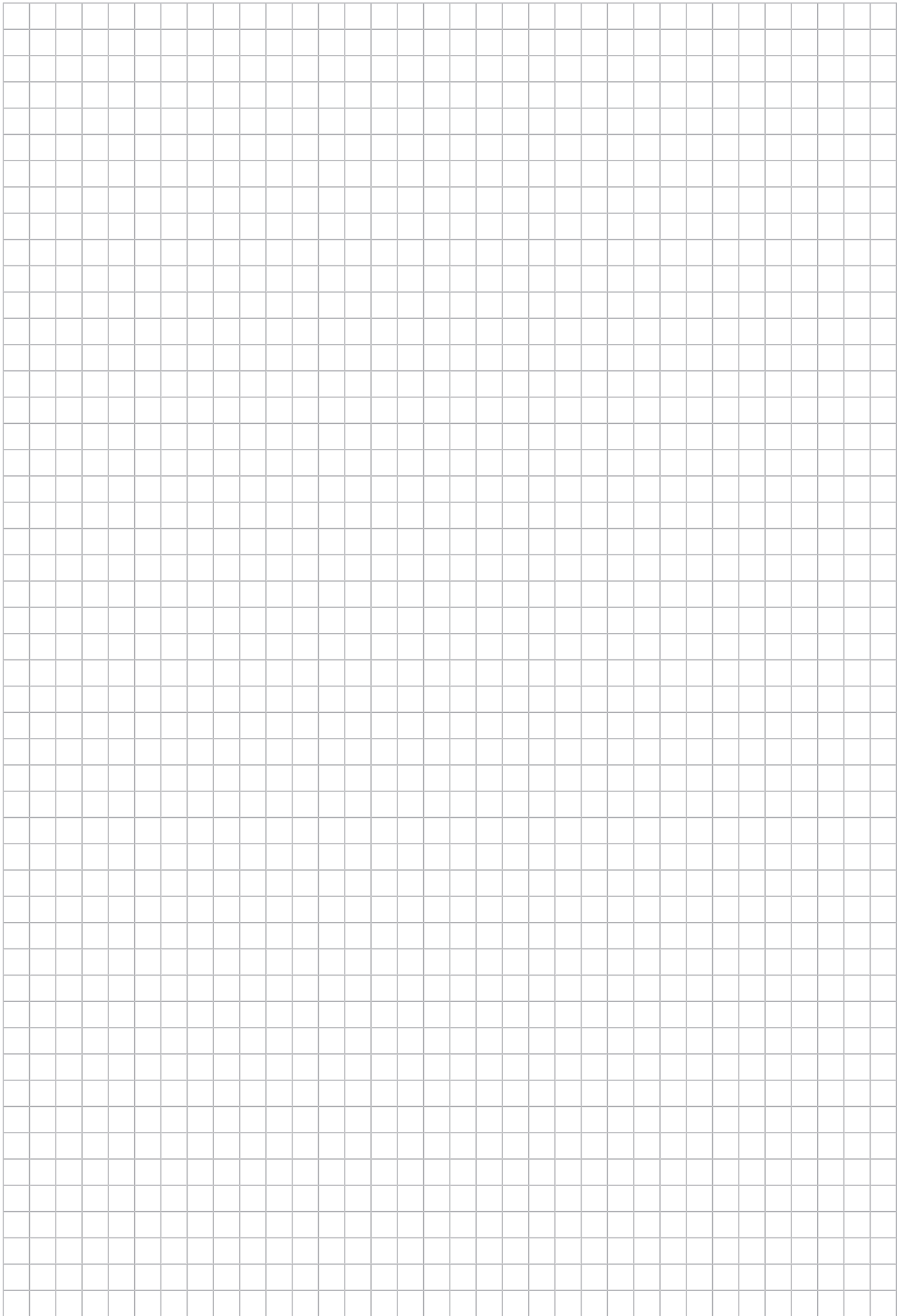
**SEW**  
**EURODRIVE**

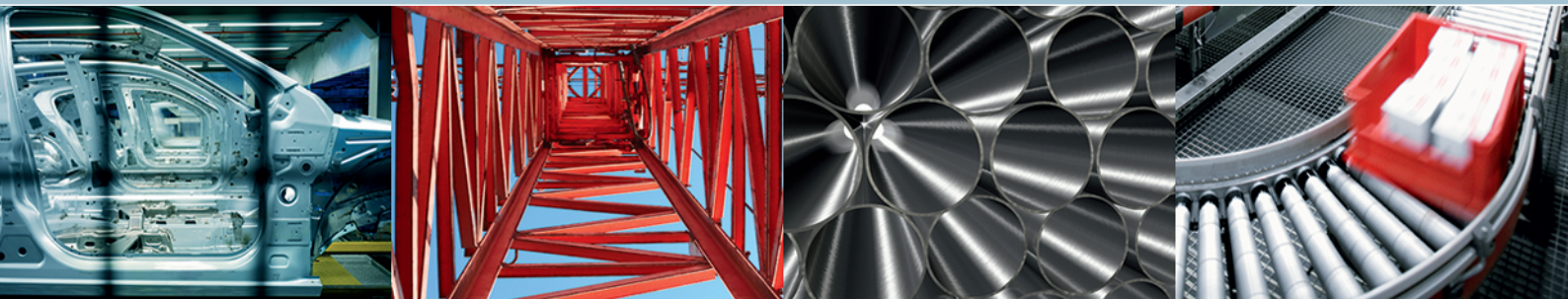
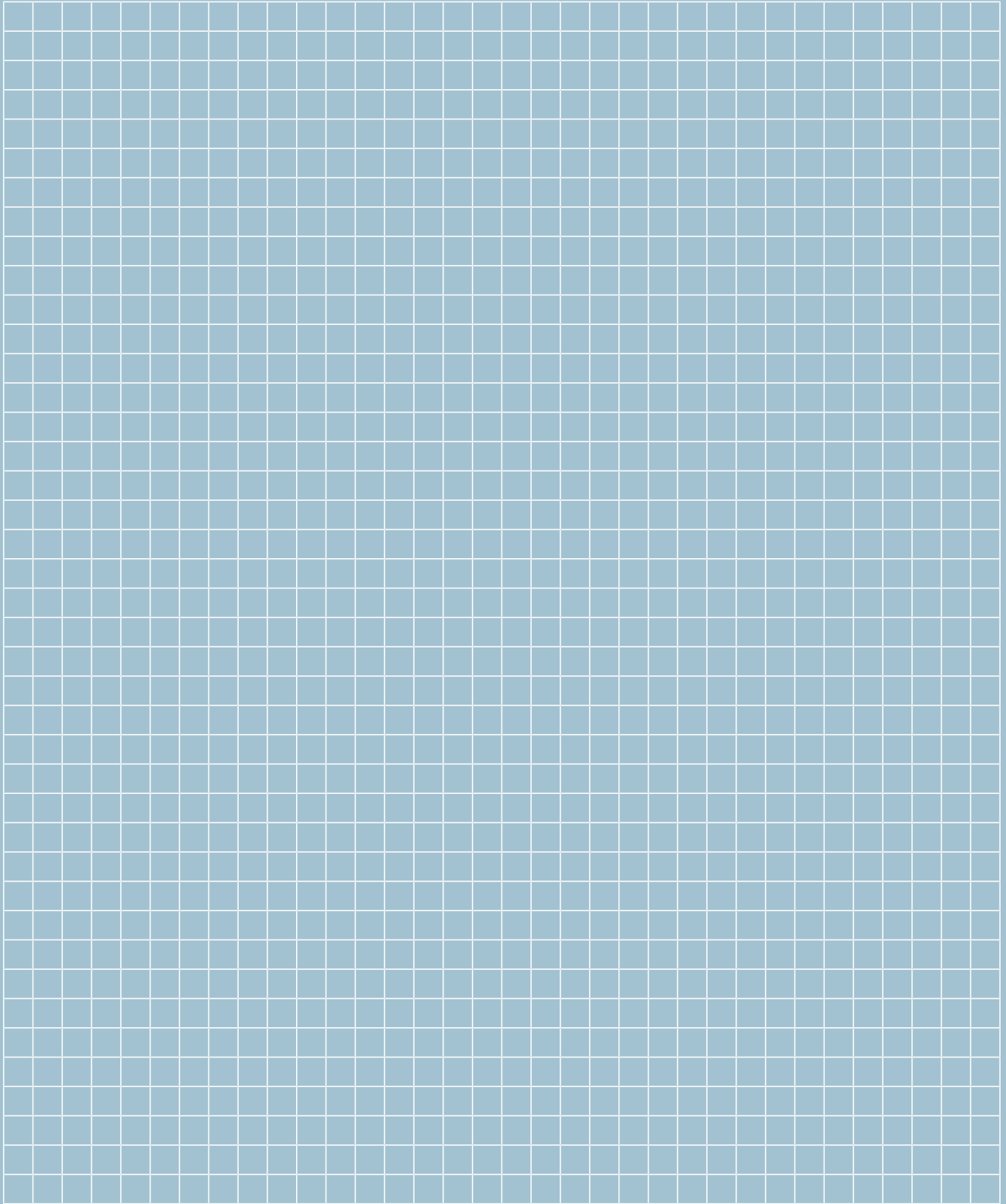




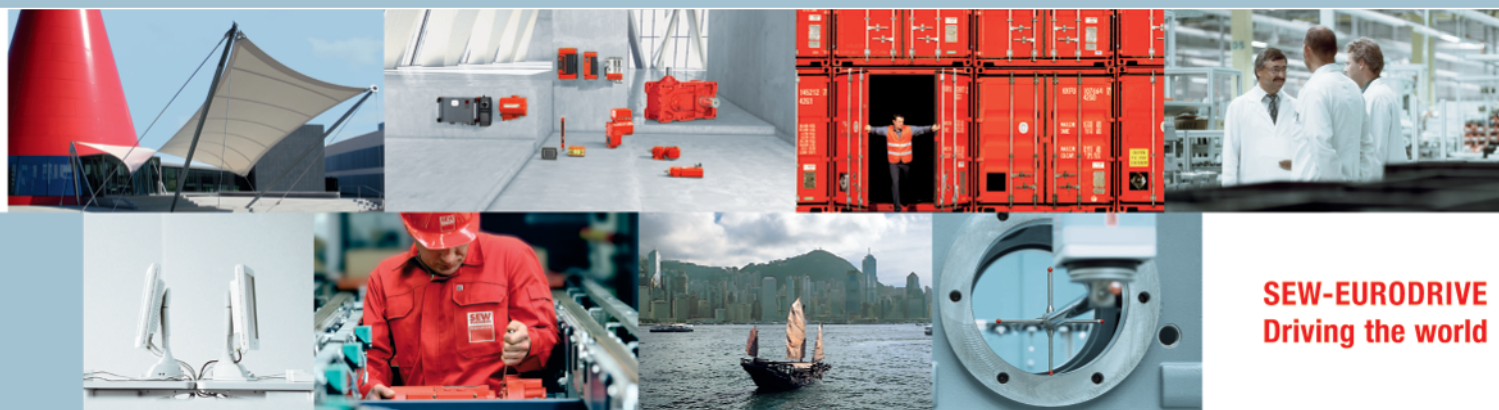












**SEW-EURODRIVE**  
Driving the world

**SEW**  
**EURODRIVE**

SEW-EURODRIVE GmbH & Co KG  
Ernst-Blickle-Str. 42  
76646 BRUCHSAL  
GERMANY  
Tel. +49 7251 75-0  
Fax +49 7251 75-1970  
sew@sew-eurodrive.com  
→ [www.sew-eurodrive.com](http://www.sew-eurodrive.com)

## Ficha técnica para sensor de valor absoluto

Data sheet for Absolute encoder

Artigo n.º : 6FX2001-5QN25  
Article No. :



Ilustração semelhante  
Figure similar

N.º pedido do cliente :  
Client order no. :  
N.º encomenda :  
Order no. :  
N.º oferta :  
Offer no. :  
Nota :  
Remarks :

N.º item :  
Item no. :  
N.º com. :  
Consignment no. :  
Projeto :  
Project :

| Dados elétricos<br>Electrical data                     |                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tensão de serviço Up<br>Operating voltage Up           | DC 10 ... 30 V                                                                                                                                                                                                                                                               |
| Interface<br>Interface                                 | PROFINET IO com RT / IRT<br>PROFINET IO with RT / IRT                                                                                                                                                                                                                        |
| Entrada cíclica<br>Clock input                         | 2 interfaces IRT<br>2 ports IRT                                                                                                                                                                                                                                              |
| Saída de dados<br>Data output                          | 2 interfaces IRT<br>2 ports IRT                                                                                                                                                                                                                                              |
| Resistência a curto-circuito<br>Short-circuit strength | Si<br>Yes                                                                                                                                                                                                                                                                    |
| Velocidade de transmissão<br>Transmission rate         | 100 Mbit/s                                                                                                                                                                                                                                                                   |
| Conexão<br>Connection                                  | 2 x conector encaixável M12, tetrapolar para interfaces PROFINET / EtherNet/IP, 1 x conector de encaixe M12, tetrapolar para tensão operacional, radial<br>2 x connector M12, 4-pin for PROFINET / EtherNet/IP Ports, 1 x connector M12, 4-pin for operating voltage,Radial  |
| Resolução<br>Resolution                                | 30 bit                                                                                                                                                                                                                                                                       |
| Telegrama<br>Telegram                                  | De acordo com o perfil do codificador PNO V4.1 classe 1, classe 2, classe 3, classe 4, telegramas padrão 81 a 89, telegramas Siemens 860/862<br><br>According to PNO encoder profile V4.1 Class 1, Class 2, Class 3, Class 4 Standard frame 81 to 89, Siemens frames 860/862 |

### Tipo de código Code type

|                               |                                                                   |
|-------------------------------|-------------------------------------------------------------------|
| Amostragem<br>Sampling        | Gray<br>Gray                                                      |
| Transferência<br>Transmission | binário, PROFINET / EtherNet/IP<br>binary, PROFINET / EtherNet/IP |

### Possibilidade de parametrização Parameterizability

|                                                             |                                                                                                                               |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Predefinição<br>Preset                                      | Si<br>Yes                                                                                                                     |
| Sentido de contagem<br>Counting direction                   | Si<br>Yes                                                                                                                     |
| Resolução por rotação<br>Resolution per revolution          | Opcional 1 ... 8192<br>Any 1 ... 8192                                                                                         |
| Resolução total<br>Total resolution                         | Opcional 1 ... 8192 x 16384<br>Any 1 ... 8192 x 16384                                                                         |
| Sinal de velocidade<br>Speed signal                         | Si<br>Yes                                                                                                                     |
| Interruptor de fim de curso<br>Limit switch                 | No<br>No                                                                                                                      |
| Sincronismo de ciclos<br>Clock synchronism                  | Si<br>Yes                                                                                                                     |
| Tráfego direto<br>Slave-to-slave communication              | No<br>No                                                                                                                      |
| Precisão<br>Accuracy                                        | ± 79 " (± 1 LSB em 8192 passos ou<br>± 2 LSB em 65136 passos)<br>± 79 " (± 1 LSB at 8192 steps or<br>(± 2 LSB at 65136 steps) |
| Binário de atrito (com 20°C)<br>Friction torque (at 20°C)   | ≤ .01                                                                                                                         |
| Binário de arranque (com 20°C)<br>Starting torque (at 20°C) | ≤ .01                                                                                                                         |

### Dados mecânicos Mechanical data

|                                                  |           |
|--------------------------------------------------|-----------|
| Velocidade, máx.<br>Speed max.                   |           |
| Com ± 1 LSB de precisão<br>With ± 1 LSB accuracy | 5.800 rpm |
| Mecânico<br>Mechanical                           | 6.000 rpm |



Ficha técnica para sensor de valor absoluto  
Data sheet for Absolute encoder

Artigo n.º : 6FX2001-5QN25  
Article No. :

Capacidade de carga do veio  
Load capacity

|                                                          |                |
|----------------------------------------------------------|----------------|
| n ≤ 6000 rpm                                             |                |
| - Axial<br>- Axial                                       | 40 N           |
| - Radial na extremidade do veio<br>- Radial at shaft end | 110 N          |
| n > 6000 rpm                                             |                |
| - Axial<br>- Axial                                       | 10 N           |
| - Radial na extremidade do veio<br>- Radial at shaft end | 20 N           |
| Diâmetro do veio<br>Shaft diameter                       | 10 mm          |
| Comprimento do veio<br>Shaft length                      | 20 mm          |
| Aceleração angular, máx.<br>Angular acceleration, max.   | 100.000 rad/s² |
| Binário de inércia do rotor<br>Rotor moment of inertia   | 0,0000019 kgm² |

Vibração e choque  
Vibration and shock

|                                                                                                                    |            |
|--------------------------------------------------------------------------------------------------------------------|------------|
| Vibração (55...2000 Hz) de acordo com EN 60068-2-6, máx<br>Vibration (55...2000 Hz) according to EN 60068-2-6, max | 100 m/s²   |
| 6 ms de acordo com EN 60068-2-27, máx<br>6 ms according to EN 60068-2-27, max                                      | 1.000 m/s² |

Tipo de proteção  
Degree of protection

|                                      |              |
|--------------------------------------|--------------|
| Na caixa<br>At housing               | IP67<br>IP67 |
| Na entrada do eixo<br>At shaft input | IP64<br>IP64 |
| Peso líquido<br>Net weight           | 0,43 kg      |

Temperatura ambiente  
Ambient temperature

|                                             |               |
|---------------------------------------------|---------------|
| Durante o funcionamento<br>During operation | -40 ... 85 °C |
|---------------------------------------------|---------------|

Normas  
Standards

|                                                         |                                                                                                                                                             |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Conformidade com as normas<br>Compliance with standards | CE, cULus<br>CE, cULus                                                                                                                                      |
| Classe de filtro CEM<br>EMC class filter                | Diretiva EMV 2014/30/UE e regulamentos das diretivas EMV (normas básicas)<br>EMC Directive 2014/30/EC and regulations of EMC directives (generic standards) |

## CABO TELEFLEX PVC/PVC

Os cabos TELEFLEX são uma linha de produtos fabricados na Telecam especialmente desenvolvidos e indicados para sistema de comando e controle em situações e condições onde o cabo continuamente se encontra em movimento. São indicados e utilizados em pontes rolantes, talhas, empilhadeiras, equipamentos de mineração, naval e portuária ou em qualquer peça e equipamento em movimento. São altamente flexíveis e duráveis, devido a sua alta flexibilidade dos condutores, do seu formato retangular (achatado) e do uso de uma capa externa em PVC totalmente flexível e emborrachada, garantindo uma alta performance em movimentos repetitivos e fadiga, além de baixo raio de curvatura e resistente a abrasão, corte, esmagamento e condições severas de uso.



Imagem meramente ilustrativa.

## ESPECIFICAÇÃO TÉCNICA

### MATERIAIS

|                   |                                                                                                                                        |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Condutor:</b>  | Fios de cobre nu flexível, têmpera mole, encordoamento classe 5.                                                                       |
| <b>Isolação:</b>  | Composto termoplástico de cloreto de polivinila (PVC/A), temperatura de operação 70°C, antichama (AC) e livre de metais pesados (LMP). |
| <b>Cobertura:</b> | Composto termoplástico de cloreto de polivinila (PVC), emborrachado, altamente flexível.                                               |

### PROPRIEDADES

|                                 |                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Ident. dos condutores:</b>   | ① Veias pretas numeradas, do Nº 1 até o número de vias do cabo.                                                                                              |
| <b>Cor da cobertura:</b>        | ●                                                                                                                                                            |
| <b>Acondicionamento:</b>        | Bobinas de madeira.                                                                                                                                          |
| <b>Raio de curvatura:</b>       | Até 10x o diâmetro do cabo.                                                                                                                                  |
| <b>Temperatura de trabalho:</b> | Estabilidade térmica de trabalho até 70°C.                                                                                                                   |
| <b>Tensões de isolamento:</b>   | 300/500V nas seções de 0,75 e 1,00mm <sup>2</sup> .<br>0,6/1,0KV nas seções a partir de 1,50mm <sup>2</sup> .                                                |
| <b>Normas aplicáveis:</b>       | NBR NM 280   NBR 7289   NBR 6251.                                                                                                                            |
| <b>Marcação na cobertura:</b>   | TELECAM TELEFLEX "Nº vias X seção em mm <sup>2</sup> " CUNU CLASSE 5 PVC/A "Tensão de isolamento" PVC EMBOR. "NBR aplicável"<br>"LOTE:XXXXX" "AAAA" "XXXXXM" |

#### Legendas

AAAA = Ano de fabricação.

XXXXXM = Marcação metro-a-metro.

#### Norma aplicável

Seção até 10mm<sup>2</sup> - NBR 7289

Seção a partir de 16mm<sup>2</sup> - NBR 6251

## DADOS CONSTRUTIVOS

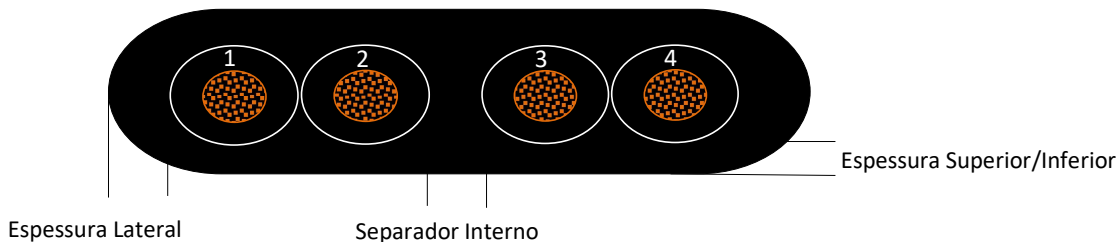


Imagem meramente ilustrativa.

| Seção: 0,75mm²                  |              |
|---------------------------------|--------------|
| Diâmeto máx. dos fios no cond.: | Fios 0,21mm. |
| Resist. elétr. máx. a 20°C:     | 26,00 Ω/km.  |
| Diâmetro do condutor:           | 1,05mm.      |
| Espes. de isolamento:           | 0,60mm.      |

| Nº de vias | Código    | Construção das vias | Esp. Sp/lf (mm) | Esp. Lat. (mm) | Sep. Int. (mm) | Altura x Largura (mm) | Peso (kg/km) |
|------------|-----------|---------------------|-----------------|----------------|----------------|-----------------------|--------------|
| 3          | 210565400 | 3                   | 0,90            | 1,50           | -              | 4,05 X 9,75           | 69,43        |
| 4          | 210565500 | 2+2                 |                 |                | 1,20           | 4,05 X 13,20          | 93,63        |
| 5          | 211784500 | 2+3                 |                 |                |                | 4,05 X 15,45          | 111,47       |
| 6          | 211784600 | 3+3                 |                 |                |                | 4,05 X 17,70          | 129,31       |
| 7          | 211784700 | 4+3                 |                 |                |                | 4,05 X 19,95          | 147,14       |
| 8          | 211784800 | 4+4                 |                 |                |                | 4,05 X 22,20          | 164,98       |
| 9          | 210563900 | 3+3+3               |                 |                |                | 4,05 X 25,65          | 189,18       |
| 10         | 211784900 | 3+4+3               |                 |                |                | 4,05 X 27,90          | 207,02       |
| 11         | 211785000 | 4+3+4               |                 |                |                | 4,05 X 30,15          | 224,86       |
| 12         | 210523400 | 3+3+3+3             |                 |                |                | 4,05 X 33,60          | 249,06       |
| 13         | 211785100 | 3+4+3+3             |                 |                |                | 4,05 X 35,85          | 266,90       |
| 14         | 211785200 | 3+4+4+3             |                 |                |                | 4,05 X 38,10          | 284,74       |
| 15         | 210547600 | 4+3+4+4             |                 |                |                | 4,05 X 40,35          | 302,57       |
| 16         | 211785300 | 4+4+4+4             |                 |                |                | 4,05 X 42,60          | 320,41       |
| 17         | 211785400 | 3+4+3+4+3           |                 |                |                | 4,05 X 46,05          | 344,61       |
| 18         | 210555700 | 3+4+4+4+3           |                 |                |                | 4,05 X 48,30          | 362,45       |
| 19         | 211785500 | 4+4+3+4+4           |                 |                |                | 4,05 X 50,55          | 380,29       |
| 20         | 211785600 | 4+4+4+4+4           |                 |                |                | 4,05 X 52,80          | 398,12       |
| 21         | 211785700 | 3+4+3+4+4+3         |                 |                |                | 4,05 X 56,25          | 422,33       |
| 22         | 211785800 | 3+4+4+4+4+3         |                 |                |                | 4,05 X 58,50          | 440,17       |
| 23         | 211785900 | 4+4+4+3+4+4         |                 |                |                | 4,05 X 60,75          | 458,00       |
| 24         | 210572600 | 4+4+4+4+4+4         |                 |                |                | 4,05 X 63,00          | 475,84       |

\*Dimensionais e peso em valores nominais.

| Seção: 1,00mm²                  |              |
|---------------------------------|--------------|
| Diâmeto máx. dos fios no cond.: | Fios 0,21mm. |
| Resist. elétr. máx. a 20°C:     | 19,50 Ω/km.  |
| Diâmetro do condutor:           | 1,20mm.      |
| Espes. de isolamento:           | 0,60mm.      |

| Nº de vias | Código    | Construção das vias | Esp. Sp/lf (mm) | Esp. Lat. (mm) | Sep. Int. (mm) | Altura x Largura (mm) | Peso (kg/km) |
|------------|-----------|---------------------|-----------------|----------------|----------------|-----------------------|--------------|
| 3          | 211786000 | 3                   | 0,90            | 1,50           | -              | 4,20 X 10,20          | 79,48        |
| 4          | 210561200 | 2+2                 |                 |                | 1,20           | 4,20 X 13,80          | 107,07       |
| 5          | 211786100 | 2+3                 |                 |                |                | 4,20 X 16,20          | 128,06       |
| 6          | 211786200 | 3+3                 |                 |                |                | 4,20 X 18,60          | 149,05       |
| 7          | 211786300 | 4+3                 |                 |                |                | 4,20 X 21,00          | 170,04       |
| 8          | 211786400 | 4+4                 |                 |                |                | 4,20 X 23,40          | 191,03       |
| 9          | 211786500 | 3+3+3               |                 |                |                | 4,20 X 27,00          | 218,63       |
| 10         | 211786600 | 3+4+3               |                 |                |                | 4,20 X 29,40          | 239,62       |
| 11         | 211786700 | 4+3+4               |                 |                |                | 4,20 X 31,80          | 260,61       |
| 12         | 210538000 | 3+3+3+3             |                 |                |                | 4,20 X 35,40          | 288,20       |
| 13         | 211786800 | 3+4+3+3             |                 |                |                | 4,20 X 37,80          | 309,19       |
| 14         | 211786900 | 3+4+4+3             |                 |                |                | 4,20 X 40,20          | 330,18       |
| 15         | 210565200 | 4+3+4+4             |                 |                |                | 4,20 X 42,60          | 351,17       |
| 16         | 210560900 | 4+4+4+4             |                 |                |                | 4,20 X 45,00          | 372,16       |
| 17         | 211787000 | 3+4+3+4+3           |                 |                |                | 4,20 X 48,60          | 399,76       |
| 18         | 211787100 | 3+4+4+4+3           |                 |                |                | 4,20 X 51,00          | 420,75       |
| 19         | 211787200 | 4+4+3+4+4           |                 |                |                | 4,20 X 53,40          | 441,74       |
| 20         | 211787300 | 4+4+4+4+4           |                 |                |                | 4,20 X 55,80          | 462,73       |
| 21         | 211787400 | 3+4+3+4+4+3         |                 |                |                | 4,20 X 59,40          | 490,32       |
| 22         | 211787500 | 3+4+4+4+4+3         |                 |                |                | 4,20 X 61,80          | 511,31       |

\*Dimensionais e peso em valores nominais.

| Seção: 1,50mm²                  |              |
|---------------------------------|--------------|
| Diâmeto máx. dos fios no cond.: | Fios 0,26mm. |
| Resist. elétr. máx. a 20°C:     | 13,30 Ω/km.  |
| Diâmetro do condutor:           | 1,45mm.      |
| Espes. de isolamento:           | 0,80mm.      |

| Nº de vias | Código    | Construção das vias | Esp. Sp/lf (mm) | Esp. Lat. (mm) | Sep. Int. (mm) | Altura x Largura (mm) | Peso (kg/km) |
|------------|-----------|---------------------|-----------------|----------------|----------------|-----------------------|--------------|
| 3          | 210512000 | 3                   | 1,00            | 1,50           | -              | 5,05 X 12,15          | 113,40       |
| 4          | 210538100 | 2+2                 |                 |                | 1,50           | 5,05 X 16,70          | 154,51       |
| 5          | 211787700 | 2+3                 |                 |                |                | 5,05 X 19,75          | 185,69       |
| 6          | 210540100 | 3+3                 |                 |                |                | 5,05 X 22,80          | 216,87       |
| 7          | 211787800 | 4+3                 |                 |                |                | 5,05 X 25,85          | 248,06       |
| 8          | 210520700 | 4+4                 |                 |                |                | 5,05 X 28,90          | 279,24       |
| 9          | 211787900 | 3+3+3               |                 |                |                | 5,05 X 33,45          | 320,35       |
| 10         | 210545200 | 3+4+3               |                 |                |                | 5,05 X 36,50          | 351,53       |
| 11         | 211788000 | 4+3+4               |                 |                |                | 5,05 X 39,55          | 382,72       |
| 12         | 210515500 | 3+3+3+3             |                 |                |                | 5,05 X 44,10          | 423,83       |
| 13         | 211788100 | 3+4+3+3             |                 |                |                | 5,05 X 47,15          | 455,01       |
| 14         | 211788200 | 3+4+4+3             |                 |                |                | 5,05 X 50,20          | 486,19       |
| 15         | 211788300 | 4+3+4+4             |                 |                |                | 5,05 X 53,25          | 517,38       |
| 16         | 210528400 | 4+4+4+4             |                 |                |                | 5,05 X 56,30          | 548,56       |
| 17         | 211788400 | 3+4+3+4+3           |                 |                |                | 5,05 X 60,85          | 589,67       |

\*Dimensionais e peso em valores nominais.

| Seção: 2,50mm²                  |              |
|---------------------------------|--------------|
| Diâmeto máx. dos fios no cond.: | Fios 0,26mm. |
| Resist. elétr. máx. a 20°C:     | 7,98 Ω/km.   |
| Diâmetro do condutor:           | 1,80mm.      |
| Espes. de isolamento:           | 0,80mm.      |

| Nº de vias | Código    | Construção das vias | Esp. Sp/lf (mm) | Esp. Lat. (mm) | Sep. Int. (mm) | Altura x Largura (mm) | Peso (kg/km) |
|------------|-----------|---------------------|-----------------|----------------|----------------|-----------------------|--------------|
| 3          | 210539400 | 3                   | 1,00            | 1,80           | -              | 5,40 X 13,80          | 151,20       |
| 4          | 210512100 | 2+2                 |                 |                | 1,50           | 5,40 X 18,70          | 203,72       |
| 5          | 210551600 | 2+3                 |                 |                |                | 5,40 X 22,10          | 245,63       |
| 6          | 210535000 | 3+3                 |                 |                |                | 5,40 X 25,50          | 287,54       |
| 7          | 211788600 | 4+3                 |                 |                |                | 5,40 X 28,90          | 329,45       |
| 8          | 210538200 | 4+4                 |                 |                |                | 5,40 X 32,30          | 371,37       |
| 9          | 211788700 | 3+3+3               |                 |                |                | 5,40 X 37,20          | 423,89       |
| 10         | 210550600 | 3+4+3               |                 |                |                | 5,40 X 40,60          | 465,80       |
| 11         | 211788800 | 4+3+4               |                 |                |                | 5,40 X 44,00          | 507,71       |
| 12         | 210515600 | 3+3+3+3             |                 |                |                | 5,40 X 48,90          | 560,23       |
| 13         | 211788900 | 3+4+3+3             |                 |                |                | 5,40 X 52,30          | 602,14       |
| 14         | 211789000 | 3+4+4+3             |                 |                |                | 5,40 X 55,70          | 644,05       |
| 15         | 211789100 | 4+3+4+4             |                 |                |                | 5,40 X 59,10          | 685,96       |
| 16         | 210546500 | 4+4+4+4             |                 |                |                | 5,40 X 62,50          | 727,88       |

\*Dimensionais e peso em valores nominais.

| Seção: 4,00mm²                  |              |
|---------------------------------|--------------|
| Diâmeto máx. dos fios no cond.: | Fios 0,31mm. |
| Resist. elétr. máx. a 20°C:     | 4,95 Ω/km.   |
| Diâmetro do condutor:           | 2,25mm.      |
| Espes. de isolamento:           | 1,00mm.      |

| Nº de vias | Código    | Construção das vias | Esp. Sp/lf (mm) | Esp. Lat. (mm) | Sep. Int. (mm) | Altura x Largura (mm) | Peso (kg/km) |
|------------|-----------|---------------------|-----------------|----------------|----------------|-----------------------|--------------|
| 3          | 210542000 | 3                   | 1,20            | 1,80           | -              | 6,70 X 16,50          | 230,68       |
| 4          | 210521000 | 2+2                 |                 |                | 1,50           | 6,70 X 22,30          | 310,20       |
| 5          | 211789300 | 2+3                 |                 |                |                | 6,70 X 26,60          | 376,56       |
| 6          | 210535100 | 3+3                 |                 |                |                | 6,70 X 30,90          | 442,92       |
| 7          | 211789400 | 4+3                 |                 |                |                | 6,70 X 35,20          | 509,28       |
| 8          | 210538300 | 4+4                 |                 |                |                | 6,70 X 39,50          | 575,64       |
| 9          | 211789500 | 3+3+3               |                 |                |                | 6,70 X 45,30          | 655,16       |
| 10         | 210565300 | 3+4+3               |                 |                |                | 6,70 X 49,60          | 721,52       |
| 11         | 211789600 | 4+3+4               |                 |                |                | 6,70 X 53,90          | 787,88       |
| 12         | 210557300 | 3+3+3+3             |                 |                |                | 6,70 X 59,70          | 867,41       |

\*Dimensionais e peso em valores nominais.

| Seção: 6,00mm²                  |              |
|---------------------------------|--------------|
| Diâmeto máx. dos fios no cond.: | Fios 0,31mm. |
| Resist. elétr. máx. a 20°C:     | 3,30 Ω/km.   |
| Diâmetro do condutor:           | 2,80mm.      |
| Espes. de isolamento:           | 1,00mm.      |

| Nº de vias | Código    | Construção das vias | Esp. Sp/lf (mm) | Esp. Lat. (mm) | Sep. Int. (mm) | Altura x Largura (mm) | Peso (kg/km) |
|------------|-----------|---------------------|-----------------|----------------|----------------|-----------------------|--------------|
| 3          | 210556200 | 3                   | 1,20            | 1,80           | -              | 7,20 X 18,00          | 295,74       |
| 4          | 210512200 | 2+2                 |                 |                | 1,50           | 7,20 X 24,30          | 397,15       |
| 5          | 211789700 | 2+3                 |                 |                |                | 7,20 X 29,10          | 484,41       |
| 6          | 210564100 | 3+3                 |                 |                |                | 7,20 X 33,90          | 571,67       |
| 7          | 211789800 | 4+3                 |                 |                |                | 7,20 X 38,70          | 658,93       |
| 8          | 210564200 | 4+4                 |                 |                |                | 7,20 X 43,50          | 746,20       |
| 9          | 211789900 | 3+3+3               |                 |                |                | 7,20 X 49,80          | 847,61       |
| 10         | 211790000 | 3+4+3               |                 |                |                | 7,20 X 54,60          | 934,87       |
| 11         | 211790100 | 4+3+4               |                 |                |                | 7,20 X 59,40          | 1022,13      |

\*Dimensionais e peso em valores nominais.

| Seção: 10,00mm²                 |              |
|---------------------------------|--------------|
| Diâmeto máx. dos fios no cond.: | Fios 0,41mm. |
| Resist. elétr. máx. a 20°C:     | 1,91 Ω/km.   |
| Diâmetro do condutor:           | 3,75mm.      |
| Espes. de isolamento:           | 1,00mm.      |

| Nº de vias | Código    | Construção das vias | Esp. Sp/lf (mm) | Esp. Lat. (mm) | Sep. Int. (mm) | Altura x Largura (mm) | Peso (kg/km) |
|------------|-----------|---------------------|-----------------|----------------|----------------|-----------------------|--------------|
| 3          | 210538400 | 3                   | 1,40            | 1,80           | -              | 8,55 X 20,85          | 450,40       |
| 4          | 210515700 | 2+2                 |                 |                | 1,50           | 8,55 X 28,10          | 603,90       |
| 5          | 210561300 | 2+3                 |                 |                |                | 8,55 X 33,85          | 740,59       |
| 6          | 211790200 | 3+3                 |                 |                |                | 8,55 X 39,60          | 877,29       |
| 7          | 211790300 | 4+3                 |                 |                |                | 8,55 X 45,35          | 1.013,98     |
| 8          | 211790400 | 4+4                 |                 |                |                | 8,55 X 51,10          | 1.150,67     |
| 9          | 211790500 | 3+3+3               |                 |                |                | 8,55 X 58,35          | 1.304,17     |

\*Dimensionais e peso em valores nominais.

| Seção: 16,00mm²                 |              |
|---------------------------------|--------------|
| Diâmeto máx. dos fios no cond.: | Fios 0,41mm. |
| Resist. elétr. máx. a 20°C:     | 1,21 Ω/km.   |
| Diâmetro do condutor:           | 4,95mm.      |
| Espes. de isolamento:           | 1,00mm.      |

| Nº de vias | Código    | Construção das vias | Esp. Sp/lf (mm) | Esp. Lat. (mm) | Sep. Int. (mm) | Altura x Largura (mm) | Peso (kg/km) |
|------------|-----------|---------------------|-----------------|----------------|----------------|-----------------------|--------------|
| 3          | 210534900 | 3                   | 1,50            | 2,00           | -              | 9,95 X 24,85          | 653,47       |
| 4          | 210505500 | 2+2                 |                 |                | 2,00           | 9,95 X 33,80          | 879,98       |
| 5          | 211790600 | 2+3                 |                 |                |                | 9,95 X 40,75          | 1.080,42     |
| 6          | 211790700 | 3+3                 |                 |                |                | 9,95 X 47,70          | 1.280,87     |
| 7          | 211790800 | 4+3                 |                 |                |                | 9,95 X 54,65          | 1.481,31     |
| 8          | 211790900 | 4+4                 |                 |                |                | 9,95 X 61,60          | 1.681,75     |

\*Dimensionais e peso em valores nominais.

| Seção: 25,00mm²                 |              |
|---------------------------------|--------------|
| Diâmeto máx. dos fios no cond.: | Fios 0,41mm. |
| Resist. elétr. máx. a 20°C:     | 0,780 Ω/km.  |
| Diâmetro do condutor:           | 6,10mm.      |
| Espes. de isolamento:           | 1,20mm.      |

| Nº de vias | Código    | Construção das vias | Esp. Sp/lf (mm) | Esp. Lat. (mm) | Sep. Int. (mm) | Altura x Largura (mm) | Peso (kg/km) |
|------------|-----------|---------------------|-----------------|----------------|----------------|-----------------------|--------------|
| 3          | 210569500 | 3                   | 1,60            | 2,00           | -              | 11,7 x 29,5           | 959,08       |
| 4          | 210538500 | 2+2                 |                 |                | 2,00           | 11,7 x 40             | 1.288,99     |
| 5          | 211791000 | 2+3                 |                 |                |                | 11,7 x 48,5           | 1.588,24     |
| 6          | 211791100 | 3+3                 |                 |                |                | 11,7 x 57             | 1.887,50     |

\*Dimensionais e peso em valores nominais.

| Seção: 35,00mm²                 |              |
|---------------------------------|--------------|
| Diâmeto máx. dos fios no cond.: | Fios 0,41mm. |
| Resist. elétr. máx. a 20°C:     | 0,554 Ω/km.  |
| Diâmetro do condutor:           | 7,50mm.      |
| Espes. de isolamento:           | 1,20mm.      |

| Nº de vias | Código    | Construção das vias | Esp. Sp/lf (mm) | Esp. Lat. (mm) | Sep. Int. (mm) | Altura x Largura (mm) | Peso (kg/km) |
|------------|-----------|---------------------|-----------------|----------------|----------------|-----------------------|--------------|
| 3          | 210545400 | 3                   | 1,60            | 2,00           | -              | 13,15 x 33,85         | 1.285,92     |
| 4          | 210522000 | 2+2                 |                 |                | 2,00           | 13,15 x 45,8          | 1.726,05     |
| 5          | 211791200 | 2+3                 |                 |                |                | 13,15 x 55,75         | 2.131,72     |

\*Dimensionais e peso em valores nominais.

| Seção: 50,00mm²                 |              |
|---------------------------------|--------------|
| Diâmeto máx. dos fios no cond.: | Fios 0,41mm. |
| Resist. elétr. máx. a 20°C:     | 0,386 Ω/km.  |
| Diâmetro do condutor:           | 9,24mm.      |
| Espes. de isolamento:           | 1,40mm.      |

| Nº de vias | Código    | Construção das vias | Esp. Sp/lf (mm) | Esp. Lat. (mm) | Sep. Int. (mm) | Altura x Largura (mm) | Peso (kg/km) |
|------------|-----------|---------------------|-----------------|----------------|----------------|-----------------------|--------------|
| 3          | 211791300 | 3                   | 1,80            | 2,20           | -              | 15,65 x 40,55         | 1.860,86     |
| 4          | 210539300 | 2+2                 |                 |                | 2,00           | 15,65 x 54,6          | 2.492,08     |
| 5          | 211791400 | 2+3                 |                 |                |                | 15,65 x 66,65         | 3.082,30     |

\*Dimensionais e peso em valores nominais.



| Seção: 70,00mm²                 |              |
|---------------------------------|--------------|
| Diâmeto máx. dos fios no cond.: | Fios 0,51mm. |
| Resist. elétr. máx. a 20°C:     | 0,272 Ω/km.  |
| Diâmetro do condutor:           | 10,82mm.     |
| Espes. de isolamento:           | 1,40mm.      |

| Nº de vias | Código    | Construção das vias | Esp. Sp/lf (mm) | Esp. Lat. (mm) | Sep. Int. (mm) | Altura x Largura (mm) | Peso (kg/km) |
|------------|-----------|---------------------|-----------------|----------------|----------------|-----------------------|--------------|
| 3          | 210552700 | 3                   | 1,90            | 2,20           | -              | 17,5 x 45,5           | 2.484,58     |
| 4          | 210539600 | 2+2                 |                 |                | 2,00           | 17,5 x 61,2           | 3.325,00     |

\*Dimensionais e peso em valores nominais.

| Seção: 95,00mm²                 |              |
|---------------------------------|--------------|
| Diâmeto máx. dos fios no cond.: | Fios 0,51mm. |
| Resist. elétr. máx. a 20°C:     | 0,206 Ω/km.  |
| Diâmetro do condutor:           | 12,38mm.     |
| Espes. de isolamento:           | 1,60mm.      |

| Nº de vias | Código    | Construção das vias | Esp. Sp/lf (mm) | Esp. Lat. (mm) | Sep. Int. (mm) | Altura x Largura (mm) | Peso (kg/km) |
|------------|-----------|---------------------|-----------------|----------------|----------------|-----------------------|--------------|
| 3          | 211791500 | 3                   | 2,00            | 2,40           | -              | 19,65 x 51,75         | 3.177,38     |
| 4          | 212319800 | 2+2                 | 2,00            | 2,40           | 2,40           | 19,65 x 69,80         | 4.257,34     |

\*Dimensionais e peso em valores nominais.

| Seção: 120,00mm²                |              |
|---------------------------------|--------------|
| Diâmeto máx. dos fios no cond.: | Fios 0,51mm. |
| Resist. elétr. máx. a 20°C:     | 0,161 Ω/km.  |
| Diâmetro do condutor:           | 14,00mm.     |
| Espes. de isolamento:           | 1,60mm.      |

| Nº de vias | Código    | Construção das vias | Esp. Sp/lf (mm) | Esp. Lat. (mm) | Sep. Int. (mm) | Altura x Largura (mm) | Peso (kg/km) |
|------------|-----------|---------------------|-----------------|----------------|----------------|-----------------------|--------------|
| 3          | 211791600 | 3                   | 2,20            | 2,60           | -              | 21,6 x 56,8           | 4.080,59     |
| 4          | 211975200 | 4                   | 2,20            | 2,60           | 2,40           | 21,6 x 76,4           | 5.459,65     |

\*Dimensionais e peso em valores nominais.

| Seção: 150,00mm²                |              |
|---------------------------------|--------------|
| Diâmeto máx. dos fios no cond.: | Fios 0,51mm. |
| Resist. elétr. máx. a 20°C:     | 0,129 Ω/km.  |
| Diâmetro do condutor:           | 15,76mm.     |
| Espes. de isolamento:           | 1,80mm.      |

| Nº de vias | Código    | Construção das vias | Esp. Sp/lf (mm) | Esp. Lat. (mm) | Sep. Int. (mm) | Altura x Largura (mm) | Peso (kg/km) |
|------------|-----------|---------------------|-----------------|----------------|----------------|-----------------------|--------------|
| 3          | 211791700 | 3                   | 2,40            | 2,60           | -              | 24,2 x 63,4           | 5.092,65     |

\*Dimensionais e peso em valores nominais.

| Seção: 185,00mm²                |              |
|---------------------------------|--------------|
| Diâmeto máx. dos fios no cond.: | Fios 0,51mm. |
| Resist. elétr. máx. a 20°C:     | 0,106 Ω/km.  |
| Diâmetro do condutor:           | 17,30mm.     |
| Espes. de isolamento:           | 2,00mm.      |

| Nº de vias | Código    | Construção das vias | Esp. Sp/lf (mm) | Esp. Lat. (mm) | Sep. Int. (mm) | Altura x Largura (mm) | Peso (kg/km) |
|------------|-----------|---------------------|-----------------|----------------|----------------|-----------------------|--------------|
| 3          | 211975400 | 3                   | 2,60            | 2,80           | -              | 26,5 x 69,5           | 6.109,33     |

\*Dimensionais e peso em valores nominais.

| Seção: 240,00mm²                |              |
|---------------------------------|--------------|
| Diâmeto máx. dos fios no cond.: | Fios 0,51mm. |
| Resist. elétr. máx. a 20°C:     | 0,0801 Ω/km. |
| Diâmetro do condutor:           | 20,00mm.     |
| Espes. de isolação:             | 2,20mm.      |

| Nº de vias | Código    | Construção das vias | Esp. Sp/lf (mm) | Esp. Lat. (mm) | Sep. Int. (mm) | Altura x Largura (mm) | Peso (kg/km) |
|------------|-----------|---------------------|-----------------|----------------|----------------|-----------------------|--------------|
| 3          | 211975800 | 3                   | 2,80            | 2,40           | -              | 30 x 78               | 8.218,57     |

\*Dimensionais e peso em valores nominais.



Imagem meramente ilustrativa.



**TELECAM INDÚSTRIA E COMÉRCIO DE FIOS E CABOS LTDA**

R. Liberata Bueno Vieira, 32 - Campinas/SP

Bosque das palmeiras - CEP: 13086-734

CNPJ: 04.051.666/0001-20

I.E.: 244.859.870.119

Telefone: +55 19 3757 1230

[www.telecamcabos.com.br](http://www.telecamcabos.com.br)

### designação do tipo de produto

descrição do produto

IE FC TP Standard Cable GP 4x2 (AWG 24, Type C)

Cabo de instalação TP blindado (8 fios), mercadoria por metro, não confeccionado  
6XV18782A CABO PROFINET FC PADRÃO 4X2 AWG 24



página técnica de visão geral de produtos

<https://i.siemens.com/1P6XV1878-2A>

aptidão para aplicação

Cabo padrão com fios rígidos para montagem rápida em instalação de cabos fixa

designação do cabo

SF/UTP, 2YH (ST) CY 4x2x0,5/1,0 GN

comprimento do cabo

mercadoria por metro

### dados elétricos

coeficiente de atenuação por comprimento

|                       |            |
|-----------------------|------------|
| • em 10 MHz / máximo  | 0,058 dB/m |
| • em 100 MHz / máximo | 0,191 dB/m |
| • em 250 MHz / máximo | 0,311 dB/m |
| • em 300 MHz / máximo | 0,343 dB/m |
| • em 500 MHz / máximo | 0,453 dB/m |

impedância de onda

|                        |       |
|------------------------|-------|
| • em 1 MHz ... 100 MHz | 100 Ω |
|------------------------|-------|

atenuação paradiáfônica por comprimento

|                        |            |
|------------------------|------------|
| • em 1 MHz ... 100 MHz | 0,453 dB/m |
| • em 1 MHz ... 250 MHz | 0,393 dB/m |
| • em 1 MHz ... 300 MHz | 0,381 dB/m |
| • em 1 MHz ... 500 MHz | 0,348 dB/m |

atenuação do acoplamento / em 30 MHz ... 100 MHz / mínimo

80 dB

resistência de acoplamento por comprimento / em 10 MHz

20 mΩ/m

resistência da malha por comprimento / máximo

190 mΩ/m

coeficiente de resistência de isolamento

5000 GΩ·m

tensão de serviço

|                 |      |
|-----------------|------|
| • valor efetivo | 80 V |
| • máximo        | 80 V |

valor NVP percentual

67 %

### dados mecânicos

número de condutores isolados elétricos

8

versão da blindagem do cabo

SF/UTP, filme laminado de alumínio sobreposto, envolto por um entrançamento blindado de fios de cobre estanhados

versão da conexão elétrica / FastConnect

Si

diâmetro do condutor isolado

|                             |         |
|-----------------------------|---------|
| • do condutor isolado AWG24 | 0,51 mm |
|-----------------------------|---------|

diâmetro exterior

|                                     |         |
|-------------------------------------|---------|
| • do condutor interno               | 0,51 mm |
| • do isolamento do condutor isolado | 1 mm    |
| • do revestimento interior do cabo  | 6,1 mm  |
| • do invólucro de cabo              | 8 mm    |

|                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| tolerância simétrica do diâmetro exterior / do invólucro de cabo                                                                                                                                                                                                                                                                                        | 0,2 mm                                                                                                                                  |
| material <ul style="list-style-type: none"> <li>do isolamento do condutor isolado</li> <li>do revestimento interior do cabo</li> <li>do invólucro de cabo</li> </ul>                                                                                                                                                                                    | polietileno (PE)<br>FRNC<br>PVC                                                                                                         |
| cor <ul style="list-style-type: none"> <li>do isolamento dos condutores isolados dos condutores isolados de dados</li> <li>do invólucro de cabo</li> </ul>                                                                                                                                                                                              | branco e azul/azul, branco e laranja/laranja, branco e verde/verde, branco e marrom/marrom<br>verde                                     |
| raio de curvatura <ul style="list-style-type: none"> <li>em curvatura única / mínimo permitido</li> <li>em curvatura múltipla / mínimo permitido</li> </ul>                                                                                                                                                                                             | 24 mm<br>40 mm                                                                                                                          |
| carga de tração / máximo                                                                                                                                                                                                                                                                                                                                | 100 N                                                                                                                                   |
| peso por comprimento                                                                                                                                                                                                                                                                                                                                    | 74,5 kg/km                                                                                                                              |
| <b>condições ambientais</b>                                                                                                                                                                                                                                                                                                                             |                                                                                                                                         |
| temperatura ambiente <ul style="list-style-type: none"> <li>durante operação</li> <li>durante o armazenamento</li> <li>durante o transporte</li> <li>durante a montagem</li> </ul>                                                                                                                                                                      | -40 ... +85 °C<br>-40 ... +80 °C<br>-40 ... +80 °C<br>-40 ... +80 °C                                                                    |
| condição ambiental / para operação                                                                                                                                                                                                                                                                                                                      | Faixa de temperaturas para instalação fixa -40 °C até +85 °C                                                                            |
| reação ao fogo                                                                                                                                                                                                                                                                                                                                          | à prova de fogo segundo IEC 60332-3-24 (Categoria C)                                                                                    |
| classe de reação ao fogo / de acordo com EN 13501-6                                                                                                                                                                                                                                                                                                     | Eca                                                                                                                                     |
| capacidade de resistência química <ul style="list-style-type: none"> <li>contra óleo mineral</li> <li>contra graxa</li> <li>contra água</li> </ul>                                                                                                                                                                                                      | Resistente ao óleo conforme IEC 60811-2-1 (4 h/70 °C)<br>resistente condicionalmente<br>resistente condicionalmente                     |
| capacidade de resistência radiológica / contra radiação UV                                                                                                                                                                                                                                                                                              | resistente                                                                                                                              |
| <b>características do produto, funções do produto, componentes do produto / geral</b>                                                                                                                                                                                                                                                                   |                                                                                                                                         |
| característica do produto <ul style="list-style-type: none"> <li>livre de halogênio</li> <li>com capacidade PoE</li> <li>com capacidade PoE+</li> <li>com capacidade PoE++</li> <li>sem silicone</li> </ul>                                                                                                                                             | No<br>Si<br>Si<br>Si<br>Si                                                                                                              |
| comprimento do cabo / em Industrial Ethernet <ul style="list-style-type: none"> <li>em 100BaseTX</li> <li>em 1000BaseT</li> <li>em 10GBase</li> </ul>                                                                                                                                                                                                   | 100 m<br>100 m<br>90 m                                                                                                                  |
| <b>normas, especificações, aprovações</b>                                                                                                                                                                                                                                                                                                               |                                                                                                                                         |
| listagem UL/ETL / classificação 300 V                                                                                                                                                                                                                                                                                                                   | Si; c(UL)us, CMG, AWM-Style 21500, cRU AWM I A/B 60°C 300V FT2                                                                          |
| estilo UL/ETL / classificação 600 V                                                                                                                                                                                                                                                                                                                     | No                                                                                                                                      |
| comprovante de conformidade <ul style="list-style-type: none"> <li>aprovação EAC</li> <li>marcação CE</li> <li>conformidade RoHS</li> </ul>                                                                                                                                                                                                             | Si<br>Si<br>Si                                                                                                                          |
| conformidade do produto <ul style="list-style-type: none"> <li>ANSI/TIA-EIA 568-B.2 Cat.5e</li> <li>IEC 61784-5-2-CP 2/2 (Ethernet/IP)</li> </ul>                                                                                                                                                                                                       | Si<br>Si                                                                                                                                |
| padrão para cabeamento estruturado                                                                                                                                                                                                                                                                                                                      | Cat6A                                                                                                                                   |
| sociedade de classificação de navios <ul style="list-style-type: none"> <li>American Bureau of Shipping Europe Ltd. (ABS)</li> <li>Bureau Veritas (BV)</li> <li>Det Norske Veritas (DNV)</li> <li>Germanischer Lloyd (GL)</li> <li>Lloyds Register of Shipping (LRS)</li> <li>Nippon Kaiji Kyokai (NK)</li> <li>Polski Rejestr Statkow (PRS)</li> </ul> | No<br>No<br>No<br>No<br>No<br>No<br>No                                                                                                  |
| <b>mais informações / links da internet</b>                                                                                                                                                                                                                                                                                                             |                                                                                                                                         |
| link da Internet <ul style="list-style-type: none"> <li>para o web site: Ajuda de seleção Cabos e Conectores</li> </ul>                                                                                                                                                                                                                                 | <a href="https://support.industry.siemens.com/cs/ww/de/view/109766358">https://support.industry.siemens.com/cs/ww/de/view/109766358</a> |

encaixáveis

- para o web site: Ajuda de seleção TIA Selection Tool
- para o web site: SiePortal
- para o web site: Base de dados de imagens
- para o web site: Gestor de download CAX
- para o web site: Industry Online Support

<https://www.siemens.com/tstcloud>  
<https://sieportal.siemens.com/>  
<https://www.automation.siemens.com/bilddb>  
<https://www.siemens.com/cax>  
<https://support.industry.siemens.com>

#### Indicações de segurança

Indicação de segurança

A Siemens fornece produtos e soluções com funções de cibersegurança industrial que contribuem para a operação segura de instalações, sistemas, máquinas e redes. Para proteger instalações, sistemas, máquinas e redes contra ameaças cibernéticas, é necessário implementar - e manter continuamente - um conceito holístico de cibersegurança industrial de última geração. Os produtos e soluções da Siemens são um elemento desse conceito. Os clientes são responsáveis por impedir acessos não autorizados às suas instalações, sistemas, máquinas e redes. Tais sistemas, máquinas e componentes apenas deverão estar conectados a uma rede corporativa ou à internet se e na medida em que tal conexão seja necessária e somente após terem sido implementadas medidas de segurança adequadas (p.ex. firewalls e/ou segmentação de rede). Para informações adicionais sobre medidas de cibersegurança industrial que podem ser implementadas, por favor visite [www.siemens.com/cybersecurity-industry](http://www.siemens.com/cybersecurity-industry). Os produtos e soluções da Siemens são desenvolvidos continuamente para torná-los mais seguros. A Siemens recomenda vivamente que atualizações de produtos sejam aplicadas assim que estiverem disponíveis, e que sejam utilizadas as versões do produto mais recentes. A utilização de versões de produtos que já não são suportadas, bem como a falta de aplicação das atualizações mais recentes, pode aumentar a exposição do cliente à ameaças cibernéticas. Para manter-se informado sobre atualizações de produtos, por favor inscreva o "Siemens Industrial Cybersecurity RSS Feed" em <https://www.siemens.com/cert>. (V4.7)

#### Homologações / certificados

##### General Product Approval

[Manufacturer Declaration](#)



[Declaration of Conformity](#)



[Fire safety / Physical security](#)

| General Product Approval   | Test Certificates                        | Environment                                 | Industrial Communication |
|----------------------------|------------------------------------------|---------------------------------------------|--------------------------|
| <a href="#">China RoHS</a> | <a href="#">Special Test Certificate</a> | <a href="#">Environmental Conformations</a> | <a href="#">PROFINET</a> |

última alteração:

28/10/2025

### designação do tipo de produto

descrição do produto

### IE FC TP Standard Cable GP 2x2 (Type A)

Cabo de barramento padrão (4 fios), comprimento preferencial, não confeccionado  
CABO PROFINET 2X2 FC 1000M-Para Consumo



página técnica de visão geral de produtos

<https://i.siemens.com/1P6XV1840-2AU10>

aptidão para aplicação

Cabo padrão com fios rígidos para montagem rápida

designação do cabo

SF/UTP, 2YY (ST) CY 2x2x0,64/1,5-100 GN

comprimento do cabo

1000 m; mercadoria por metro

### dados elétricos

coeficiente de atenuação por comprimento

- em 10 MHz / máximo
- em 100 MHz / máximo

0,052 dB/m  
0,195 dB/m

impedância de onda

- em 1 MHz ... 100 MHz

100 Ω

tolerância simétrica relativa

- da impedância de onda em 1 MHz ... 100 MHz

15 %

resistência de acoplamento por comprimento / em 10 MHz

10 mΩ/m

resistência da malha por comprimento / máximo

115 mΩ/m

tensão de serviço

- valor efetivo

80 V

valor NVP percentual

69 %

### dados mecânicos

número de condutores isolados elétricos

4

versão da blindagem do cabo

SF/UTP, filme laminado de alumínio sobreposto, envolto por um entrançamento blindado de fios de cobre estanhados

versão da conexão elétrica / FastConnect

Si

diâmetro do condutor isolado

- do condutor isolado AWG22

0,64 mm

diâmetro exterior

- do condutor interno
- do isolamento do condutor isolado
- do revestimento interior do cabo
- do invólucro de cabo

0,64 mm  
1,5 mm  
3,9 mm  
6,5 mm

tolerância simétrica do diâmetro exterior / do invólucro de cabo

0,2 mm

material

- do isolamento do condutor isolado
- do revestimento interior do cabo
- do invólucro de cabo

polietileno (PE)  
PVC  
PVC

cor

- do isolamento dos condutores isolados dos condutores isolados de dados
- do invólucro de cabo

branco/amarelo/azul/laranja  
verde

raio de curvatura

|                                                                                                                      |                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• em curvatura única / mínimo permitido</li> </ul>                            | 19,5 mm                                                                                                                                                                                                                                                                                 |
| <ul style="list-style-type: none"> <li>• em curvatura múltipla / mínimo permitido</li> </ul>                         | 49 mm                                                                                                                                                                                                                                                                                   |
| carga de tração / máximo                                                                                             | 150 N                                                                                                                                                                                                                                                                                   |
| peso por comprimento                                                                                                 | 61 kg/km                                                                                                                                                                                                                                                                                |
| <b>condições ambientais</b>                                                                                          |                                                                                                                                                                                                                                                                                         |
| temperatura ambiente                                                                                                 |                                                                                                                                                                                                                                                                                         |
| <ul style="list-style-type: none"> <li>• durante operação</li> </ul>                                                 | -40 ... +75 °C                                                                                                                                                                                                                                                                          |
| <ul style="list-style-type: none"> <li>• durante o armazenamento</li> </ul>                                          | -40 ... +75 °C                                                                                                                                                                                                                                                                          |
| <ul style="list-style-type: none"> <li>• durante o transporte</li> </ul>                                             | -40 ... +75 °C                                                                                                                                                                                                                                                                          |
| <ul style="list-style-type: none"> <li>• durante a montagem</li> </ul>                                               | -40 ... +60 °C                                                                                                                                                                                                                                                                          |
| <ul style="list-style-type: none"> <li>• nota</li> </ul>                                                             | Propriedades elétricas medidas a 20 °C, verificações conforme DIN VDE 0472                                                                                                                                                                                                              |
| reação ao fogo                                                                                                       | à prova de fogo segundo IEC 60332-3-24 (Categoria C) e UL 1685 (CSA FT 4)                                                                                                                                                                                                               |
| classe de reação ao fogo / de acordo com EN 13501-6                                                                  | Eca                                                                                                                                                                                                                                                                                     |
| capacidade de resistência química                                                                                    |                                                                                                                                                                                                                                                                                         |
| <ul style="list-style-type: none"> <li>• contra óleo mineral</li> </ul>                                              | Resistente ao óleo conforme IEC 60811-2-1 (4 h/70 °C)                                                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>• contra graxa</li> </ul>                                                     | resistente condicionalmente                                                                                                                                                                                                                                                             |
| <ul style="list-style-type: none"> <li>• contra água</li> </ul>                                                      | resistente condicionalmente                                                                                                                                                                                                                                                             |
| capacidade de resistência radiológica / contra radiação UV                                                           | resistente                                                                                                                                                                                                                                                                              |
| <b>características do produto, funções do produto, componentes do produto / geral</b>                                |                                                                                                                                                                                                                                                                                         |
| característica do produto                                                                                            |                                                                                                                                                                                                                                                                                         |
| <ul style="list-style-type: none"> <li>• livre de halogênio</li> </ul>                                               | No                                                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• com capacidade PoE</li> </ul>                                               | Si                                                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• com capacidade PoE+</li> </ul>                                              | Si                                                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• sem silicone</li> </ul>                                                     | Si                                                                                                                                                                                                                                                                                      |
| comprimento do cabo / em Industrial Ethernet                                                                         |                                                                                                                                                                                                                                                                                         |
| <ul style="list-style-type: none"> <li>• em 100BaseTX</li> </ul>                                                     | 100 m                                                                                                                                                                                                                                                                                   |
| <b>normas, especificações, aprovações</b>                                                                            |                                                                                                                                                                                                                                                                                         |
| listagem UL/ETL / classificação 300 V                                                                                | Si; c(ETL)us / CMG / (ETL)us PLTC/ ITC / Sun Res                                                                                                                                                                                                                                        |
| estilo UL/ETL / classificação 600 V                                                                                  | Si; cRUus AWM 21694 AWM I A/B 60°C 600V FT2                                                                                                                                                                                                                                             |
| comprovante de conformidade                                                                                          |                                                                                                                                                                                                                                                                                         |
| <ul style="list-style-type: none"> <li>• aprovação EAC</li> </ul>                                                    | Si                                                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• marcação CE</li> </ul>                                                      | Si                                                                                                                                                                                                                                                                                      |
| padrão para cabeamento estruturado                                                                                   | Cat5e                                                                                                                                                                                                                                                                                   |
| sociedade de classificação de navios                                                                                 |                                                                                                                                                                                                                                                                                         |
| <ul style="list-style-type: none"> <li>• American Bureau of Shipping Europe Ltd. (ABS)</li> </ul>                    | No                                                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• Bureau Veritas (BV)</li> </ul>                                              | No                                                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• Det Norske Veritas (DNV)</li> </ul>                                         | No                                                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• Germanischer Lloyd (GL)</li> </ul>                                          | No                                                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• Lloyds Register of Shipping (LRS)</li> </ul>                                | No                                                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• Nippon Kaiji Kyokai (NK)</li> </ul>                                         | No                                                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>• Polski Rejestr Statkow (PRS)</li> </ul>                                     | No                                                                                                                                                                                                                                                                                      |
| <b>normas, especificações, aprovações / declaração ambiental de produto</b>                                          |                                                                                                                                                                                                                                                                                         |
| declaração ambiental de produto                                                                                      | Si                                                                                                                                                                                                                                                                                      |
| Potencial de Aquecimento Global [CO2 eq]                                                                             |                                                                                                                                                                                                                                                                                         |
| <ul style="list-style-type: none"> <li>• total</li> </ul>                                                            | 0,9 kg                                                                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>• durante fabricação</li> </ul>                                               | 0,81 kg                                                                                                                                                                                                                                                                                 |
| <ul style="list-style-type: none"> <li>• durante operação</li> </ul>                                                 | 0,02 kg                                                                                                                                                                                                                                                                                 |
| <ul style="list-style-type: none"> <li>• após final da vida útil</li> </ul>                                          | 0,07 kg                                                                                                                                                                                                                                                                                 |
| <b>mais informações / links da internet</b>                                                                          |                                                                                                                                                                                                                                                                                         |
| link da Internet                                                                                                     |                                                                                                                                                                                                                                                                                         |
| <ul style="list-style-type: none"> <li>• para o web site: Ajuda de seleção Cabos e Conectores encaixáveis</li> </ul> | <a href="https://support.industry.siemens.com/cs/ww/de/view/109766358">https://support.industry.siemens.com/cs/ww/de/view/109766358</a>                                                                                                                                                 |
| <ul style="list-style-type: none"> <li>• para o web site: Ajuda de seleção TIA Selection Tool</li> </ul>             | <a href="https://www.siemens.com/tstcloud">https://www.siemens.com/tstcloud</a>                                                                                                                                                                                                         |
| <ul style="list-style-type: none"> <li>• para o web site: SiePortal</li> </ul>                                       | <a href="https://sieportal.siemens.com/">https://sieportal.siemens.com/</a>                                                                                                                                                                                                             |
| <ul style="list-style-type: none"> <li>• para o web site: Base de dados de imagens</li> </ul>                        | <a href="https://www.automation.siemens.com/bilddb">https://www.automation.siemens.com/bilddb</a>                                                                                                                                                                                       |
| <ul style="list-style-type: none"> <li>• para o web site: Gestor de download CAX</li> </ul>                          | <a href="https://www.siemens.com/cax">https://www.siemens.com/cax</a>                                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>• para o web site: Industry Online Support</li> </ul>                         | <a href="https://support.industry.siemens.com">https://support.industry.siemens.com</a>                                                                                                                                                                                                 |
| <b>indicações de segurança</b>                                                                                       |                                                                                                                                                                                                                                                                                         |
| indicação de segurança                                                                                               | A Siemens fornece produtos e soluções com funções de cibersegurança industrial que contribuem para a operação segura de instalações, sistemas, máquinas e redes. Para proteger instalações, sistemas, máquinas e redes contra ameaças cibernéticas, é necessário implementar - e manter |



continuamente - um conceito holístico de cibersegurança industrial de última geração. Os produtos e soluções da Siemens são um elemento desse conceito. Os clientes são responsáveis por impedir acessos não autorizados às suas instalações, sistemas, máquinas e redes. Tais sistemas, máquinas e componentes apenas deverão estar conectados a uma rede corporativa ou à internet se e na medida em que tal conexão seja necessária e somente após terem sido implementadas medidas de segurança adequadas (p.ex. firewalls e/ou segmentação de rede). Para informações adicionais sobre medidas de cibersegurança industrial que podem ser implementadas, por favor visite [www.siemens.com/cybersecurity-industry](https://www.siemens.com/cybersecurity-industry). Os produtos e soluções da Siemens são desenvolvidos continuamente para torná-los mais seguros. A Siemens recomenda vivamente que atualizações de produtos sejam aplicadas assim que estiverem disponíveis, e que sejam utilizadas as versões do produto mais recentes. A utilização de versões de produtos que já não são suportadas, bem como a falta de aplicação das atualizações mais recentes, pode aumentar a exposição do cliente à ameaças cibernéticas. Para manter-se informado sobre atualizações de produtos, por favor subscreva o "Siemens Industrial Cybersecurity RSS Feed" em <https://www.siemens.com/cert>. (V4.7)

## Homologações / certificados

### General Product Approval

[Manufacturer Declaration](#)



[Declaration of Conformity](#)



[China RoHS](#)

| General Product Approval                        | Test Certificates                        | other                         | Environment                                                                       | Industrial Communication |
|-------------------------------------------------|------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------|--------------------------|
| <a href="#">Fire safety / Physical security</a> | <a href="#">Special Test Certificate</a> | <a href="#">Miscellaneous</a> |  | <a href="#">PROFINET</a> |

última alteração:

28/10/2025 

## Ficha técnica

**6GK1901-1BB10-2AE0**

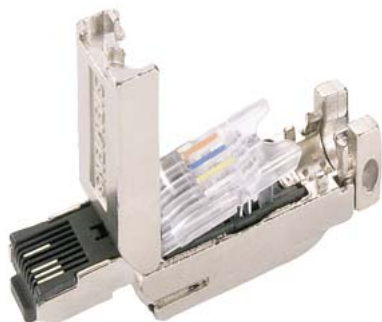
designação do tipo de produto

**IE FC RJ45 Plug 180 (2x2)**

descrição do produto

Conector de encaixe de dados RJ45

6GK19011BB102AE0 CONECTOR ETHERNET RJ45 2X2 180°, 50 pcs.



página técnica de visão geral de produtos

<https://i.siemens.com/1P6GK1901-1BB10-2AE0>

aptidão para aplicação

Para conexão a cabos IE FC TP 2x2, adequado para a montagem rápida com o sistema FastConnect

### taxa de transmissão

taxa de transmissão / em Industrial Ethernet

10, 100 Mbit/s

### interfaces

número de conexões elétricas

- para cabos Industrial Ethernet FC TP
- para componentes de rede ou dispositivos terminais

4

1

versão da conexão elétrica

- para cabos Industrial Ethernet FC TP
- para componentes de rede ou dispositivos terminais

Contatos de corte/borne integrados para cabos de instalação TP FC de 4 fios AWG22

Conector de encaixe RJ45

versão da conexão elétrica / FastConnect

Si

### dados mecânicos

material / do invólucro

metal

número de reutilizações

10

versão do travamento

outros

### modelo, medidas e pesos

tipo de saída do cabo

Saída de cabo de 180°

largura

13,7 mm

altura

16 mm

profundidade

55 mm

peso líquido

35 g

diâmetro do cabo conectável

6,5 ... 6,5 mm

secção transversal do condutor conectável

0,33 mm²

### condições ambientais

temperatura ambiente

- durante operação
- durante o armazenamento
- durante o transporte

-40 ... +85 °C

-40 ... +85 °C

-40 ... +85 °C

umidade relativa do ar

- em 25 °C / sem condensação / durante operação / máximo

95 %

grau de proteção IP

IP20

### características do produto, funções do produto, componentes do produto / geral

característica do produto

- com capacidade PoE
- com capacidade PoE+

Si

Si

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| • sem silicone                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Si                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| componente do produto                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| • alívio da tração                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Si                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| normas, especificações, aprovações                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| comprovante de conformidade                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| • conformidade RoHS                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Si                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| • aprovação UL                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Si                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| • aprovação cULus                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Si                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| • aplicação na tração de acordo com EN 50155                                                                                                                                                                                                                                                                                                                                                                                                                                        | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| capacidade de resistência contra poluição do ar / conformidade segundo ANSI/ISA-71.04                                                                                                                                                                                                                                                                                                                                                                                               | Si; G3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| padrão para cabeamento estruturado                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Cat5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| normas, especificações, aprovações / declaração ambiental de produto                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| declaração ambiental de produto                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Si                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Potencial de Aquecimento Global [CO2 eq]                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| • total                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0,277 kg                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| • durante fabricação                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0,263 kg                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| • durante operação                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0,0086 kg                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| • após final da vida útil                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0,0062 kg                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| mais informações / links da internet                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| link da Internet                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| • para o web site: Ajuda de seleção Cabos e Conectores encaixáveis                                                                                                                                                                                                                                                                                                                                                                                                                  | <a href="https://support.industry.siemens.com/cs/ww/de/view/109766358">https://support.industry.siemens.com/cs/ww/de/view/109766358</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| • para o web site: Ajuda de seleção TIA Selection Tool                                                                                                                                                                                                                                                                                                                                                                                                                              | <a href="https://www.siemens.com/tstcloud">https://www.siemens.com/tstcloud</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| • para o web site: Comunicação industrial                                                                                                                                                                                                                                                                                                                                                                                                                                           | <a href="https://www.siemens.com/simatic-net">https://www.siemens.com/simatic-net</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| • para o web site: SiePortal                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <a href="https://sieportal.siemens.com">https://sieportal.siemens.com</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| • para o web site: Base de dados de imagens                                                                                                                                                                                                                                                                                                                                                                                                                                         | <a href="https://www.automation.siemens.com/bilddb">https://www.automation.siemens.com/bilddb</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| • para o web site: Gestor de download CAX                                                                                                                                                                                                                                                                                                                                                                                                                                           | <a href="https://www.siemens.com/cax">https://www.siemens.com/cax</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| • para o web site: Industry Online Support                                                                                                                                                                                                                                                                                                                                                                                                                                          | <a href="https://support.industry.siemens.com">https://support.industry.siemens.com</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| indicações de segurança                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| indicação de segurança                                                                                                                                                                                                                                                                                                                                                                                                                                                              | A Siemens fornece produtos e soluções com funções de cibersegurança industrial que contribuem para a operação segura de instalações, sistemas, máquinas e redes. Para proteger instalações, sistemas, máquinas e redes contra ameaças cibernéticas, é necessário implementar - e manter continuamente - um conceito holístico de cibersegurança industrial de última geração. Os produtos e soluções da Siemens são um elemento desse conceito. Os clientes são responsáveis por impedir acessos não autorizados às suas instalações, sistemas, máquinas e redes. Tais sistemas, máquinas e componentes apenas deverão estar conectados a uma rede corporativa ou à internet se e na medida em que tal conexão seja necessária e somente após terem sido implementadas medidas de segurança adequadas (p.ex. firewalls e/ou segmentação de rede). Para informações adicionais sobre medidas de cibersegurança industrial que podem ser implementadas, por favor visite <a href="http://www.siemens.com/cybersecurity-industry">www.siemens.com/cybersecurity-industry</a> . Os produtos e soluções da Siemens são desenvolvidos continuamente para torna-los mais seguros. A Siemens recomenda vivamente que atualizações de produtos sejam aplicadas assim que estiverem disponíveis, e que sejam utilizadas as versões do produto mais recentes. A utilização de versões de produtos que já não são suportadas, bem com a falta de aplicação das atualizações mais recentes, pode aumentar a exposição do cliente à ameaças cibernéticas. Para manter-se informado sobre atualizações de produtos, por favor subscreva o "Siemens Industrial Cybersecurity RSS Feed" em <a href="https://www.siemens.com/cert">https://www.siemens.com/cert</a> . (V4.7) |
| Homologações / certificados                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| General Product Approval                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Test Certificates                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <div><div><div><div><div><a href="#">Declaration of Con-</a><br/><a href="#">formity</a></div><div></div><div></div></div><div><div><a href="#">China RoHS</a></div><div><a href="#">Miscellaneous</a></div><div><a href="#">Special Test Certific-</a><br/><a href="#">ate</a></div></div></div></div></div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Maritime application                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Environment                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Industrial Communication                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <div><div><div><div><div></div><div></div><div></div></div><div><div></div><div><a href="#">PROFINET</a></div></div></div></div></div>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |



## Ficha técnica

6GK1901-1BB12-2AB0

designação do tipo de produto

IE FC RJ45 Plug 180 (4x2)

descrição do produto

Conector de encaixe de dados RJ45

CONECTOR ETHERNET RJ45 4X2 180°, 10 pcs.(CAT 6A)



página técnica de visão geral de produtos

<https://i.siemens.com/1P6GK1901-1BB12-2AB0>

aptidão para aplicação

Para conexão a cabos IE FC TP 4x2, adequado para a montagem rápida com o sistema FastConnect

### taxa de transmissão

|                                              |                      |
|----------------------------------------------|----------------------|
| taxa de transmissão / em Industrial Ethernet | 10, 100, 1000 Mbit/s |
| taxa de transmissão / em Industrial Ethernet | 10000 Mbit/s         |

### interfaces

|                                                      |                                                                                                      |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| número de conexões elétricas                         |                                                                                                      |
| • para cabos Industrial Ethernet FC TP               | 1                                                                                                    |
| • para componentes de rede ou dispositivos terminais | 1                                                                                                    |
| versão da conexão elétrica                           |                                                                                                      |
| • para cabos Industrial Ethernet FC TP               | contatos de corte/borne integrados para cabos de instalação TP FC de 8 fios (AWG24) e 4 fios (AWG22) |
| • para componentes de rede ou dispositivos terminais | Conector de encaixe RJ45                                                                             |
| versão da conexão elétrica / FastConnect             | Si                                                                                                   |

### dados mecânicos

|                         |        |
|-------------------------|--------|
| material / do invólucro | metal  |
| número de reutilizações | 10     |
| versão do travamento    | outros |

### modelo, medidas e pesos

|                                           |                       |
|-------------------------------------------|-----------------------|
| tipo de saída do cabo                     | Saída de cabo de 180° |
| largura                                   | 13,7 mm               |
| altura                                    | 16 mm                 |
| profundidade                              | 55 mm                 |
| peso líquido                              | 35 g                  |
| diâmetro do cabo conectável               | 6,5 ... 8 mm          |
| secção transversal do condutor conectável | 0,21 ... 0,33 mm²     |

### condições ambientais

|                                                          |                |
|----------------------------------------------------------|----------------|
| temperatura ambiente                                     |                |
| • durante operação                                       | -40 ... +85 °C |
| • durante o armazenamento                                | -40 ... +85 °C |
| • durante o transporte                                   | -40 ... +85 °C |
| umidade relativa do ar                                   |                |
| • em 25 °C / sem condensação / durante operação / máximo | 95 %           |
| grau de proteção IP                                      | IP20           |

### características do produto, funções do produto, componentes do produto / geral

|                           |    |
|---------------------------|----|
| característica do produto |    |
| • com capacidade PoE      | Si |

|                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                                                                           |                               |                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------|
| <ul style="list-style-type: none"><li>• com capacidade PoE+</li><li>• com capacidade PoE++</li><li>• sem silicone</li></ul>                                                                                                                                                                                                                                                                                                       | Si                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                            |                                                                                           |                               |                                          |
| componente do produto                                                                                                                                                                                                                                                                                                                                                                                                             | Si                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                            |                                                                                           |                               |                                          |
| <ul style="list-style-type: none"><li>• alívio da tração</li></ul>                                                                                                                                                                                                                                                                                                                                                                | Si                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                            |                                                                                           |                               |                                          |
| normas, especificações, aprovações                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                                                                           |                               |                                          |
| comprovante de conformidade                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                                                                           |                               |                                          |
| <ul style="list-style-type: none"><li>• conformidade RoHS</li><li>• aprovação UL</li><li>• aprovação cULus</li><li>• aplicação na tração de acordo com EN 50155</li></ul>                                                                                                                                                                                                                                                         | Si                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                            |                                                                                           |                               |                                          |
| capacidade de resistência contra poluição do ar / conformidade segundo ANSI/ISA-71.04                                                                                                                                                                                                                                                                                                                                             | Si; G3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                                                                           |                               |                                          |
| padrão para cabeamento estruturado                                                                                                                                                                                                                                                                                                                                                                                                | Cat6A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |                                                                                           |                               |                                          |
| mais informações / links da internet                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                                                                           |                               |                                          |
| link da Internet                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                                                                           |                               |                                          |
| <ul style="list-style-type: none"><li>• para o web site: Ajuda de seleção Cabos e Conectores encaixáveis</li><li>• para o web site: Ajuda de seleção TIA Selection Tool</li><li>• para o web site: Comunicação industrial</li><li>• para o web site: SiePortal</li><li>• para o web site: Base de dados de imagens</li><li>• para o web site: Gestor de download CAX</li><li>• para o web site: Industry Online Support</li></ul> | <a href="https://support.industry.siemens.com/cs/ww/de/view/109766358">https://support.industry.siemens.com/cs/ww/de/view/109766358</a><br><br><a href="https://www.siemens.com/tstcloud">https://www.siemens.com/tstcloud</a><br><a href="https://www.siemens.com/simatic-net">https://www.siemens.com/simatic-net</a><br><a href="https://sieportal.siemens.com">https://sieportal.siemens.com</a><br><a href="https://www.automation.siemens.com/bilddb">https://www.automation.siemens.com/bilddb</a><br><a href="https://www.siemens.com/cax">https://www.siemens.com/cax</a><br><a href="https://support.industry.siemens.com">https://support.industry.siemens.com</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |                                                                                           |                               |                                          |
| indicações de segurança                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                                                                           |                               |                                          |
| indicação de segurança                                                                                                                                                                                                                                                                                                                                                                                                            | A Siemens fornece produtos e soluções com funções de cibersegurança industrial que contribuem para a operação segura de instalações, sistemas, máquinas e redes. Para proteger instalações, sistemas, máquinas e redes contra ameaças cibernéticas, é necessário implementar - e manter continuamente - um conceito holístico de cibersegurança industrial de última geração. Os produtos e soluções da Siemens são um elemento desse conceito. Os clientes são responsáveis por impedir acessos não autorizados às suas instalações, sistemas, máquinas e redes. Tais sistemas, máquinas e componentes apenas deverão estar conectados a uma rede corporativa ou à internet se e na medida em que tal conexão seja necessária e somente após terem sido implementadas medidas de segurança adequadas (p.ex. firewalls e/ou segmentação de rede). Para informações adicionais sobre medidas de cibersegurança industrial que podem ser implementadas, por favor visite <a href="https://www.siemens.com/cybersecurity-industry">www.siemens.com/cybersecurity-industry</a> . Os produtos e soluções da Siemens são desenvolvidos continuamente para torna-los mais seguros. A Siemens recomenda vivamente que atualizações de produtos sejam aplicadas assim que estiverem disponíveis, e que sejam utilizadas as versões do produto mais recentes. A utilização de versões de produtos que já não são suportadas, bem com a falta de aplicação das atualizações mais recentes, pode aumentar a exposição do cliente à ameaças cibernéticas. Para manter-se informado sobre atualizações de produtos, por favor subscreva o "Siemens Industrial Cybersecurity RSS Feed" em <a href="https://www.siemens.com/cert">https://www.siemens.com/cert</a> . (V4.7) |                            |                                                                                           |                               |                                          |
| Homologações / certificados                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                                                                           |                               |                                          |
| General Product Approval                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                                                                           |                               |                                          |
| Test Certificates                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                                                                           |                               |                                          |
| <br>CCC                                                                                                                                                                                                                                                                                                                                        | <br>EAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <a href="#">China RoHS</a> | <br>UL | <a href="#">Miscellaneous</a> | <a href="#">Special Test Certificate</a> |
| Maritime application                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Industrial Communication   |                                                                                           |                               |                                          |
| <br>DNV                                                                                                                                                                                                                                                                                                                                        | <br>LRS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <a href="#">PROFINET</a>   |                                                                                           |                               |                                          |

última alteração:

30/10/2025 

## Ficha técnica

**6GK1901-1BB11-2AA0**

designação do tipo de produto

IE FC RJ45 Plug 180 (4x2)

descrição do produto

Conector de encaixe de dados RJ45

6GK19011BB112AA0 CONECTOR ETHERNET RJ45 4X2 180°, UNIT.



página técnica de visão geral de produtos

<https://i.siemens.com/1P6GK1901-1BB11-2AA0>

aptidão para aplicação

Para conexão a cabos IE FC TP 4x2, adequado para a montagem rápida com o sistema FastConnect

### taxa de transmissão

taxa de transmissão / em Industrial Ethernet

10, 100, 1000 Mbit/s

### interfaces

número de conexões elétricas

- para cabos Industrial Ethernet FC TP
- para componentes de rede ou dispositivos terminais

1

1

versão da conexão elétrica

- para cabos Industrial Ethernet FC TP
- para componentes de rede ou dispositivos terminais

contatos de corte/borne integrados para cabos de instalação TP FC de 8 fios  
Conector de encaixe RJ45

versão da conexão elétrica / FastConnect

Si

### dados mecânicos

material / do invólucro

metal

número de reutilizações

10

versão do travamento

outros

### modelo, medidas e pesos

tipo de saída do cabo

Saída de cabo de 180°

largura

13,7 mm

altura

16 mm

profundidade

55 mm

peso líquido

35 g

diâmetro do cabo conectável

6,5 ... 8 mm

secção transversal do condutor conectável

0,21 ... 0,33 mm²

### condições ambientais

temperatura ambiente

- durante operação
- durante o armazenamento
- durante o transporte

-40 ... +85 °C

-40 ... +85 °C

-40 ... +85 °C

umidade relativa do ar

- em 25 °C / sem condensação / durante operação / máximo

95 %

grau de proteção IP

IP20

### características do produto, funções do produto, componentes do produto / geral

característica do produto

- com capacidade PoE
- com capacidade PoE+

Si

Si

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| • sem silicone                                                     | Si                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| componente do produto                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| • alívio da tração                                                 | Si                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>normas, especificações, aprovações</b>                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| comprovante de conformidade                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| • conformidade RoHS                                                | Si                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| • aprovação UL                                                     | Si                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| • aprovação cULus                                                  | Si                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| • aplicação na tração de acordo com EN 50155                       | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| padrão para cabeamento estruturado                                 | Cat6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>mais informações / links da internet</b>                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| link da Internet                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| • para o web site: Ajuda de seleção Cabos e Conectores encaixáveis | <a href="https://support.industry.siemens.com/cs/ww/de/view/109766358">https://support.industry.siemens.com/cs/ww/de/view/109766358</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| • para o web site: Ajuda de seleção TIA Selection Tool             | <a href="https://www.siemens.com/tstcloud">https://www.siemens.com/tstcloud</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| • para o web site: Comunicação industrial                          | <a href="https://www.siemens.com/simatic-net">https://www.siemens.com/simatic-net</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| • para o web site: SiePortal                                       | <a href="https://sieportal.siemens.com">https://sieportal.siemens.com</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| • para o web site: Base de dados de imagens                        | <a href="https://www.automation.siemens.com/bilddb">https://www.automation.siemens.com/bilddb</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| • para o web site: Gestor de download CAX                          | <a href="https://www.siemens.com/cax">https://www.siemens.com/cax</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| • para o web site: Industry Online Support                         | <a href="https://support.industry.siemens.com">https://support.industry.siemens.com</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>indicações de segurança</b>                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| indicação de segurança                                             | <p>A Siemens fornece produtos e soluções com funções de cibersegurança industrial que contribuem para a operação segura de instalações, sistemas, máquinas e redes. Para proteger instalações, sistemas, máquinas e redes contra ameaças cibernéticas, é necessário implementar - e manter continuamente - um conceito holístico de cibersegurança industrial de última geração. Os produtos e soluções da Siemens são um elemento desse conceito. Os clientes são responsáveis por impedir acessos não autorizados às suas instalações, sistemas, máquinas e redes. Tais sistemas, máquinas e componentes apenas deverão estar conectados a uma rede corporativa ou à internet se e na medida em que tal conexão seja necessária e somente após terem sido implementadas medidas de segurança adequadas (p.ex. firewalls e/ou segmentação de rede). Para informações adicionais sobre medidas de cibersegurança industrial que podem ser implementadas, por favor visite <a href="http://www.siemens.com/cybersecurity-industry">www.siemens.com/cybersecurity-industry</a>. Os produtos e soluções da Siemens são desenvolvidos continuamente para torna-los mais seguros. A Siemens recomenda vivamente que atualizações de produtos sejam aplicadas assim que estiverem disponíveis, e que sejam utilizadas as versões do produto mais recentes. A utilização de versões de produtos que já não são suportadas, bem com a falta de aplicação das atualizações mais recentes, pode aumentar a exposição do cliente à ameaças cibernéticas. Para manter-se informado sobre atualizações de produtos, por favor subscreva o "Siemens Industrial Cybersecurity RSS Feed" em <a href="https://www.siemens.com/cert">https://www.siemens.com/cert</a>. (V4.7)</p> |
| <b>Homologações / certificados</b>                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>General Product Approval</b>                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <a href="#">Declaration of Conformity</a>                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Test Certificates</b>                                           | <b>Maritime application</b>    <b>other</b>  <b>Industrial Communication</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

última alteração:

30/10/2025 