



LICITAÇÃO ELETRÔNICA LRE Nº 282/2025

SAP Nº 1000000282

SISTEMA DE REGISTRO DE PREÇO (SRP) (ID 108 14 05)

À APPA
OBJETO:

A empresa ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA com sede na cidade de SERRA-ES à RUA ZILDA RODRIGUES DE SOUZA OLIVEIRA, GALPÃO 2 JARDIM LIMOEIRO Nº 493, CEP 29.164-009,
TELEFONE : 19-3429-2929, com CNPJ/MF12.965.396/0002-71,
e-mail: MANOEL.CURCINO@ALUCEL.NET propõe a APPA a execução do objeto da Licitação supra-referenciada, tudo em conformidade com o Edital, Condições Gerais de Contratos e Elementos Técnicos Instrutores da Licitação.

O valor proposto no Lote 3: é de R\$ 766.750,00 (setecentos e sessenta e seis mil, setessentos e cinquenta reais).

O prazo de validade da Proposta será de, no mínimo, 90 dias, contados da entrega da propostada licitação. Se vencedora da Licitação, assinará o Contrato Administrativo, na qualidade de representante legal, o Sr. Walter Antonio Breda Francoso, portador do CPF 062.905.578-58, RG 13753643 SSP/SP, endereço na RUA ZILDA RODRIGUES DE SOUZA OLIVEIRA, GALPÃO 2 JARDIM LIMOEIRO Nº 493, CEP 29.164-009, Serra/ES

SERRA -ES em 01 de DEZEMBRO 2025.

LOTE 3 – SENSORES

LOTE	ITEM	QTD	UNID	CDR SAP APPA	DESCRIÇÃO DO PRODUTO	VALOR UNITARIO	VALOR TOTAL DO ITEM
03	36	8	PÇ	1000213	Sirene e Alarme Audiovisual, Área de aplicação: Zonas 21 e 22, Marcação sirene: Ex tb IIC T100C Db IP 65, Marcação estrobo: Ex tb IIC 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	10.008,00	80.064,00
03	37	2	PÇ	1001220	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	63.000,00	126.000,00

03	38	30	P Ç	1001214	Sensor indutivo, Tensão de alimentação: 10~30Vcc, Ripple $\pm 10\%$, Corrente de consumo: $<10\text{mA}$, Histerese $\pm 5\%$, Repetibilidade: $<0,01\text{mm}$, Distância operacional: Sa 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: $<2\text{ V}$ (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 PS10-30GI50-E2-Ex	370,80	11.124,00
03	39	30	P Ç	1001215	Sensor indutivo, Tensão de alimentação: 10~30Vcc, Ripple $\pm 10\%$, Corrente de consumo: $<10\text{mA}$, Histerese $\pm 5\%$, Repetibilidade: $<0,01\text{mm}$, Distância operacional: Sa 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: $<2\text{ V}$ (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: PS15-30GI50-A2-V1-EX	393,60	11.808,00
03	40	10	P Ç	1001202	Sensor indutivo, tensão de operação: 20~250 VAC/DC; corrente de saída (constante): 250mA AC / 100mA DC; corrente de saída (pico): máx 2200mA, 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	1.241,00	12.410,00
03	41	8	P Ç	1000895	Sensor Anticolisão, diâmetro: 30mm, distância sensora: 6000mm (ajustável), zona morta: 800mm, Tipo de saída: PNP (simples), frequência do transdutor: 80Khz, Resolução: 0,18mm, repetibilidade: $\pm 0,15\%$, Tensão de alimentação: 9 a 30Vcc, Ripple: 10%, Corrente de consumo: $<80\text{mA}$, 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	4.538,00	36.304,00
03	42	2	P Ç	1001216	Sensor de ângulo, Faixa de medição: -45° a 45° , Resolução: $\pm 0,01^\circ$, Precisão $\pm 0,1\%$, tensão de alimentação: 10-30VDC, Saída: 4-20 mA, conexão: conector M8 de 4 pinos, material: alumínio, grau de proteção: IP67.	8.545,00	17.090,00
03	43	1	P Ç	1000891	Sensor de ângulo (Inclinômetro), Tipo: Sensor de inclinação de 2 eixos, Faixa de medição: 0...360°, Precisão absoluta: $\leq \pm 0,5^\circ$, Atraso na resposta: $\leq 25\text{ms}$, Resolução: $\leq 0,1^\circ$, Precisão de repetição: $\leq \pm 0,1^\circ$, Influência da temperatura: $\leq 0,027^\circ/\text{K}$, Tensão operacional: 10~30Vcc, Atraso antes da disponibilidade: $\leq 200\text{ms}$, Tipo de saída: 2 saídas de comutação PNP, Proteção: contra polaridade reversa e curto-circuito, Corrente de alimentação: $\leq 25\text{mA}$ (sem carga) / $\leq 100\text{mA}$ (operacional), Queda de tensão: $\leq 3\text{V}$, 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 7x0,5mm ² de 5m. Fabricante: Pepperl+Fuchs Modelo: INY030D-F99-2I2E2-5M	7.994,20	7.994,20

03	44	20	P Ç	1000890	Sensor de Temperatura, Tipo: Parafuso em Instalação de Montagem Positiva, Entrada de Eletroduto: 1/2" NPT, entrada de mancal: 1/8" NPT, Graxa Zerk para Lubrificação do Rolamento, Sensor PT100 – Platina RTD CSA/NRTL, Classe II. Fabricante: 4B Modelo: WDB2	2.410,00	48.200,00
03	45	10	P Ç	1001232	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	499,00	4.990,00
03	46	4	P Ç	1000892	Sonda de Nível, Acionamento: 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.	2.289,00	9.156,00
03	47	8	P Ç	1001209	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 235-02Z-3D	1.921,00	15.368,00
03	48	4	P Ç	1000908	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	4.070,00	16.280,00
03	49	22	P Ç	1000894	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 mm ² (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, Acionamento: 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.	4.033,00	88.726,00
03	50	30	P Ç	1000893	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 isolamento: 500V, Velocidade de acionamento: min. 1 mm/s e máx 1 m/s. Normas: ABNT NBR IEC 60079-0, ABNT NBR IEC 60079-1, ABNT NBR IEC 60079-31	2.406,00	72.180,00
03	51	8	P Ç	1000909	Chave de Desalinhamento, Tipo: Fim de Curso, Material: corpo em alumínio e rolete em poliuretano, Ação Contato: Rápido Com Ruptura Positiva, Tipo Atuador: Rolete, Corrente: máx. 4A, Contatos: 2NA+2NF, Grau de Proteção: IP65. Fabricante: Ace Schmersal – Modelo: ZV12HI500 11/11Y DIR	2.038,00	16.304,00

03	52	12	P Ç	1001224	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).	383,96	4.607,52	
					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.		0,00	
03	53	10	P Ç	1001225	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.	2.457,00	24.570,00	
03	54	6	P Ç	1001218	Aquecedor de Painel, Potência: 100W, Tensão de Alimentação: 110V - 250V AC, Frequência: 60 Hz, Temperatura de Operação: -20°C a +40°C. Fabricante: Pfannenbergl Modelo: FLH 100W	1.011,40	6.068,40	
03	55	3	P Ç	1001204	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 tc IIIC T120°C Dc. Fabricante: SEW Modelo: EK8S	8.610,00	25.830,00	
03	56	2	P Ç	1000872	Encoder Absoluto PROFINET Fabricante: Siemens – Modelo: 6FX2001-5QN25	14.065,44	28.130,88	
03	57	120	P Ç	1000902	Cabo Festoon, Cabo elétrico chato, Bitola: 8X1,0mm², blindado, isolamento: 750V, Encordoamento: Classe 5.	72,70	8.724,00	
03	58	120	P Ç	1000903	Cabo Festoon, Cabo elétrico chato, Bitola: 8X6mm², Isolação: 750V, Encordoamento: Classe 5.	75,00	9.000,00	
03	59	120	P Ç	1000904	Cabo Festoon, Cabo elétrico chato, Bitola: 10X2,5mm², Isolação: 750V, Encordoamento: Classe 5.	43,10	5.172,00	
03	60	240	P Ç	1000905	Cabo Festoon, Cabo elétrico chato, Bitola: 10X1,5 mm², Isolação: 750V, Encordoamento: Classe 5.	30,40	7.296,00	
03	61	120	M T	1000906	Cabo Festoon, Cabo elétrico chato, Bitola: 4X10mm², Isolação: 750V, Encordoamento: Classe 5.	64,80	7.776,00	
03	62	1000	T	1001205	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	36,80	36.800,00	
03	63	1000	M T	1001206	Cabo de par trançado (TP) para Industrial Ethernet Fastconnect GP 2x2, aplicação: PROFINET Tipo A, para conexão com plugue IE FastConnect RJ45x2, uso universal, CAT5E blindado. Fabricante: Siemens Modelo: 6XV1840-2AU10	15,60	15.600,00	
03	64	30	P Ç	1001207	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	129,90	3.897,00	
03	65	30	P Ç	1001208	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	219,00	6.570,00	
03	66	10	P Ç	1001217	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	271,00	2.710,00	
							766.750,00	

Serra, 01 de dezembro de 2025

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Alucel Suprimentos Industriais LTDA

Walter Antonio Breda Francoso – Sócio Proprietário

RG 13753643 SSP/SP

CPF 062.905.578-58

Piracicaba, 14 de Janeiro de 2025.

ATESTADO DE CAPACIDADE TÉCNICA

A empresa **INOVAGEO GEOSSINTÉTICOS LTDA**, inscrita no CNPJ sob o nº 44.173.316/0001-50, com o endereço na Av. José Trevisan, 50, bairro Abaeté, CEP 13.420-267, Piracicaba – SP vem **ATESTAR** para os devidos fins que a empresa **ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA**, com sede na Rua Lucas Sampronha, 261 – Distrito Industrial, CEP 13.413-042, Piracicaba – SP, inscrita no CNPJ sob o nº 12.965.396/0001-90 e sua filial com o endereço na Av. Brasil, 2078, bairro São Diogo II, CEP 29.163-165, Serra – ES, inscrita no CNPJ sob o nº 12.965.396/0002-71 têm nos fornecido satisfatoriamente desde o ano de 2021 materiais elétricos em geral dos fabricantes abaixo listados, não havendo nada que desabone o seu desempenho durante todo esse período.

Fabricantes: Weg, Siemens, Schneider, Prysmian, Induscabos, Dacota, Cobrecom, Intelli, Italcabos, PanElectric, Philips, Ledvance, Ouralux, SX Lighting, Empalux Fortlight, G-Light, Intral, Conexled, Telbra, Steck, HellermannTyton, Conimel, Ekoflex, Hummel, Wago, 3M, Alfa, Tagout, Kanaflex, Piralux, Elmec, Bandeirantes, Dutoplast, PSA, Brum, Lukma, Lukbox, Carthom's, Legrand, Nelmetais, Ritall, Minuzzi, ACE Schmersal, Stamplac, Tramontina, Melfex, Wetzel, Omron, Sense, Balluf, Alutal, Metaltex, Phoenix Contact, Weidmuller, Margirus, Dinaksa, Coel, Finder, Pextron, etc.

Atenciosamente,

INOVAGEO
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CNPJ: 44.173.316/0001-50

INOVAGEO GEOSSINTÉTICOS

www.inovageo.eng.br



(19) 2533-8800



atendimento@inovageo.eng.br



Av. Laudelina Cotrim de Castro,
141, Água Branca,
Piracicaba - SP - 13425-110



EX SE STB - LED

- Zona 1, 2, 21 e 22
- Intensidade de 105 dB
- Opção com caixa de bornes

Item

Descrição: EX SE STB

Dados Gerais

Material da Botoeira: Invólucro em alumínio isento de cobre
Marcação Ex: Ex d IIC T5 Gb, Ex tb IIIC T100C Db
Aplicação: Zonas 1, 2, 21 e 22
Peso: 2,5 kg
Pintura: Cor vermelha padrão fabricante
Entrada: Fornecido com prensa cabo em alumínio e cabo pré formado
Intensidade: 105dB a 1m

Nota: Luz Estroboscópica padrão na cor vermelha. Outras cores mediante consulta.

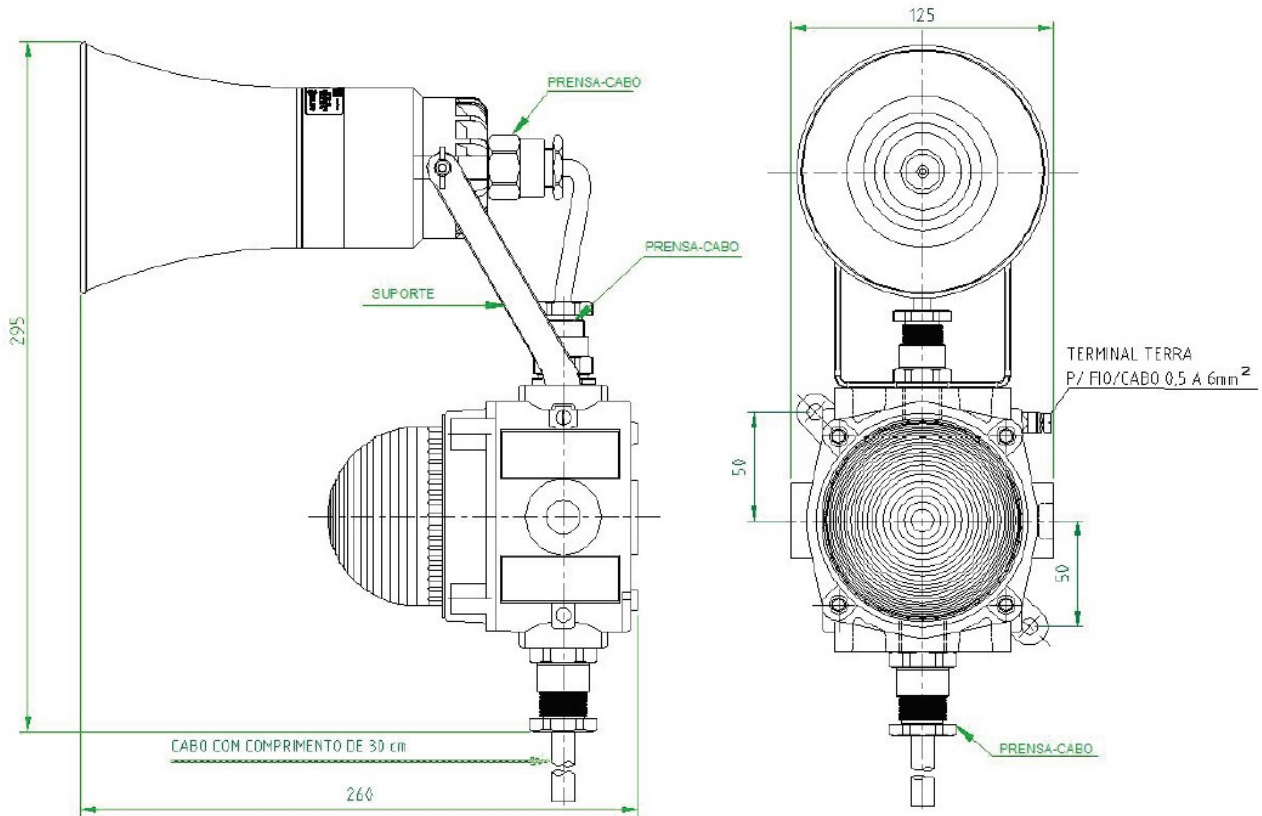
Ambiente

Classe de temperatura: T5
Grau de proteção: IP 65W
Temperatura de Operação: $-20^{\circ}\text{C} \leq T_a \leq +40^{\circ}\text{C}$

Dados técnicos

Tensão: 24Vcc, 130Vca ou 220Vca
Frequência: 50/60 Hz
Vida útil: 1.000.000 de flashes
Frequencia de flashes: 60 flashes /min
Nº certificado inmetro: CEPEL 15.2380
Saída elétrica: Cabo de 1m

Desenho





Ultrasonic Wind Sensor

- **Parameters measured**
Wind speed, wind direction, virtual temperature, barometric pressure
- **Measurement range**
Ultrasonic
- **Product highlights**
Maintenance-free measurement, suitable for extreme ambient conditions, ice-free operation, vibration and seawater resistant, compatible interfaces
- **Interface**
SDI-12, RS-485, various RS-485-protocols, analogue output

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 the lowest temperature.

Data	
Measured	wind speed, wind direction, virtual air temperature, barometric pressure

Calculated	instantaneous values in intervals from 1 to 10 seconds, vector and scalar means in intervals from 1 to 10 minutes max/min values of the wind direction sectors maximum gust of wind and wind direction, virtual temperature
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Wind speed	
Measuring method	4 x 10 Hz ultrasonic sensors
Measuring range	0 ... 75 m/s
Resolution	0.1 m/s
Accuracy	± 0.2 m/s or ± 2 % RMS
Threshold	0.1 m/s

Wind direction	
Measuring method	4 x 10 Hz ultrasonic sensors
Measuring range	0 ... 359,9°
Resolution	0.1°
Accuracy	$< 2^\circ$ (> 1 m/s) RMSE
Threshold	0.1 m/s

Virtual air temperature	
Measuring method	ultrasonic technology
Measuring range	-50 ... +70 °C
Resolution	0.1 °C
Accuracy	± 2 K (no heating, no solar irradiation, or wind speed above 4 m/s)

Barometric pressure	
Measuring method	MEMS-Sensor, capacitive
Measuring range	300 ... 1200 hPa
Resolution	0.1 hPa
Accuracy	± 1.5 hPa

Electrical data

Interfaces selectable using the Lufft-Config tool (PC-SW for Windows OS)	
SDI-12	release 1.3 (factory setting)
RS-485	galvanically isolation, half-duplex, baud rates 1200 ... 19200
RS-485 protocols	binary, ASCII, TLS2002FG3, MODBUS, NMEA-WIMWV
Analog output	4 ... 20 mA or 2 ... 10 VDC, 16 bits

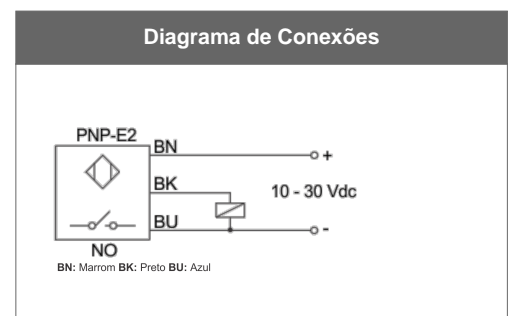
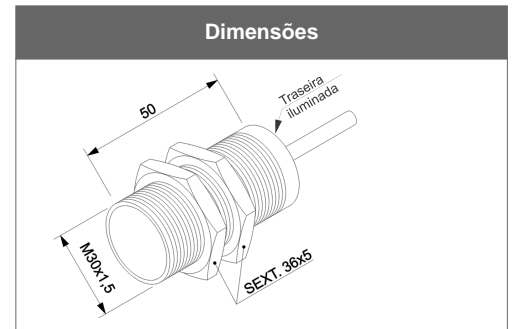
Power supply	
Input voltage	10,5 ... 28 VDC

Power consumption (sensor)	
Heater	50 mA @ 12 VDC 24 VDC/240 Watt

Ambient	
Operating temperature range	-40 °C ... +60 °C (with heater), -20 °C ... +60 °C (without heater)
Storage temperature	-55 °C ... +80 °C
Relative humidity	0 ... 100 % R.H.
Mechanical data	
Dimensions (H x Ø)	170 mm x 150 mm
Weight	1.7 kg
Material	seawater resistant AlMg3Si aluminium alloy
Color	gray
Fastener (Ø)	50 mm
Protection and standards	
Type of protection	IP66
Standard	
EMC directive	2004/108/EG
Emitted interference	EN 55011:2009, EN 61000-6-3
Immunity	EN 61000-6-6 and EN 61000-4-2/3/4/5/6/8
Vibration	IEC 60068-2-6/IEC 60945
Salt spray	MIL-Std 810, 509.3
Ice	MIL-Std 810F, 521.2

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 (carga energizada)	<2 V
Frequência de comutação maxima	300 Hz
Invólucro	roscado; latão com banho de níquel
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	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

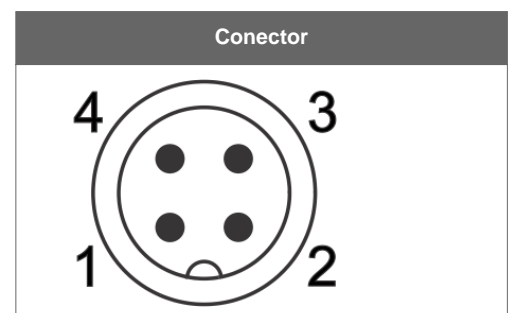
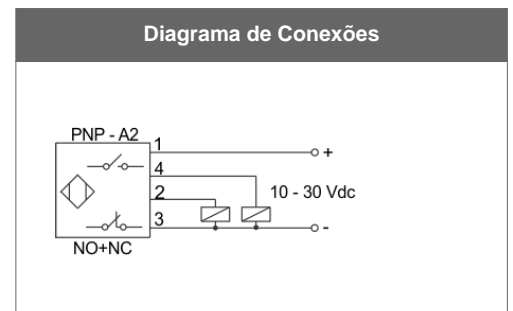
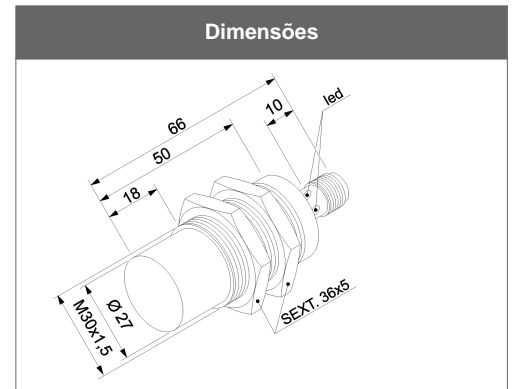
Part Number	Modelo	No canais	Aplicação	Tensão de alimentação	Potência consumida
52920552	KMV-100/110-220Vac	Mono canal	Fonte com relé para sensor	110Vca ou 220Vca	1 VA em 110 Vac e 1,7 VA em 220 Vac

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
Involúcro	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 involúcro	GX (inox), GT (PTFE), GP (plástico)
Comprimento do tubo	50 mm
Proteção Ex	Proteção por involúcro 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 para poeira combustível	16/05/2027 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 consumi
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

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

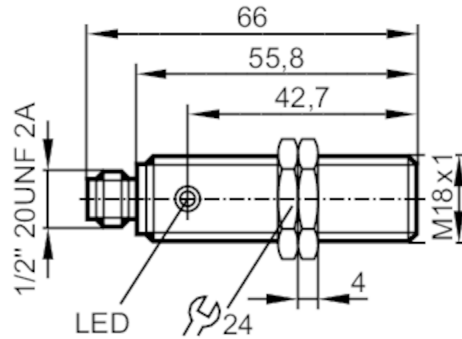
Accesório: Suporte - Suporte Sensor Tubular

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

IG0348



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; 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

IG0348

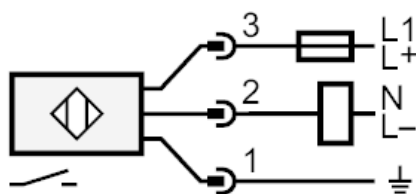


Sensor indutivo

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

Conexão elétrica - conector

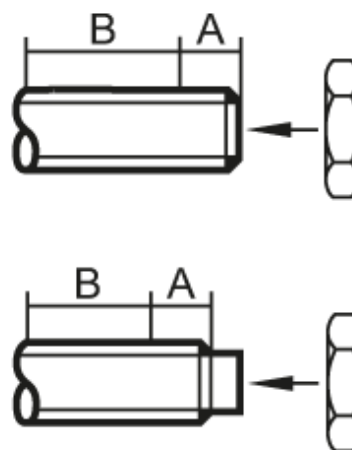
Conexão: 1 x 1/2"; codificação: C



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

Diagramas e curvas

Montagem



MIC+600/D/TC

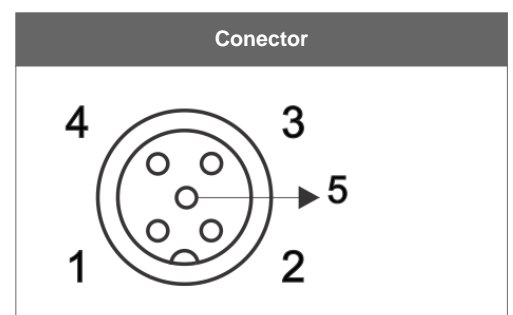
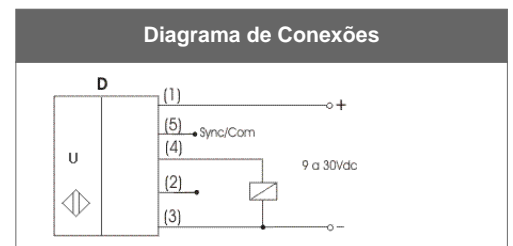
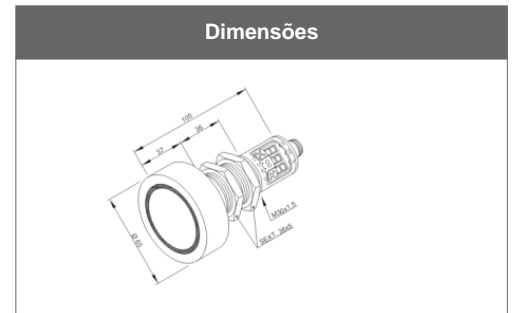
Características técnicas	
Tipo	Digital
Fabricante	Microsonic
Série	MIC+
Tensão de alimentação	09 a 30Vcc
Ripple	10 %
Corrente de consumo sem carga	<80 mA
Diâmetro	M30
Distância sensora	6000 mm (ajustável)
Zona morta	600 mm
Distância máxima	8000 mm
Repetibilidade	+/- 0,15%
Material da frente	PBT
Peso	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

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



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

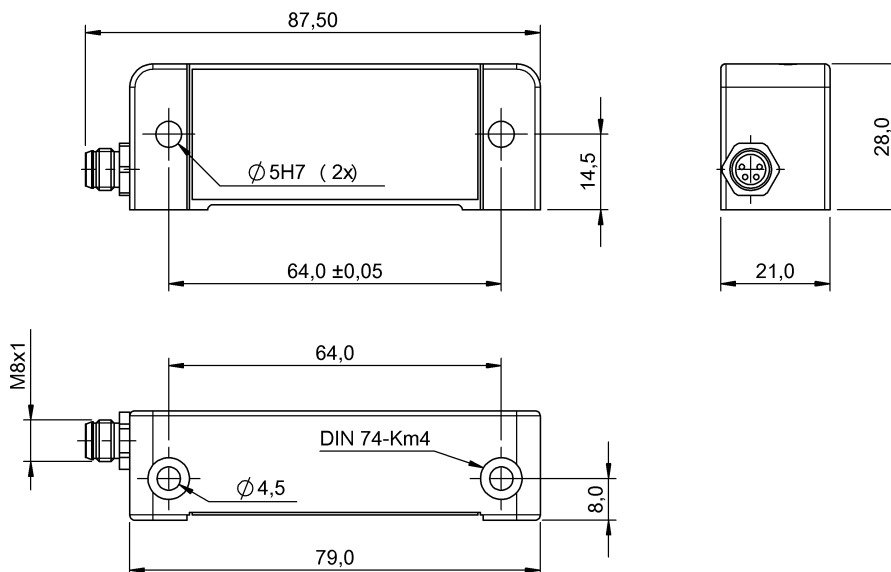
Part Number	Modelo	Função	Consumo sem carga	Tipo de conexão com sensor	Tipo de conexão com PC
5000005726	LCA-2	Configurador	? 25 mA	Conector M12 4 pinos	USB
5000005819	LCA-2-KIT	Configurador	? 25 mA	Conector M12 4 pinos	USB

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

Sensores de inclinação
BSI R11A0-XB-CXS045-S75G
Código de pedido: BSI0002

BALLUFF



Basic features

Certificação/conformidade	CE 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
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Interface

Saída analógica	Análogica, corrente 4...20 mA
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Material

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

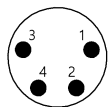
Mechanical data

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

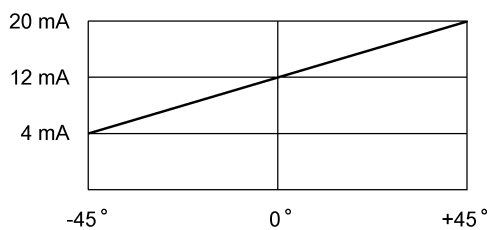
Desvio de temperatura, máx.	±0,01%/10 K
Precisão	±0,1 % FS min. 0,1°
Resolução	≤ 0,01 °
Taxa de varredura	150 ms

Connector Drawings



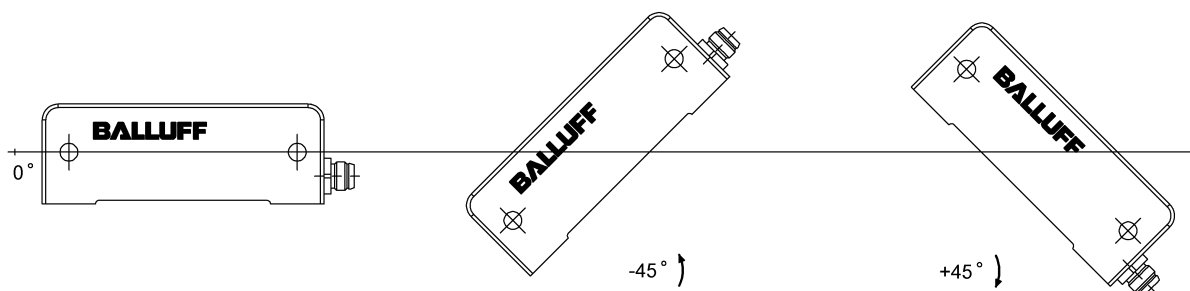
PINO 1: tensão de alimentação +
PINO 2: n.c.
PINO 3: GND
PINO 4: saída analógica

Technical Drawings



Faixa de medição do sinal de saída

Help Views



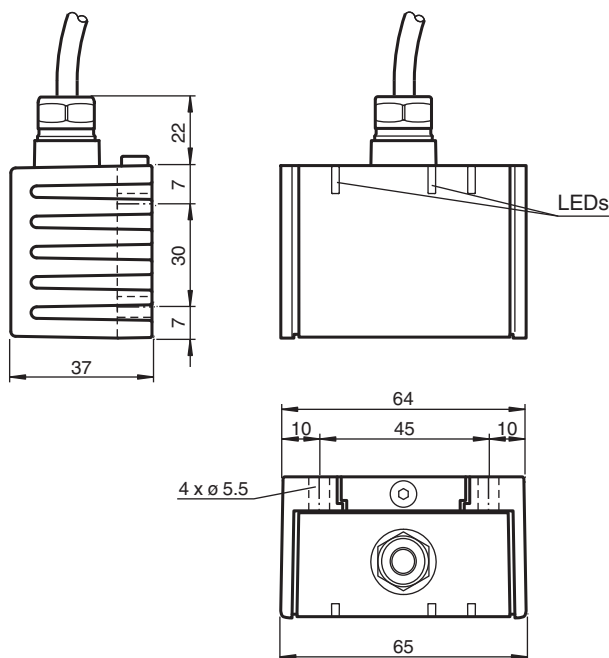
Inclination sensor INY030D-F99-2I2E2-5M



- 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	≤ 25 ms
Resolution	$\leq 0.01^{\circ}$
Repeat accuracy	$\leq \pm 0.02^{\circ}$
Temperature influence	$\leq 0.004^{\circ}/K$

Functional safety related parameters

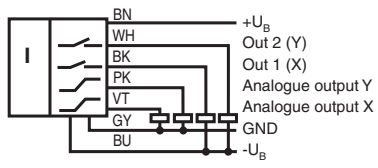
Technical Data

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

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

Connection

Standard symbol/Connection:



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

Mounting

Sensor Orientation

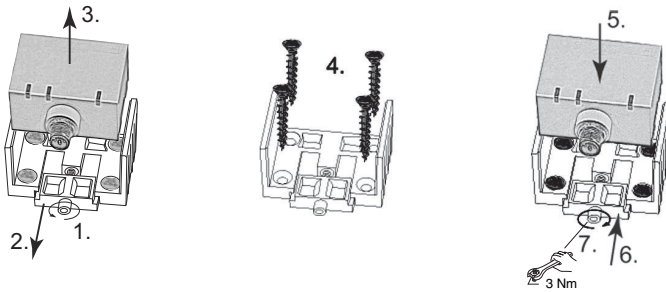
In the default setting the zero position of the sensor is reached, when the sensor is mounted on a horizontal plane and electrical connection faces sideways.

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					

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

Sensores de Temperatura do Rolamento

TECHNOLOGY · INNOVATION · QUALITY · VALUE

Série WDB1 e WDB2

Sensores de Temperatura do Rolamento

APLICAÇÃO

Para uso em qualquer aplicação onde for desejado ou exigido o monitoramento da temperatura do rolamento.

MÉTODO DE OPERAÇÃO

A série WDB 1 e 2 é uma faixa de sensores de rolamento fabricados para serem parafusados diretamente em um gabinete de rolamento através da rosca de graxa zerk 1/8" NPT existentes. Cada sensor é ajustado com uma graxa zerk para permitir a lubrificação do rolamento sem a necessidade de remover o sensor. Três versões estão disponíveis, um tipo termistor NTC ou platina RTD para monitoramento de temperatura contínuo, e um modelo termistor PTC com os seguintes pontos de excursão (especificar ao pedir): 122°F, 140°F, 158°F, 176°F, 194°F. O sensor é fornecido com um cabo conectado de nove pés e pode ser conectado a um PLC ou a um sistema de monitoramento de risco, como o T500 Hotbus Elite, Watchdog Elite ou T400 Elite da 4B. As conexões não são sensíveis à polaridade, portanto, exigências de conexão especial são eliminadas e o cabo pode ser estendido no campo.

CARACTERÍSTICAS

- ▶ Parafuso em Instalação de Montagem Positiva
- ▶ Graxa Zerk para Lubrificação do Rolamento
- ▶ Entrada de Eletroduto de 1/2" NPT (Série WDB2)
- ▶ Versão NTC – Temperatura Contínua
- ▶ Versão PTC – Pontos de Excursão de 122°F a 194°F
- ▶ Versão PT100 – Platina RTD
- ▶ CSA/NRTL, Classe II Div. 1 Aprovado

NÚMEROS DE PEÇAS

Sensores Aprovados Pela ATEX / IECEx:

- ▶ WDB10V3AI – Tipo NTC (Contínuo)
- ▶ WDB11V3AI – Tipo PTC (Excursão 122°F)
- ▶ WDB12V3AI – Tipo PTC (Excursão 140°F)
- ▶ WDB13V3AI – Tipo PTC (Excursão 158°F)
- ▶ WDB14V3AI – Tipo PTC (Excursão 176°F)
- ▶ WDB15V3AI – Tipo PTC (Excursão 194°F)
- ▶ WDB19V3AI – Tipo PT100 (Contínuo)

CSA / NRTL Classe II Div. 1 Sensores Aprovados:

- ▶ WDB20V3C – Tipo NTC (Contínuo)
- ▶ WDB21V3C – Tipo PTC (Excursão 122°F)
- ▶ WDB22V3C – Tipo PTC (Excursão 140°F)
- ▶ WDB23V3C – Tipo PTC (Excursão 158°F)
- ▶ WDB24V3C – Tipo PTC (Excursão 176°F)
- ▶ WDB25V3C – Tipo PTC (Excursão 194°F)
- ▶ WDB29V3C – Tipo PT100 (Contínuo)



WDB20V3C
(CSA / NRTL Classe II Div 1 Aprovado)



WDB23V3C
(CSA / NRTL Classe II Div 1 Aprovado)



WDB10V3AI
(ATEX / IECEx Aprovado)



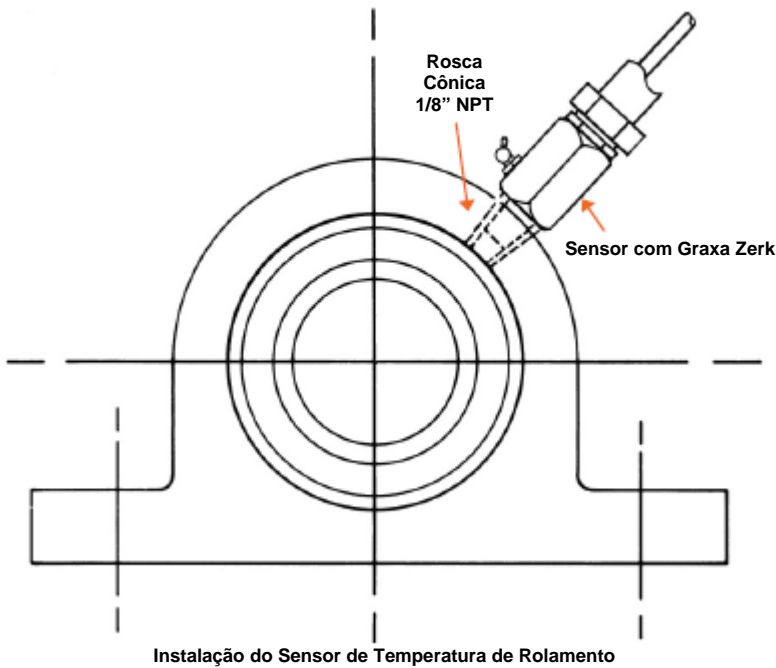
Versões Aprovadas pela
ATEX Disponíveis



Versões Aprovadas Disponíveis

Sensores de Temperatura do Rolamento

TECHNOLOGY · INNOVATION · QUALITY · VALUE



Sensor Instalado em Rolamento de Transportador de Correia



Exemplo de Falha de Rolamento

ESPECIFICAÇÕES TÉCNICAS

Sensores de Temperatura de Rolamento Serie WDB1 e WDB2

Sensores NTC	
Resistência a 77°F	10.000 Ohms
Resistência a 140°F	2.487 Ohms
Resistência a 194°F	916 Ohms
Tensão de Detecção	5 a 24 VDC
Consumo de Corrente	1 mA

Sensores PTC	
Resistência a 140°F	≤ 250 Ohms
Resistência no Ponto de Excursão	≥ 2.000 Ohms
Tensão de Detecção	5 a 25 VDC
Consumo de Corrente	20 mA

Sensores PT100	
Resistência a 32°F	100 Ohms
Resistência a 212 °F	138,4 Ohms
Tensão de Detecção	Por Transdutor
Consumo de Corrente	1 mA

OBSERVAÇÃO: Os sensores da série WDB 1 possuem corpo em latão e não possuem entradas de eletroduto. Os sensores da série WDB 2 possuem corpos banhados em aço com entradas de eletroduto de 1/2" NPT e são CSA / NRTL Classe II Div 1 Grupos E, F e G aprovados. Ambas as séries WDB 1 e 2 estão disponíveis em três versões de sensores, NTC, PTC ou PT100.

Os sensores de temperatura podem ser usados com os seguintes Sistemas de Monitoramento de Risco da 4B



T500 Hotbus Elite



Watchdog Elite



T400 Elite

TxRail-USB

TRANSMISSOR DE TEMPERATURA - MANUAL DE OPERAÇÃO – V2.0x B



INTRODUÇÃO

O TxRail-USB é um avançado transmissor de temperatura programável para montagem em trilho DIN. Sua tecnologia microprocessada aceita total configuração via USB, permitindo a seleção do tipo de entrada, faixa de medição, tipo de saída e calibração. A saída do produto 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 ajustada em função da escala configurada.

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_{25°C}: 10 kΩ ±1 %, B_{25/85} = 3435

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

0 a 100 mVcc. Impedância >> 1 MΩ (*)

(*) Recurso disponível para produtos 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 tempo 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 a faixa configurada.

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

Alimentação: 10 a 35 Vcc (saída 4-20 mA) e
12 a 35 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 35 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 de junta-fria para termopares.

Secção do fio utilizado: 0,14 a 1,5 mm²

Torque recomendado: 0,8 Nm.

Caixa: ABS UL94-HB

Certificação: CE, UKCA

CONFIGURAÇÃO

Quando uma alteração na configuração for necessária, esta deverá ser realizada através do software **TxConfig II**.

A interface de configuração do transmissor (cabo USB) pode ser adquirida junto ao fabricante ou em seus representantes autorizados.

O software de configuração pode ser baixado gratuitamente no website do fabricante. Para a instalação execute o arquivo **TxConfigIISetup.exe** e siga as instruções do instalador.

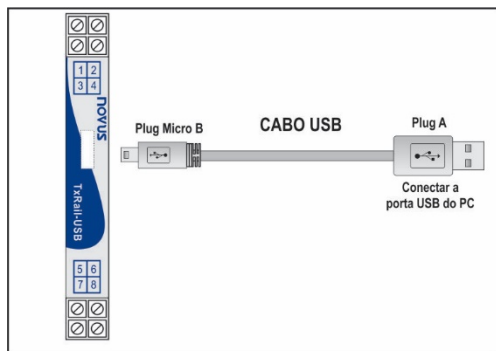


Fig. 1 – Conexão do cabo USB

Durante a configuração, o transmissor é alimentado pela USB, não necessitando fonte externa.

A configuração do transmissor também pode ser feita com este conectado ao *loop*, utilizando a energia da fonte que alimenta o processo. Não há isolamento elétrico entre a entrada do transmissor e a porta (interface) de comunicação, portanto não é recomendada sua configuração com a entrada de sensor ligada ao processo. Ver Fig. 2.

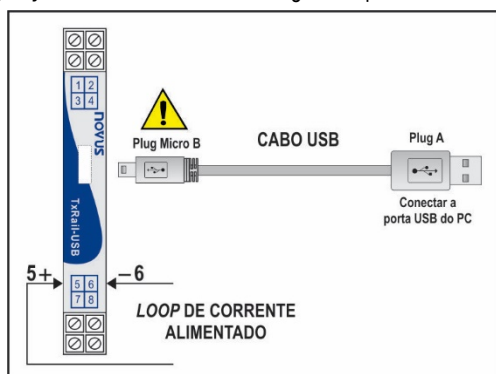
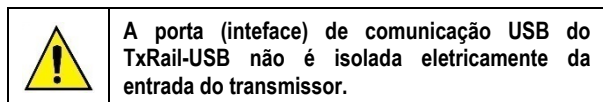


Fig. 2 – Conexões do cabo USB – Alimentação pelo *loop*

Após estas conexões, o usuário deve executar o software **TxConfig II** e, se necessário, consultar o tópico *Ajuda* para auxílio na utilização do software.



SOFTWARE DE CONFIGURAÇÃO:

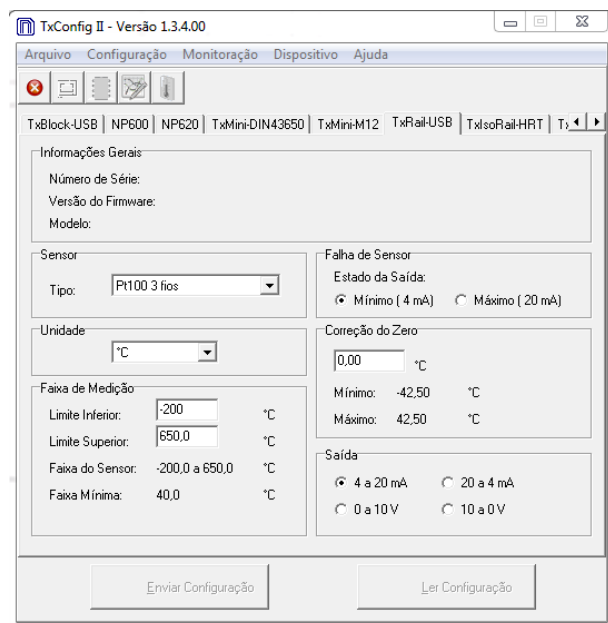


Fig. 3 – Tela principal do software **TxConfig II**

Os campos desta tela têm as seguintes finalidades:

- 1. Informações Gerais:** Neste campo constam dados que identificam o transmissor. Estas informações devem ser apresentadas ao fabricante em eventuais consultas.
- 2. Sensor:** Selecionar o sensor a ser utilizado. Ver **Tabela 1**.
- 3. Faixa de Medição:** Definir a faixa de medição do transmissor.

Limite Inferior de Faixa: temperatura desejada para valor mínimo de retransmissão.

Limite Superior de Faixa: temperatura desejada para valor máximo de retransmissão.

Faixa do Sensor

Os valores escolhidos não podem ultrapassar a **Faixa do Sensor** mostrada neste mesmo campo. Ver **Tabela 1** deste manual.

Faixa Mínima

Não podem estabelecer faixa com largura (*span*) menor que o valor de **Faixa Mínima** indicada mais abaixo neste mesmo campo. Ver **Tabela 1** deste manual.

- 4. Falha de Sensor:** Estabelece o comportamento da saída, quando o transmissor indicar falha:

Mínimo: corrente de saída vai para < 3,8 mA ou tensão de saída fica em 0 V (down-scale), tipicamente utilizado em refrigeração.

Máximo: corrente de saída vai para > 20,5 mA ou tensão de saída em 10 V (up-scale), tipicamente utilizado em aquecimento.

- 5. Correção do Zero:** Corrige pequenos desvios apresetados na saída do transmissor, por exemplo, quando ocorrer a troca do sensor.
- 6. Enviar Configuração:** Envia a nova configuração feita. Uma vez enviada, a configuração será imediatamente adotada pelo transmissor.
- 7. Ler Configuração:** Lê a configuração presente no transmissor conectado. A tela passa a apresentar a configuração atual que poderá ser alterada pelo usuário.

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.

INSTALAÇÃO MECÂNICA

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

DIMENSÕES:

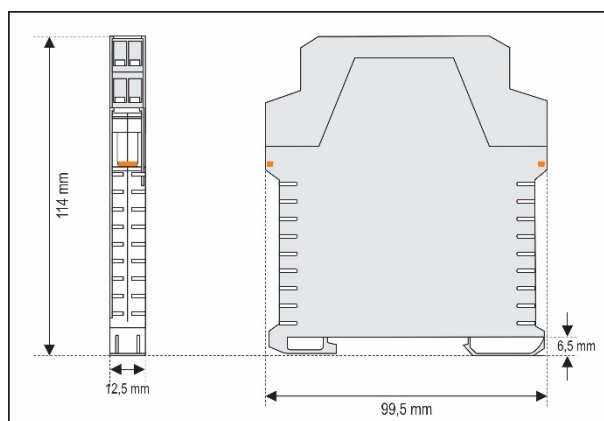


Fig. 4 – Dimensões do transmissor

ABRINDO O TRANSMISSOR:

Para abrir o transmissor, deve-se pressionar dois bornes laterais em laranja e puxar a tampa frontal do equipamento com cuidado, conforme Fig. 5.

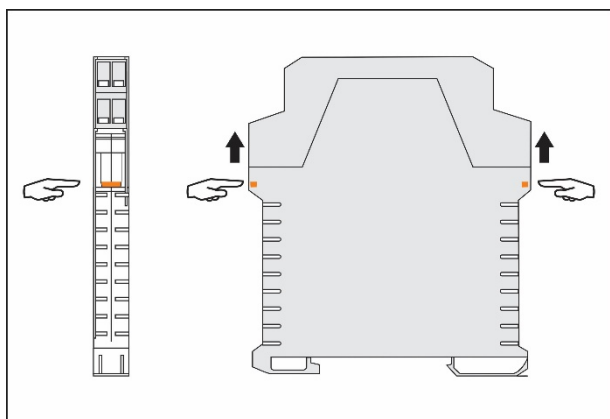


Fig. 5 – Abrindo o transmissor

INSTALAÇÃO ELÉTRICA

A Fig. 6 mostra as conexões elétricas necessárias. Para conexões de entrada termopar, RTD, resistência e tensão no transmissor TxRail-USB, devem seguir conforme figura abaixo:

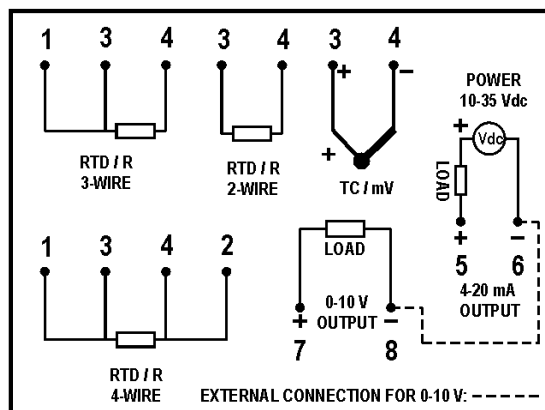


Fig. 6 – Conexões elétricas do transmissor TxRail-USB

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.

RECOMENDAÇÕES PARA A INSTALAÇÃO

- Condutores de sinais de entrada devem percorrer a planta do sistema separados dos condutores de saída e de alimentação, se possível em eletrodutos aterrados.
- A alimentação dos instrumentos deve vir de uma rede própria para 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 Ω e 100 nF, série) em bobinas de contactoras, solenóides, etc.

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.).

PT100/PT1000 2 FIOS / NTC

Nota: Quando 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 no **TxConfig II**.

O comprimento do cabo do Pt100/Pt1000 **deverá ser menor que 30 cm** para não ocorrer erros da resistência do cabo.

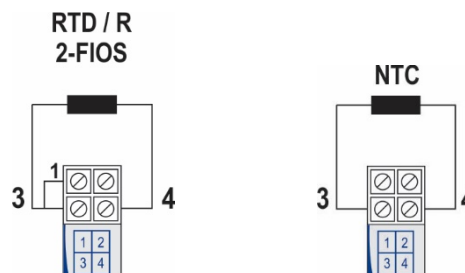


Fig. 7 – Conexões elétricas do transmissor (Pt100/Pt1000 2 fios e NTC)

PT100/PT1000 3 FIOS

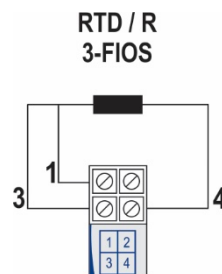


Fig. 8 – Conexões elétricas do transmissor (Pt100/Pt1000 3 fios)

PT100 4 FIOS

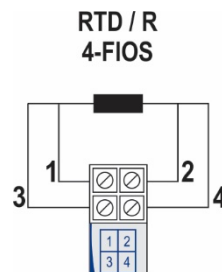


Fig. 9 – Conexões elétricas do transmissor (Pt100 4 fios)

Pt100 3 e 4 fios / Pt1000 3 fios: Para a correta compensação das resistências do cabo do RTD, elas devem ser iguais em todos os terminais e não devem ultrapassar 25 Ω por cabo. A fim de garantir estas condições, recomenda-se o uso de cabo de 3 ou 4 fios de mesmo comprimento e mesma bitola.

TERMOPARES

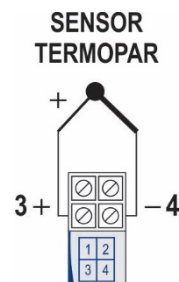


Fig. 10 – Conexões elétricas do transmissor (Termopar)

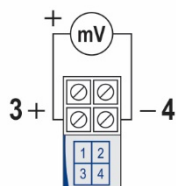
TENSÃO (0-50 mV / 0-100 mV)**0-50 mV / 0-100 mV**

Fig. 11 – Conexões elétricas do transmissor (0-50 mV/ 0-100 mV)

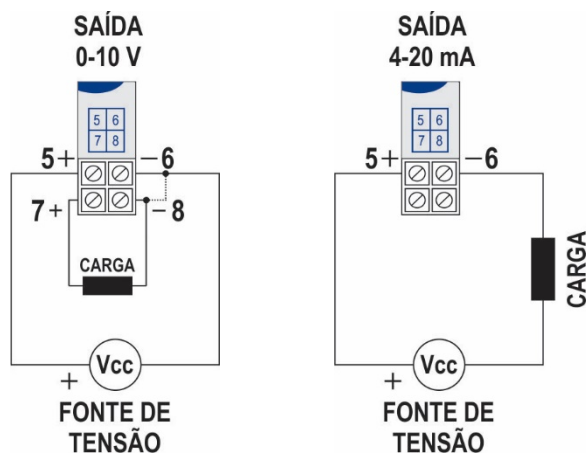
SAÍDAS (0-10 V e 4-20 mA)

Fig. 12 – Conexões elétricas do transmissor (0-10 V e 4-20 mA)

OPERAÇÃO

O offset do sensor pode ser alterado através do software *TxConfig II*. A conexão USB pode ser feita mesmo com o transmissor ligado ao processo e operando, sem ocasionar erros na medida. Ver item *Correção de Zero* no capítulo **CONFIGURAÇÃO** deste manual.

O usuário deve escolher sensor e faixa mais adequados ao seu 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 este mesmo sensor.

É importante observar que a exatidão do transmissor é sempre baseada na faixa máxima do sensor utilizado, mesmo quando uma faixa intermediária foi configurada. Exemplo:

- O sensor Pt100 na faixa de 0 a 100 °C e exatidão de 0,12 %, logo teremos um erro máximo de até 1,02 °C (0,12 % de 850 °C)
- O sensor Pt100 na faixa 500 a 600 °C e exatidão de 0,19 %, logo teremos um erro máximo de até 1,61 °C (0,19 % de 850 °C)

Nota: Quando efetuadas aferições no transmissor, 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.

GARANTIA

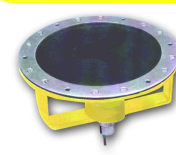
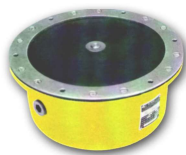
As condições de garantia encontram-se em nosso website www.novus.com.br/garantia.



Sonda de nível com diafragma

Aplicação: Controle de nível em chutes de transportadores e silos.

Atuação por deflexão de diafragma de borracha; ideal para serviço pesado em ambientes agressivos e instalações ao tempo.



Especificações	FA-790	FA-792	FL-795
Operação			
Acionamento	Deflexão do Diafragma	Deflexão do Diafragma	Deflexão do Diafragma
Força mínima para atuação	5 kgf	1,5 kgf	1,0 kgf
Materiais			
Corpo	Carcaça em alumínio fundido	Carcaça em alumínio fundido	Chapa de aço 1/4"
Diafragma	Borracha nitrílica com lona	Borracha nitrílica sem lona	Borracha nitrílica com lona
Grau de proteção	IP-65	IP-65	Sensor IP-67
Mola de retorno	Aço inoxidável	Aço inoxidável	Aço inoxidável
Eixo e parafusos da tampa	Aço inoxidável	Aço inoxidável	-
Pintura	Poliéster, eletrostática	Poliéster, eletrostática	Poliéster, eletrostática
Cor de acabamento	Amarelo segurança Munsell 5Y8/12	Amarelo segurança Munsell 5Y8/12	Amarelo segurança Munsell 5Y8/12
Placa de identificação	Aço inoxidável	Aço inoxidável	Aço inoxidável
Peso	5,2 kg	3,1 kg	2,4 kg
Contatos elétricos			
Tipo	Microrruptor de ação rápida	Microrruptor de ação rápida	Sensor Indutivo Ø18mm
Quantidade	1NA + 2NF	1NA + 2NF	1NF / CA
Corrente / tensão	3A / 120 Vca (AC-15) 3A / 24 Vcc (DC-13); $i_{max} = 6A$; $V_{max} = 400V$	3A / 120 Vca (AC-15) 3A / 24 Vcc (DC-13); $i_{max} = 6A$; $V_{max} = 400V$	0,2 A x 90-250 Vca
Conexão elétrica	1 x 3/4 " rosca GAS	1 x 3/4 " rosca GAS	2 fios
Opcionais			
/C6	Contato c/sensor indutivo: 1NF 0,2Ax250V	Contato c/sensor indutivo: 1NF 0,2Ax250V	padrão
/CD2	C/ módulo G88102201 P/ rede Dupline®	C/ módulo G88102201 P/ rede Dupline®	não aplicável
/i	Chapa inoxidável de proteção do diafragma(força mín. de atuação: 8 kg)	não aplicável	não aplicável
/T	P/ alta temperatura (até 200°C)	P/ alta temperatura (até 200°C)	não aplicável
/FN	Conexão elétrica com rosca NPT	Conexão elétrica com rosca NPT	não aplicável
/M5	não aplicável	não aplicável	Força mínima de atuação: 0,5 kgf
/X	não aplicável	não aplicável	Corpo em aço inoxidável
/C6C	Com sensor, 1NF, 0,2A x 10-60 Vcc	não aplicável	Com sensor, 1NF, 0,2A x 10-60 Vcc
/C6A1	não aplicável	não aplicável	Sem sensor, altura T1; furo 18 mm
/C6A2	não aplicável	não aplicável	Sem sensor, altura T1; furo 30 mm
/C6B1	não aplicável	não aplicável	Sem sensor, altura T2; furo 18 mm
/C6B2	não aplicável	não aplicável	Sem sensor, altura T2; furo 30 mm

Para obter o código do produto, adicione o(s) código(s) do(s) item(s) opcional(is) sequencialmente, após o código do produto padrão.

Ex: **FA-790 / C6 / i** (sonda c/contato 1NF tipo sensor indutivo e chapa de aço inox para proteção do diafragma)

Dimensões:

<p>Diagram showing dimensions for FA-790: Outer diameter Ø204, inner diameter Ø238, total height 110, mounting hole diameter Ø220, and a 3/4" Gas connection. It features 6 x Ø7 mounting holes.</p>	<p>Diagram showing dimensions for FA-792: Outer diameter Ø200, inner diameter Ø145, total height 110, mounting hole diameter Ø235, and a 3/4" Gas connection. It features 6 x Ø11 mounting holes.</p>	<p>Diagram showing dimensions for FL-795: Outer diameter Ø204, inner diameter Ø238, total height 110, mounting hole diameter Ø260, and a 3/4" Gas connection. It features 6 x Ø7 mounting holes and an inductive sensor with Ø18 or Ø30 diameter.</p>
FA-790	FA-792	FL-795

Os dados deste catálogo técnico podem ser alterados sem aviso prévio

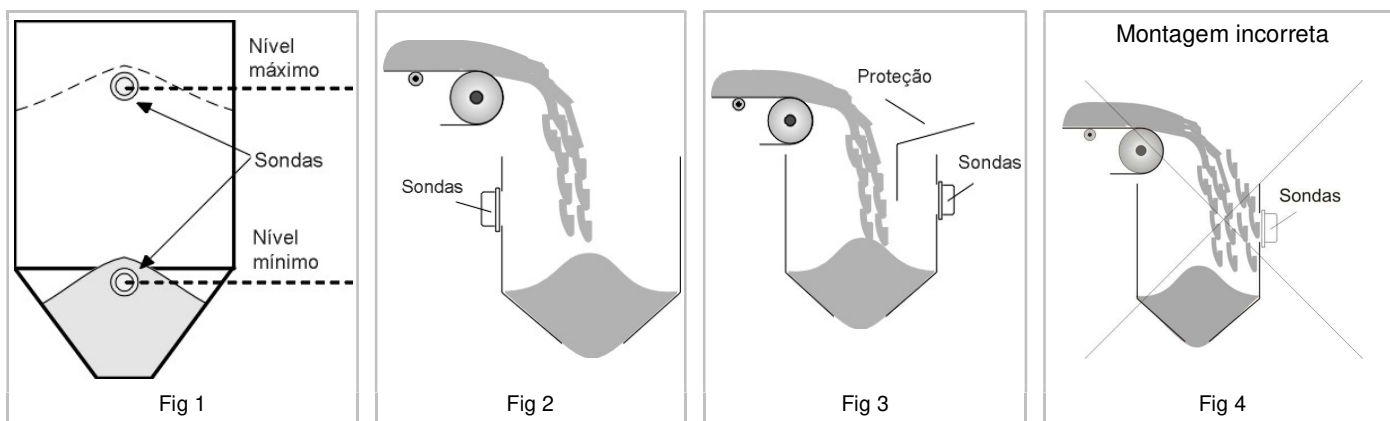
INSTRUÇÕES GERAIS

1 - Aplicação :

- As sondas de nível com acionamento por diafragma podem ser usadas basicamente na detecção de nível de silos e chutes de transportadores.
- A pressão do material sobre a cobertura de borracha da sonda desloca o mecanismo interno comutando o contato da sonda (FA-790 / FA-792) ou chaveando o sensor indutivo (FL-795).
- Para detecção de nível de produtos mais pesados, deve ser usada a sonda FA-790, cuja força mínima para acionamento é de cerca de 5 kg.
- Para detecção de nível de produtos leves, devem ser usadas as sondas FA-792 ou FL-795, cuja força mínima para acionamento é menor.
- Para detecção de nível de materiais muito brutos ou pontiagudos, recomenda-se a sonda FA-790/i, que possui uma chapa de aço inoxidável de proteção do diafragma e necessita de carga de cerca de 8 kg para acionar o contato.
- Para detecção de nível de materiais quentes, recomenda-se a sonda FA-790/T ou FA-792/T, que possui diafragma de silicone e suporta temperaturas de até 200° C.
- Não recomendamos o uso de sonda tipo diafragma para materiais aglutinantes e úmidos, que possam criar uma crosta sobre o diafragma, impedindo sua deflexão e acionamento do contato.

2 - Montagem das sondas :

- Podem ser usadas diversas sondas montadas ao longo do silo para indicar os diversos pontos de nível (fig.1).
- As sondas de diafragma devem ser montadas nas laterais dos silos ou chutes sem queda direta do material sobre elas (fig.2) ou com defletores para proteção contra impactos diretos (fig.3).

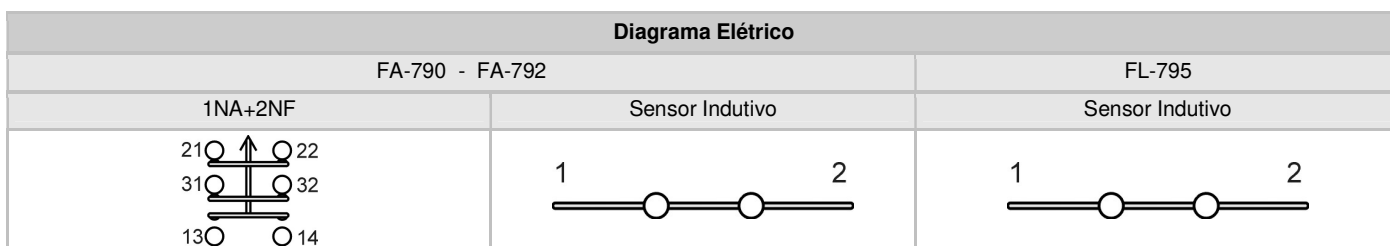


3 - Ligações elétricas :

- O sensor da sonda FL-795 é fornecido com cabo de 2 metros. O cabo possui dois, três ou quatro condutores dependendo do sensor usado. O diagrama elétrico do sensor está impresso em seu corpo.
- As sondas fornecidas com sensores exigem proteção mecânica para seus cabos, o que deve ser providenciado. Na extremidade do cabo deve ser colocada uma caixa com bornes para conexão à linha de controle e testes.
- Quando a sonda estiver próxima da central de controle, a fiação pode ser feita com cabos comuns. Para distâncias até 1000 metros, recomenda-se o uso de cabos blindados, separados dos cabos de força. Para distâncias ainda maiores, não devem ser usadas as sondas com sensores indutivos ou devem ser providenciados relés amplificadores montado próximo à sonda.
- As tubulações devem ser montadas de modo a não introduzir tensões na carcaça. Preferencialmente devem ser usadas ligações flexíveis. Em atmosferas muito poluídas, é aconselhável o uso de um selo junto à sonda.
- Os condutores devem ter uma seção de cobre máxima de 2 x 1,5 mm² (cabo com terminal).

4 - Manutenção :

- As peças móveis e molas são inoxidáveis e estão em condições de operar em regime normal por vários anos. Ocasionalmente deverão ser levadas à oficina para limpeza e lubrificação.
- As peças sobressalentes são fornecidas pela ELMEC. Para fazer a substituição, recomenda-se que a sonda seja levada a uma oficina apropriada.
- Opcionalmente, a sonda pode ser enviada à ELMEC para manutenção.



Os dados deste catálogo técnico podem ser alterados sem aviso prévio



EX-ZS 235-02Z-3D

- Snap action with constant contact pressure up to switching point
- Metal enclosure
- Wide range of alternative actuators
- Good resistance to oil and petroleum spirit
- 30 mm x 63,5 mm x 30 mm
- Actuator heads can be repositioned by 4 x 90°
- Mounting details to EN 50047
- 1 Cable entry M 20 x 1.5
- Ex-Zone 2 and 22

Data

Ordering data

Product type description	EX-ZS 235-02Z-3D
Article number (order number)	101214399
EAN (European Article Number)	4030661398570
eCl@ss number, version 12.0	27-27-26-01
eCl@ss number, version 11.0	27-27-26-01
eCl@ss number, version 9.0	27-27-26-01
ETIM number, version 7.0	EC000030
ETIM number, version 6.0	EC000030

Approvals - Standards

Certificates	ATEX (Konformitätserklärung)
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Explosion protection

Explosion protection: regulations	EN IEC 60079-0 EN IEC 60079-15 EN 60079-31
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Explosion protection zones	2 22
Explosion protection category	3G 3D
Explosion protection designation	⊕ II 3G Ex nC IIC T5 Gc X ⊕ II 3D Ex tc IIIC T90°C Dc X
Manufacturer declaration	ATEX Zone 2 and 22

General data

Standards	BG-GS-ET-15 EN IEC 60947-5-1
Housing construction form	Norm construction design
Actuator type to EN 50047	B
Housing material	Metal, zinc die-cast
Housing coating material	painted
Gross weight	195 g

General data - Features

Safety functions	Yes
Number of auxiliary contacts	0
Number of safety contacts	2

Safety classification

Standards	EN ISO 13849-1
Mission time	20 Year(s)

Safety classification - Safety outputs

B _{10D} Normally-closed contact (NC)	20,000,000 Operations
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Mechanical data

Actuating element	Plunger
-------------------	---------

Mechanical lifetime, minimum	20,000,000 Operations
Actuating force, minimum	9 N
Positive break force, minimum	19 N
Actuating speed, minimum	10 mm/min
Actuating speed, maximum	1 m/s

Mechanical data - Connection technique

Termination	Screw terminals M20 x 1.5
Cable cross-section of the cable glands, minimum	7 mm
Cable cross-section of the cable glands, maximum	12 mm
Cable section, minimum	0.75 mm ²
Cable section, maximum	2.5 mm ²
Note	All indications including the conductor ferrules.
Wire cross-section	13 AWG

Mechanical data - Dimensions

Length of sensor	30 mm
Width of sensor	30 mm
Height of sensor	75.5 mm

Ambient conditions

Degree of protection	IP67
Ambient temperature	-20 ... +60 °C

Ambient conditions - Insulation values

Rated insulation voltage U_i	500 V
Rated impulse withstand voltage U_{imp}	6 kV

Electrical data

Thermal test current	10 A
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Utilisation category AC-15	230 VAC
Utilisation category AC-15	4 A
Utilisation category DC-13	24 VDC
Utilisation category DC-13	1 A
Switching element	2 NC contact
Switching principle	Snap action
Bounce duration, maximum	3 ms
Maximale Schalthäufigkeit	5,000 /h
Switchover time, minimum	5.5 ms
Material of the contacts, electrical	Silver

Scope of delivery

Scope of delivery	Ex-certified screwed cable gland
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Pictures

Product picture (catalogue individual photo)



ID: k235sf01

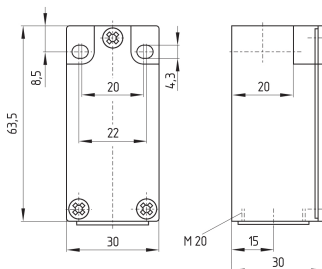
| 620.3 kB | .jpg | 352.778 x 668.867 mm - 1000 x 1896 px - 72 dpi

| 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

Dimensional drawing basic component



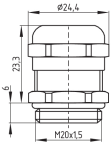
ID: k-235g01

| 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

Dimensional drawing basic component

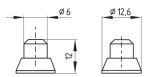


ID: 1xzm1g07

| 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

Dimensional drawing actuator



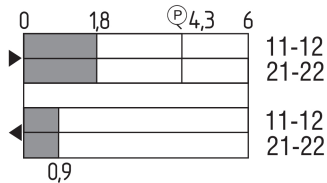
ID: 1s236g01

| 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

Switch travel diagram



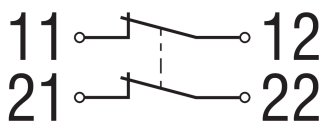
ID: kr235s11

| 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

Diagram



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

Schmersal Ltd., Sparrowhawk Close, WR14 1GL Malvern

The details and data referred to have been carefully checked. Images may diverge from original. Further technical data can be found in the manual. Technical amendments and errors possible.

Generated on: 03/12/2025, 16:00



ITEM 48 LOTE 3
LE282

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
Um dieses Datenblatt in Deutscher Sprache wenden Sie sich bitte anfordern info@idemsafety.com
Pour obtenir cette fiche en Français, veuillez contacter info@idemsafety.com
Para solicitar esta hoja de datos en Español, por favor contacto con info@idemsafety.com

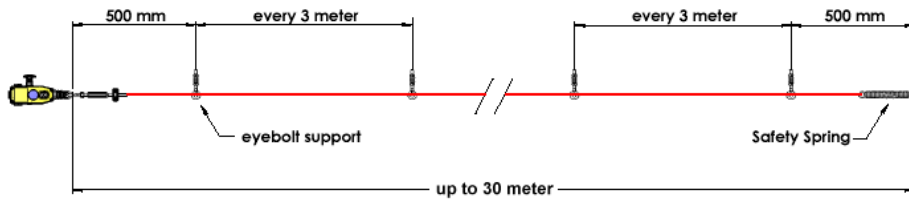


WARNING: DO NOT DEFEAT, TAMPER, OR BYPASS THE SAFETY FUNCTION. FAILURE TO DO SO CAN RESULT IN DEATH OR SERIOUS INJURY.

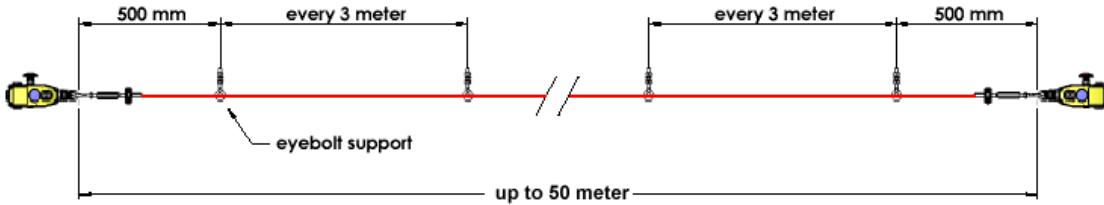
AVERTISSEMENT: NE PAS DESACTIVER, MODIFIER, RETIRER, OU CONTOURNER CETI INTERVERROUILLAGE IL PEUT EN RESULTER DES BLESSURES GRAVES DU PERSONNEL UTILISATEUR.

Safety Rope Switches from IDEM

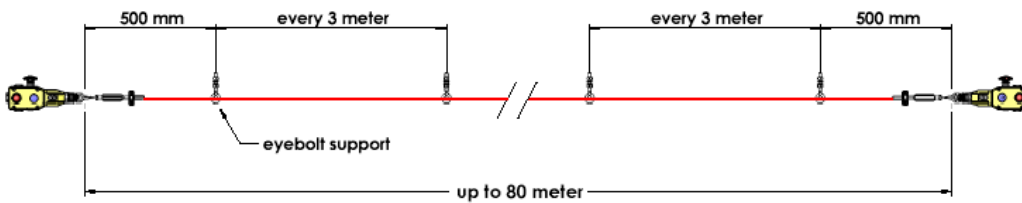
7. Recommended rope span options and fittings - (subject to an individual risk assessment for the installation):



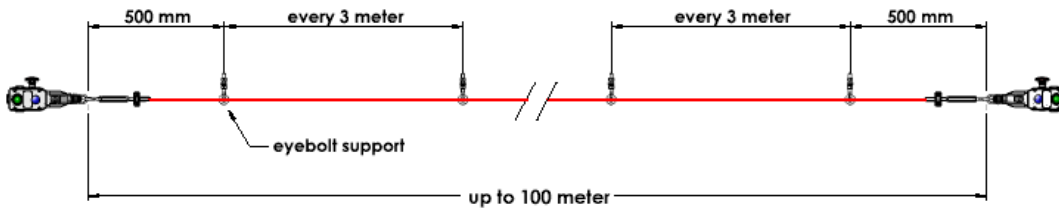
GLM 30m.
with Safety Spring



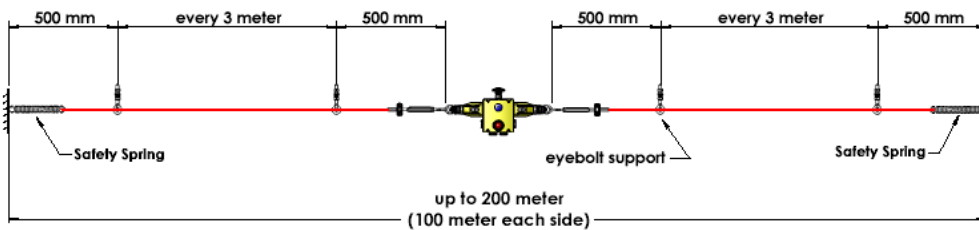
GLM 50m.



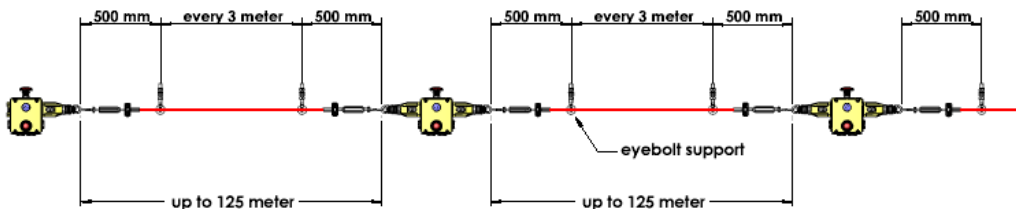
GLS 80m.



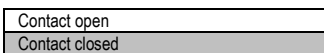
GLS-SS 100m.



GLHD 200m.
with Safety Springs



GLHD/L/R 250m.



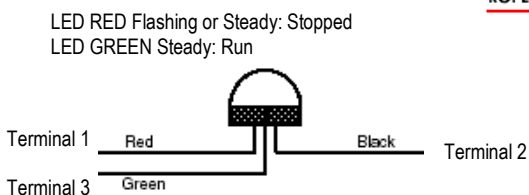
0mm 3.5mm 14.5mm 17.0mm

Typical operating conditions:

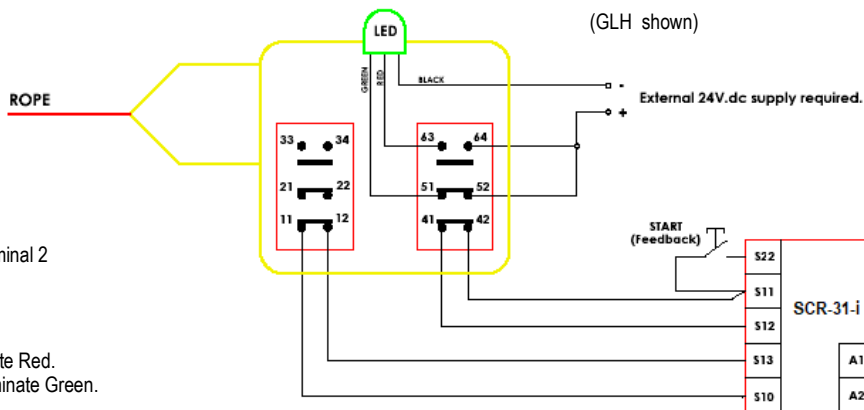
EX	2NC 1NO	3NC 1NO	2NC 2NO	4NC	4NC 2NO	Latched off – Rope Slack	Tension Range (Switch Reset)	Rope Pulled
NC	11/12	11/12	11/12	11/12	11/12			
	21/22	21/22	21/22	21/22	21/22			
		31/32		31/32	41/42			
NO	33/34	43/44	33/34	41/42	51/52			
			43/44		33/34			
					63/64			

Safety Rope Switches from IDEM

8. Wiring examples:

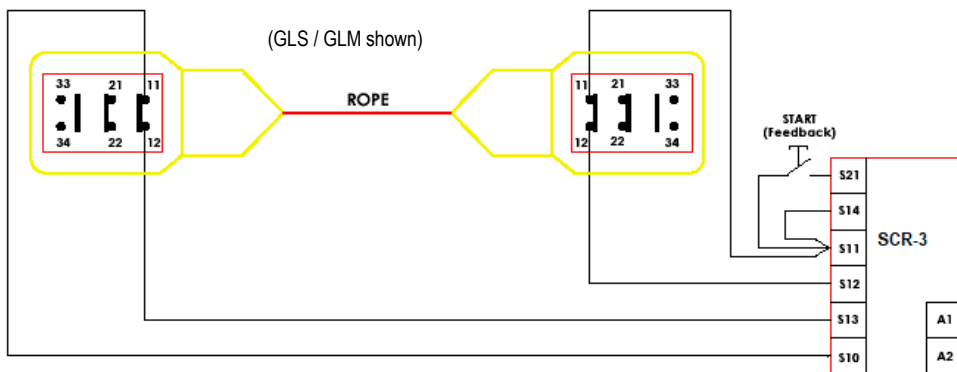
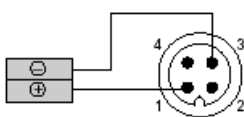


When power is applied to the Red wire, the lamp will illuminate Red.
When power is applied to the Green Wire, the Lamp will illuminate Green.
Black is 0V.dc or Neutral for 110Vac and 230Vac versions.



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

Standards:	IEC 60947-5- IEC60947-5-5 UL508 ISO13850 IEC 13849-1
Approvals:	cULus TUV
Mechanical Features:	
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 1/2" NPT by part number
Torque settings	Mounting M5 4.0 Nm Lid T20 Torx M4 1.5 Nm 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. GLHD 1320g. GLHL / R 1100g. GLS 880g. GLS-SS 1635g. 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 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 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 ⁶ 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 MTTFd 214 years

Information with regard to UL 508:

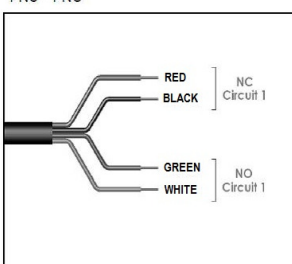
Type 1 Enclosures. Temperature rating 80C.
Use 16 - 12AWG copper conductors, rated 75°C only.
Intended for same polarity use and one polymeric conduit connection.
Electrical Rating: A300 240V.ac 3A. (6,000 cycles)
120V. 60A. Making 6A. Breaking PF >0.38 (100,000 cycles)
240V. 10A. carry only.
Wire range: 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:

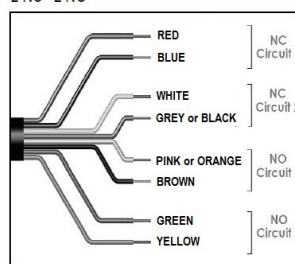
- Perpendicular Force to operate the switches midway between Eyebolt supports: Check <70N. Rope Deflection <300mm
- Axial Force - Direct along rope axis: <230N. (Typical 125N).

PRE-WIRED EX VERSIONS:

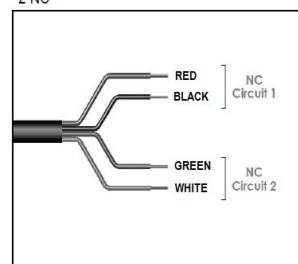
1 NC 1 NO



2 NC 2 NO



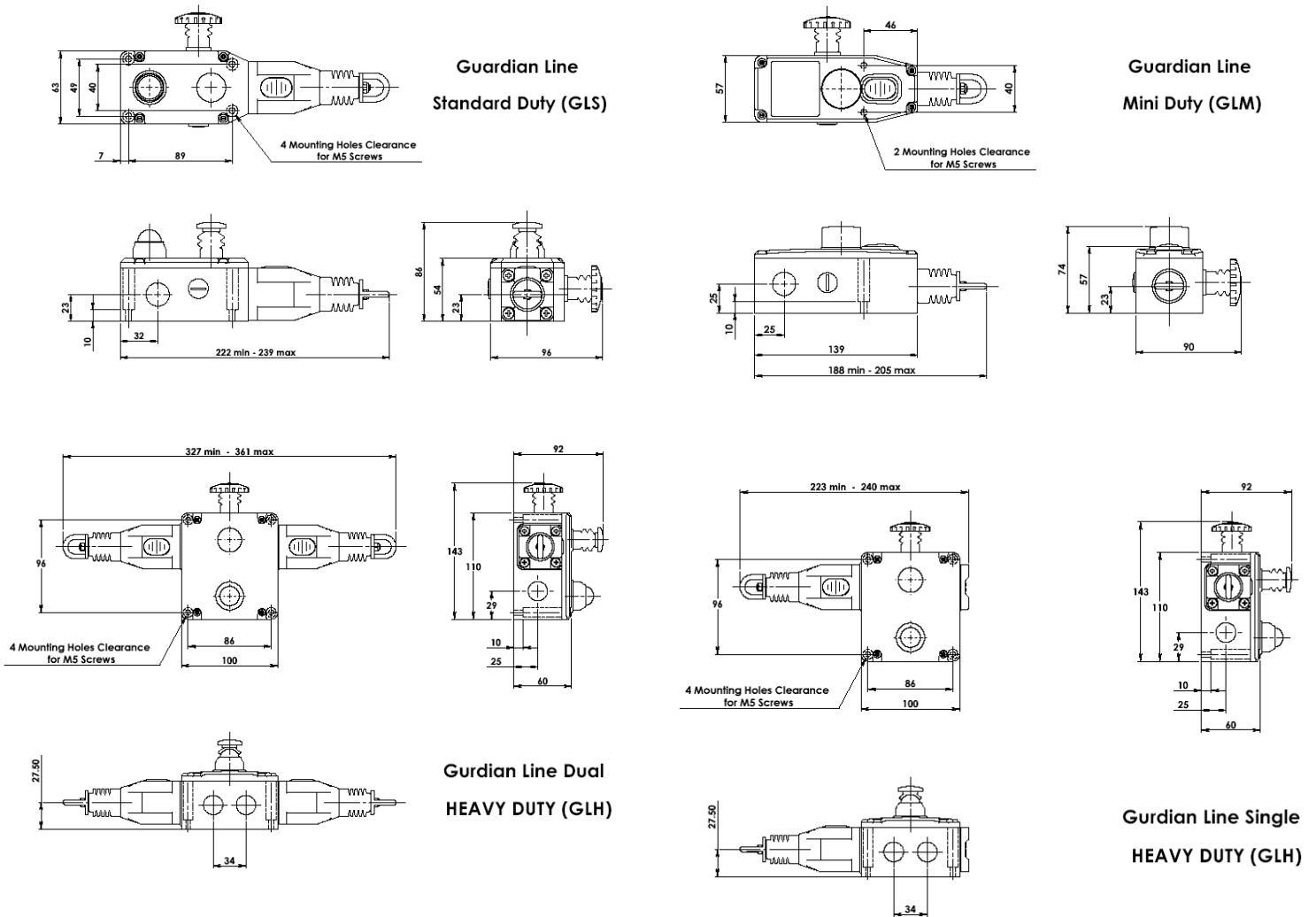
2 NC



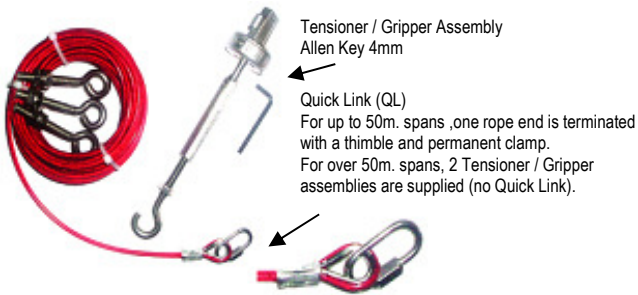
IMPORTANT- SPECIFIC CONDITIONS OF USE FOR EX VERSIONS:
THE INTEGRAL CABLE SHALL BE SUITABLY PROTECTED FROM PHYSICAL DAMAGE AND ABRASION.
THE INTEGRAL CABLE IS TO BE TERMINATED IN A SUITABLE TERMINAL FACILITY.

Safety Rope Switches from IDEM

11. Dimensions



12. Accessories



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	140020	Rope Tensioner / Gripper	Stainless Steel
		Rope Tensioner / Gripper	Galvanised Steel
140021	140064	77mm Long 40mm High Fixing Hole centres 20mm	Universal Pulley Stainless Steel
		Universal Pulley	Galvanised
140045	140046	84mm Long Thread length 51mm M8 x 1.25	Eyebolt Stainless Steel
		Eyebolt	Galvanised
Standard Bezel	S/Steel Bezel	LED Green / Flashing Red	24V. dc.
140042-A	140042-A-SS	LED Green / Flashing Red	110-120V. ac.
140042-B	140042-B-SS	LED Green / Flashing Red	230V. ac.
140042-C	140042-C-SS	LED Steady Green/Steady Red	24V. dc.
140132-AS	140132-AS-SS	LED Steady Green/Steady Red	110-120V. ac.
140132-BS	140132-BS-SS	LED Steady Green/Steady Red	230V. ac.
140132-CS	140132-CS-SS		
140044	140144	E-Stop Mechanism – Standard	
		E-Stop Mechanism – Stainless Steel	
140043		Safety Spring	220mm long





Chave de Emergência GLHD 141001A -Chave de tração em aço fundido, para 250m, com botão de emergência, rearme e led

Idem Safety

Chave de Emergência para cabo tracionado, até 250m, com indicador de tração, botão de emergência, reset manual e led bicolor, corpo robusto e em aço fundido pintado em amarelo, IP67.

Chave de Emergência GLHD 141001A

A chave de emergência **GLHD** é um interruptor que trabalha com o acionamento manual de um cabo tracionado, sendo que quando o cabo perde a tração (cabo rompido) ou ganha uma tração maior (atuação manual), a segurança é ativada comutando seus contatos elétricos.

Trabalha monitorando uma distância de 200m para aplicação de uma única chave, ou até 250m aplicando três chaves em conjunto.

Para aplicação em grandes transportadores de correia e de roletes, linhas de produção compartilhadas e sistemas análogos.

Design extremamente robusto, sendo confeccionada em aço fundido com partes em inox para aplicações pesadas e poeirentas, apresentando grau de proteção IP67.

A conexão elétrica do dispositivo pode ser feita através entrada M20 e conexão a parafuso ou com conector M23x12 pinos.

Nas aplicações de segurança apresenta categoria de segurança PLe/CAT.4, conforme ISO 13849-1.

Características

Modelo	GLHD 141001A
Código de Compra	40003185
Contatos elétricos	4NF + 2NA
Conexão elétrica	A parafuso, entrada M20
Opcional	Botão de Emergência e Led bicolor 24Vcc (Vm Piscante)

Dados Técnicos

Normas:	IEC 60947-5- IEC60947-5-5 UL508 ISO13850 IEC 13849-1
Certificação	cULus TUV
Elétrico	
Tipo de contato de segurança	IEC 60947-5-1 Duplo com ruptura positiva
Material de contato	Prata
Terminais	Para condutores de até 2,5 mm ²
Classificação	Categoria de Utilização: AC15
Classificação Operacional	AC15 A300 240V 3A / 120V 6A 24Vcc 2.5A (indutivo)
Corrente térmica (Ith)	10A
Tensão nominal de isolamento (Ui)	500V
Tensão suportável (Uimp)	2500V
Proteção contra sobrecarga e curto-circuito	Fusível externamente 10A. (FF)

Contatos opcionais à prova de explosão

Tipo	Chave interna IDEM LS-EX
Número do certificado CE	Baseefa11ATEX0267X
Número do certificado IEC	IECEX BAS11.0133X
Classificação	Ex d IIC T6 (-20C Ta 60C) Gb Ex IIIC T85C (-20C Ta 60C) Db
Zonas	1, 21, 2, 22
Tensão nominal	250V ca/cc
Corrente nominal	2 pólos 4A 4 pólos 2.5A

Classificação de segurança e dados de confiabilidade

Confiabilidade mecânica	1,5 x 10 ⁶ operações com carga de 100mA
ISO 13849-1	até categoria 4 com relé de segurança
ISO 13849-1	até PLe, dependendo da arquitetura do sistema
EN 62061	até SIL3, dependendo da arquitetura do sistema
Dados de segurança – uso anual MTTFd	8 ciclos por hora / 24 horas por dia / 365 dias 214 anos

Características Mecânicas

Gabinete/Tampa	Aço Fundido – Pintado amarelo
Peças externas	Aço inoxidável
Grau de proteção	IP67
Vãos de corda	Até 250m (3 interruptores), 200m (1 interruptor)
Dispositivo de tensão da corda	Tensor/Pinça IDEM, Fixação Rápida
Tipo de corda:	Diâmetro externo de 4,0 mm, Interior em aço galvanizado, Revestimento em PVC
Montagem	4 x M5

Posição de montagem

Entrada de conduíte	4 x M20, 4 x ½" NPT ou 1 x M23 / 12 polos
Configurações de torque	Montagem M5 4,0 Nm Tampa T20 Torx M4 1,5 Nm Terminais 1,0 Nm
Temperatura ambiente	-25C...80C (-40C Versões -FZ)
Resistência à vibração	10-500Hz 0.35mm
Resistência ao choque	15g 11ms
Força de tensão (configuração típica)	130N
Força de operação típica (corda puxada)	<125N. Deflexão <300mm



EX-ZQ 900-22-3D

- 3 Entradas de condutor M 20 x 1.5
- Zona Ex 22
- invólucro metálico
- Botão de rearme
- Indicação de posicionamento
- Tipo reforçado
- amplo espaço para conexões
- A prova de inversão
- Colar de vedação externo
- Accionamento por tracção ou ruptura do cabo
- Actuação unilateral / comprimento do cabo até 75 m

Dados

Dados para encomenda

Descrição do tipo de produtos	EX-ZQ 900-22-3D
Número de artigo (Número de encomenda)	101212892
EAN (European Article Number)	4030661402130
Número eCI@ss, versão 12.0	27-37-12-01
Número eCI@ss, versão 11.0	27-37-12-01
Número eCI@ss, versão 9.0	27-37-12-01
Número ETIM, versão 7.0	EC002033
Número ETIM, versão 6.0	EC002033

Proteção contra explosão

Proteção contra explosões: Instruções	EN IEC 60079-0 EN 60079-31
Proteção contra explosões- zonas	22
Proteção contra explosões- categoria de comando	3D
Proteção contra explosões- características	⊕D II 3D Ex tc IIIC T100°C Dc

Propriedades globais

Instruções	EN ISO 13850 EN IEC 60947-5-1 EN IEC 60947-5-5
Material do invólucro	Filme metálico, zinco fundido sob pressão

Material do revestimento do compartimento	pintura de fábrica
Material da tampa do invólucro	Aço
Comprimento do cabo, máximo	75 m
Peso bruto	1 470 g

Propriedades globais - Características

Número de contactos auxiliares	2
Número de contactos de segurança	2

Classificação

Certificados	EN ISO 13849-1
Vida útil	20 Jahr(e)

Classificação - saídas de segurança

B _{10D} Contacto normalmente fechado (NC)	100 000 Schaltspiele
--	----------------------

Dados mecânicos

Resistência mecânica, Mínimo	1 000 000 Schaltspiele
Força de acionamento, máximo	200 N
Percurso de atuação	400 mm

Dados mecânicos - Tecnologia conectiva

Tipo de conexão	Ligação por parafuso M20 x 1.5
Secção do cabo, mínimo	7 mm
Secção do cabo, máximo	12 mm
Secção dos cabos de conexão, mínimo	0,75 mm ²
Secção dos cabos de conexão, máximo	2,5 mm ²
Orientação	Todas as especificações incluindo ponteiros de cabo.

Dados mecânicos - dimensões

Comprimento de sensor	57 mm
Largura de sensor	71,5 mm
Altura do sensor, mínimo {mm}	221 mm

Altura do sensor, máximo {mm} 237 mm

Ambiente

Tipo de proteção IP67
Temperatura ambiente -20 ... +55 °C
Humidade relativa, mínimo 30 %
Humidade relativa, máximo 95 %

Ambiente - Parâmetros de isolamento

Tensão calculada de isolamento U_i 500 V
Medição da rigidez dielétrica da tensão máxima U_{imp} 6 kV

Dados elétricos

Corrente de ensaio térmico 4 A
Categoria de aplicação AC-15 230 VAC
Categoria de aplicação AC-15 4 A
Categoria de aplicação DC-13 24 VDC
Categoria de aplicação DC-13 1 A
Elemento de comutação Contacto normalmente fechado/contacto normalmente aberto (NA/NO)
Princípio de comutação Comutação de ação rápida
Material dos contactos, elétrico Prata

Escopo do fornecimento

Escopo do fornecimento Incluindo bucin e ficha com certificação EX

Orientação

Orientação (geral) Para cabos com comprimentos superiores a 10 m, devemos dispor suportes de cabo a cada 3 a 5 m.
Comprimento recomendado para o cabo usado em conjunto com interruptores de paragens de emergência quando há interdependência com a temperatura ambiente
Como os olhais são deformados sob carga, eles devem ser puxados com força várias vezes após a montagem. Depois deve-se tensionar o cabo de novo com os parafusos ou tensores.

Código de componentes

Descrição do tipo de produtos:
EX-ZQ 900 -(1)-3D

(1)

11	1 contacto normalmente aberto (NA) / 1 normalmente fechado (NF)
13	1 contacto normalmente aberto (NA) / 3 normalmente fechado (NF)
22	2 contacto normalmente aberto (NA) / 2 normalmente fechado (NF)
02	2 normalmente fechado (NF)
04	4 normalmente fechado (NF)

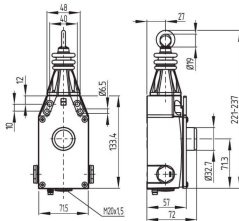
Imagens

Foto do produto (foto individual do catálogo)



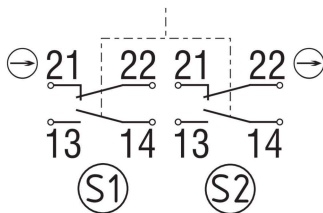
ID: kxzq9f01
| 564,6 kB | .jpg | 215.9 x 529.167 mm - 612 x 1500 px - 72 dpi
| 103,2 kB | .png | 74.083 x 181.681 mm - 210 x 515 px - 72 dpi
| 30,4 kB | .jpg | 50.447 x 123.472 mm - 143 x 350 px - 72 dpi

Desenho dimensional componente básico



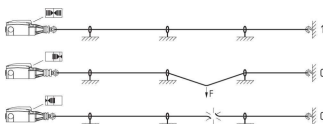
ID: 1xzq9g01
| 120,0 kB | .cdr |
| 12,4 kB | .png | 74.083 x 51.506 mm - 210 x 146 px - 72 dpi
| 133,1 kB | .jpg | 352.778 x 245.181 mm - 1000 x 695 px - 72 dpi

Diagrama



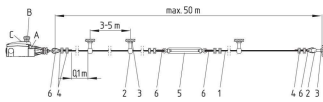
ID: ktf--k12
| 17,9 kB | .cdr |
| 101,3 kB | .jpg | 352.778 x 228.953 mm - 1000 x 649 px - 72 dpi
| 4,1 kB | .png | 74.083 x 47.978 mm - 210 x 136 px - 72 dpi

Princípio operacional



ID: kzq90a05
| 67,9 kB | .cdr |
| 66,9 kB | .jpg | 352.778 x 130.528 mm - 1000 x 370 px - 72 dpi
| 1,5 kB | .png | 74.083 x 27.517 mm - 210 x 78 px - 72 dpi

Princípio operacional



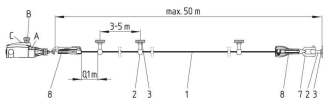
ID: kzq90a04

| 64,8 kB | .cdr |

| 61,8 kB | .jpg | 352.778 x 99.131 mm - 1000 x 281 px - 72 dpi

| 4,9 kB | .png | 74.083 x 20.814 mm - 210 x 59 px - 72 dpi

Princípio operacional



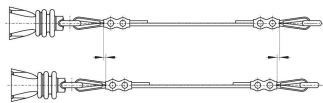
ID: kzq90a08

| 155,1 kB | .cdr |

| 54,9 kB | .jpg | 352.778 x 99.131 mm - 1000 x 281 px - 72 dpi

| 4,4 kB | .png | 74.083 x 20.814 mm - 210 x 59 px - 72 dpi

Princípio operacional



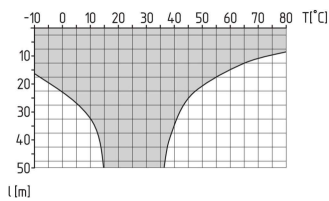
ID: kzq90a03

| 28,7 kB | .cdr |

| 74,1 kB | .jpg | 352.778 x 103.011 mm - 1000 x 292 px - 72 dpi

| 1,7 kB | .png | 74.083 x 21.519 mm - 210 x 61 px - 72 dpi

Curva de característica



ID: kzs73d01

| 33,4 kB | .cdr |

| 2,9 kB | .png | 74.083 x 43.744 mm - 210 x 124 px - 72 dpi

| 118,0 kB | .jpg | 352.778 x 208.139 mm - 1000 x 590 px - 72 dpi

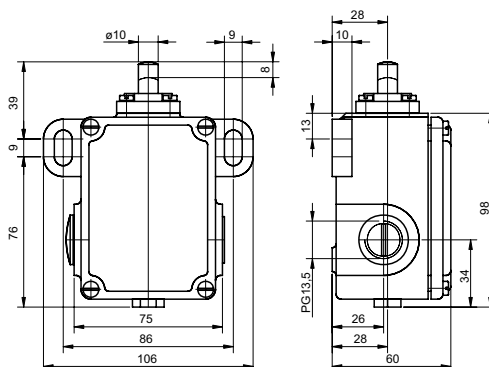
ACE Schmersal Eletroeletrônica Ind. Ltda, Av. Brasil, nº 815, Jardim Esplanada – CEP 18557-646 Boituva/SP
Os dados e informações anteriores foram verificados cuidadosamente. As imagens podem ser diferentes do original. Mais informações técnicas podem ser encontradas nos manuais de instruções. Sujeito a modificações técnicas e erros.
Gerado em 15/08/2024 12:34

Chave Fim de Curso 441



Dados Técnicos

Propriedades	
Normas	IEC 60947-5-1, ABNT NBR IEC 60529-0
Materiais	
Material dos invólucros	Alumínio SAE 306 Coquilhado
Material dos contatos	Prata
Dados mecânicos	
Design da conexão elétrica	Conexão por parafuso
Bitola de conexão	
Bitola de conexão mín.	1 x 0,75 mm ²
Bitola de conexão máx.	1 x 2,5 mm ²
Resistência mecânica	(M) 5.000.000 operações (T) 10.000.000 operações
Frequência de acionamento	Máx. 3.000 h
Entrada dos cabos	2 prensa-cabos Pg 13,5
Ambiente	
Temperatura ambiente mínima	-30°C
Temperatura ambiente máxima	+90°C
Tipo de proteção	IP65
Dados elétricos	
Tipo de contato	Pontes de contatos independentes
Medição da rigidez dielétrica da tensão máxima U_{imp}	6 kV
Medição de isolamento da tensão U_i	500 V
Corrente de ensaio térmico I_{the}	16A
Categoria de aplicação	AC-15
Corrente / Tensão operação I_e / e_u	4A/400 Vac
Resistência a curto-circuito	16A (com retardo); 25A (sem retardo)
Distância de abertura do contato	Ação rápida (M) máx. 2 x 2,5 mm Impulso (T) máx. 2 x 6 mm
Tempo de chaveamento	Chaveamento por ação rápida <= 35ms Chaveamento por impulso dependente da velocidade do came



Detalhes de encomenda

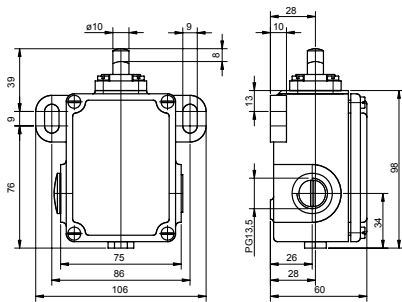
(1)(2) 441 (3)(4)

Nº	Opção	Descrição
(1)	M	Comutação por ação rápida
	T	Comutação por impulso
(2)	S	Pistão metálico
	K	Alavanca com roldana em nylon
	2C	Alavanca em "V" pequena metálica com trava
	3C	Alavanca em "V" grande metálica com trava
	ML	Alavanca pequena com roldana em nylon
	MD	Alavanca grande com roldana em nylon
	MR	Pistão com roldana em nylon
(3)	MV	Rolete em poliuretano
	MAF	Haste em mola metálica
	11	1 NA / 1NF
(4)	20	NA
	2	NF
(4)	y	IP65

Características especiais

Quando a aplicação for em altas temperaturas considere	Chave por acionamento impulso (T)=200°C indicar no final do código do produto Chave por acionamento rápido (M)=150°C indicar no final do código do produto
Sinalização por LED opcional	24Vcc, 125Vca, 220Vca
Tamanho dos roletes disponíveis	60 mm, 80 mm ou 120 mm (poliuretano) Para versões em aço carbono ou inox, consulte nossa engenharia de aplicação

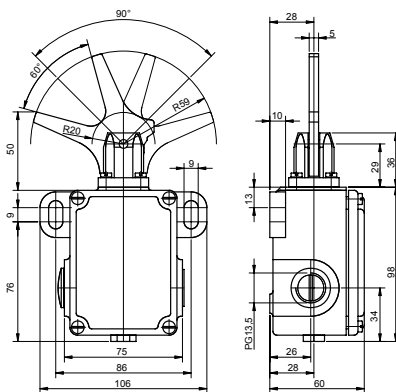
Pistão metálico



Tipos de contatos

Chaves de deslocamento / Contatos	Comutação por ação rápida (M)	Comutação por impulso (T)
1NA + 1NF	<p>MS 441 11y</p>	<p>TS 441 11y</p>
2NA		<p>TS 441 20y</p>
2NF		<p>TS 441 02y</p>

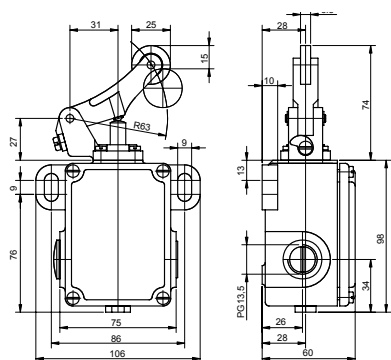
Alavanca em "V" pequena e metálica com trava



Tipos de contatos

Chaves de deslocamento / Contatos	Comutação por ação rápida (M)	Comutação por impulso (T)
1NA + 1NF	<p>M2C 441 11y</p>	<p>T2C 441 11y</p>
2NA		<p>T2C 441 20y</p>
2NF		<p>T2C 441 02y</p>

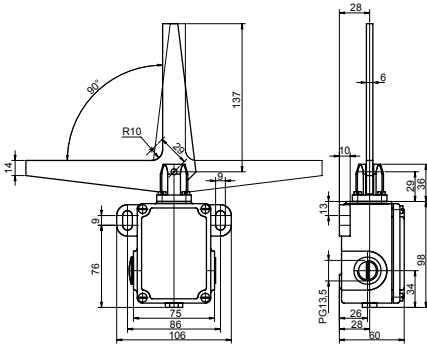
Pistão com roldana em nylon



Tipos de contatos

Chaves de deslocamento / Contatos	Comutação por ação rápida (M)	Comutação por impulso (T)
1NA + 1NF	<p>MK 441 11y</p>	<p>TK 441 11y</p>
2NA		<p>TK 441 20y</p>
2NF		<p>TK 441 02y</p>

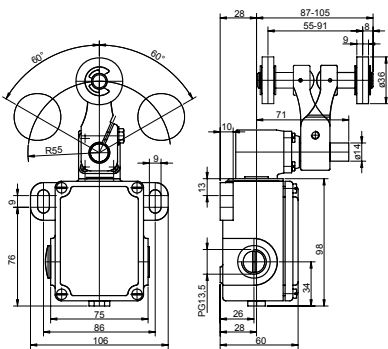
Alavanca em "V" grande metálica com trava



Tipos de contatos

Chaves de deslocamento / Contatos	Comutação por ação rápida (M)	Comutação por impulso (T)
1NA + 1NF	<p>M3C 461 22y</p>	<p>T3C 461 22y</p>
2NA		<p>T3C 461 40y</p>
2NF		<p>T3C 461 04y</p>

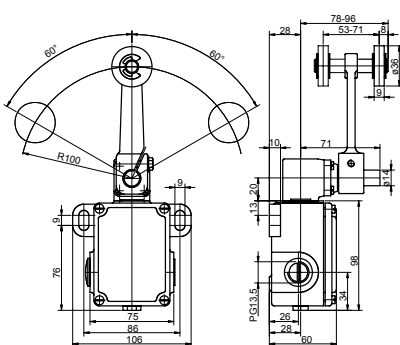
Alavanca pequena com roldana em nylon



Tipos de contatos

Chaves de deslocamento / Contatos	Comutação por ação rápida (M)	Comutação por impulso (T)
1NA + 1NF	<p>ML 441 11y</p>	<p>TL 441 11y</p>
2NA		<p>TL 441 20y</p>
2NF		<p>TL 441 02y</p>

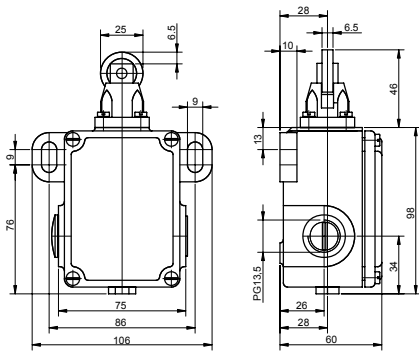
Alavanca grande com roldana em nylon



Tipos de contatos

Chaves de deslocamento / Contatos	Comutação por ação rápida (M)	Comutação por impulso (T)
1NA + 1NF	<p>MD 441 11y</p>	<p>TD 441 11y</p>
2NA		<p>TD 441 20y</p>
2NF		<p>TD 441 02y</p>

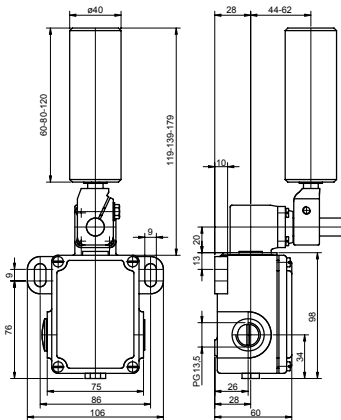
Pistão com roldana em nylon



Tipos de contatos

Chaves de deslocamento / Contatos	Comutação por ação rápida (M)	Comutação por impulso (T)
1NA + 1NF	<p>MR 441 11y</p>	<p>TR 441 11y</p>
2NA		<p>TR 441 20y</p>
2NF		<p>TR 441 02y</p>

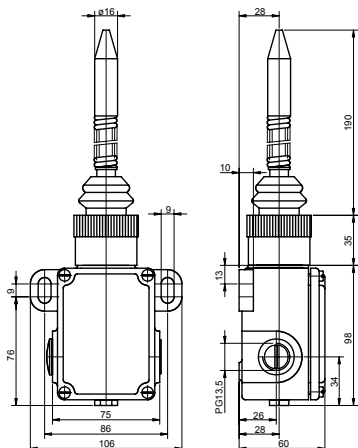
Rolete em poliuretano



Tipos de contatos

Chaves de deslocamento / Contatos	Comutação por ação rápida (M)	Comutação por impulso (T)
1NA + 1NF	<p>MV12H 441 11y</p>	<p>TV12H 441 11y</p>
2NA		<p>TV12H 441 20y</p>
2NF		<p>TV12H 441 02y</p>

Haste em mola metálica



Tipos de contatos

Chaves de deslocamento / Contatos	Comutação por ação rápida (M)
1NA + 1NF	<p>MAF 441 11y</p>



Foto Ilustrativa

ZV12HI 500 Rolote em aço inoxidável

- Para ambientes agressivos
- Fabricação Nacional

Dados

Dados para encomenda

Descrição: ZV12HI 500 11/11Y DIR
Part Number: 186581

Dados Gerais

Material involucro: Alumínio SAE 306 Coquilhado
Material dos contatos: Prata
Material do rolete: Aço Inoxidável
Posição da alavanca: Direito
Característica: Com ruptura positiva
Peso: 2600g
Resistência mecânica: 200.000 comutações a um ângulo máximo de 60°
Frequência de acionamento: Max. 1.000 h
Entrada dos cabos: 1x prensa-cabo 3/4" NPT

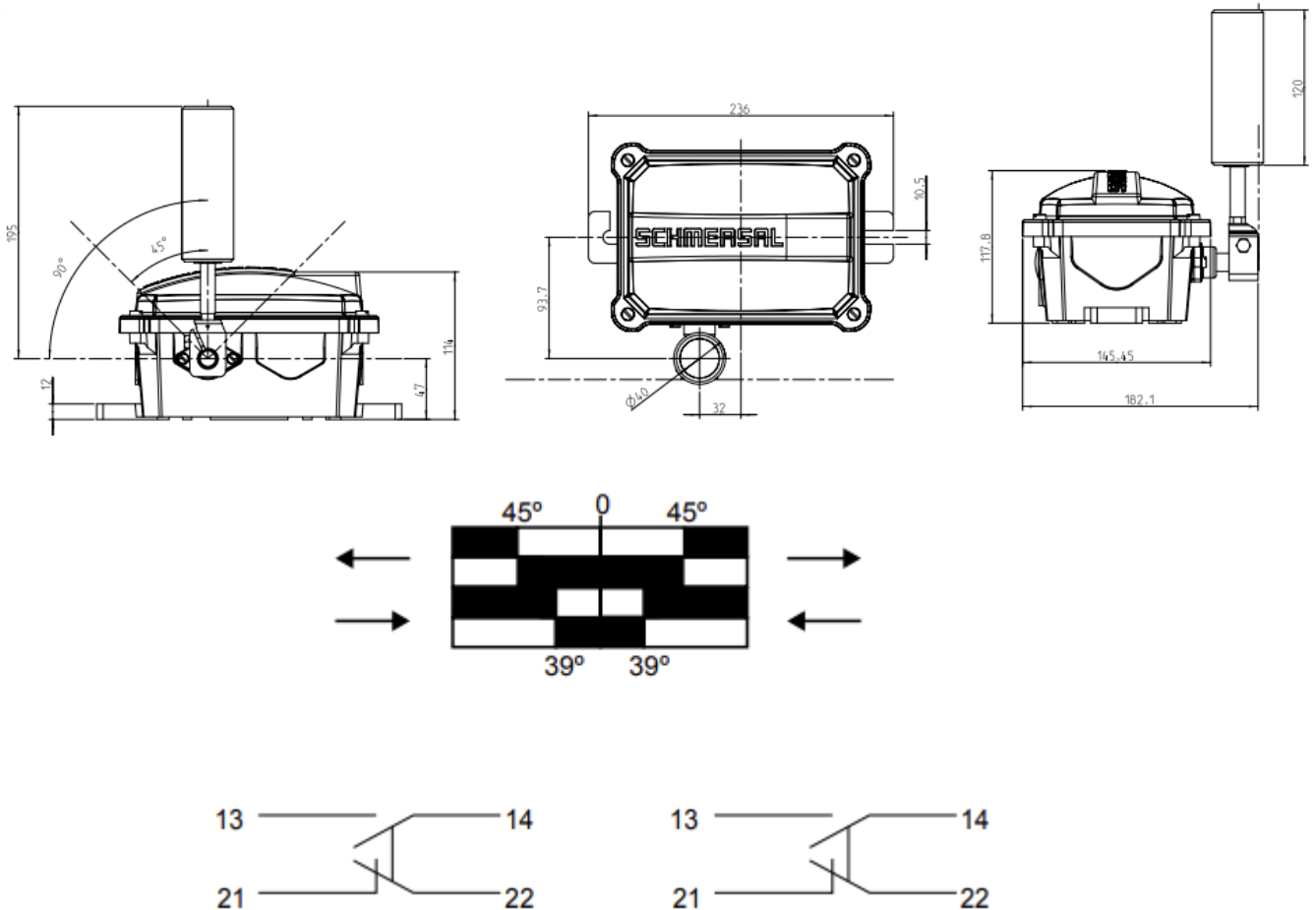
Ambiente

Temperatura de trabalho:
- Temperatura ambiente mínima - 30°C
- Temperatura ambiente máxima + 80°C
Grau de proteção: IP 65

Dados Elétricos

Número de contatos:	2na+2nf
Rigidez dielétrica da tensão máxima Uimp:	6 kV
Isolação da tensão Ui:	500V
Ensaio térmico:	10A
Categoria de aplicação:	AC-15
Proteção contra curto-circuito:	6 A gG fusível D de acordo DIN EN 60269-1
Corrente / Tensão de Operação:	4A / 230Vac; 2,5A / 400Vac; 1A / 500Vac;
Resistência a curto-circuito:	10A (com retardo); 16A(sem retardo); 6A (com retardo) como chave de posicionamento com ruptura positiva

Desenho



ITEM 52 LOTE 3
LE282



Câmera IP

- » Resolução 2 megapixels (1080p)
- » Alimentação PoE Ativo (IEE 802.3af)
- » Alcance LED de 20m
- » ROI (Região de Interesse)
- » Índice de proteção IP67



RESOLUÇÃO IP



FULL COLOR



COMPRESSÃO DE VÍDEO



POWER OVER ETHERNET



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.

Especificações técnicas

VIP 1220 B Full Color G4

VIP 1220 D Full Color G4

Sensor de imagem	1/2.8" 2 megapixels CMOS
Obturador eletrônico	Automático Manual: 1/3s ~ 1/100.000s
Pixels efetivos	1920 (H) × 1080 (V)
Iluminação mínima	0,005 lux/F1.6 (Colorido, 1/3s, 30IRE) 0 lux/F2.0 (IR ligado)
Relação sinal-ruído	>56 dB
Controle de ganho	Automático/ Manual
Balço do branco	Automático/ Natural / Externo Automático / Exterior / Manual / Personalizado
Compensação de luz de fundo	BLC/ HLC/ DWDR (60dB)
Perfil Dia & Noite	Colorido/ Preto e Branco
Modos de vídeo	Colorido/ Preto e Branco

Detecção de vídeo	Até 4 regiões de detecção	
LED	1 unidade	
Controle de LED	Automático/ Manual (ON/OFF)	
Lente		
Distância focal	3.6mm	2.8 mm
Abertura máxima	F2.0	
Ângulo de visão	H: 88° / V: 46°	H: 106° / V: 56°
Tipo de lente	Fixa	
LED inteligente	Sim	
Tipo de montagem	Montada em placa	
Vídeo		
Quantidade de streams	2	
Compressão de vídeo	H.264/ H.264B/ H.264H/ H.265/ MJPEG ¹	
Compressão Inteligente	Sim	
Resolução de imagem	2MP (1920x1080) / 16:9 1.3M (1280x960) / 4:3 1M (1280x720) / 16:9 D1 (704x480) / 22:15 VGA (640x480) / 4:3 CIF (352x240) / 22:15	
Foto	Até 1 foto por segundo	
Formato do vídeo	NTSC	
Taxa de bit	H.264: 32 kbps a 6144 kbps H.265: 12 kbps a 6400 kbps	
Taxa de frames	1 ~ 30 FPS	
Análise de Vídeo		
Detecção de movimento	Até 4 áreas ²	
Região de interesse	Até 4 áreas	
Máscara de vídeo	Sim	
Rede		
Interface	RJ45 (10/100BASE-T)	
Throughput Máximo	25 Mbps	

Protocolos e serviços suportados	TCP/IP, UDP, IPv4, IPv6, DHCP, ARP, ICMP, DNS, DDNS, RTSP, RTCP, HTTPs, HTTP, Filtro IP, SMTP, SSL, TLS, IGMP, Multicast, FTP, NTP, UPnP, RTP, Onvif, Intelbras Cloud, RTMP e Intelbras -1 ³
Onvif	Perfil S e T
Serviços DDNS	Intelbras DDNS, DDNS No-IP®, DynDNS®
Configuração de nível de acesso	Acesso a múltiplos usuários (máximo de 20) com proteção por senha ⁴
Navegador	Internet Explorer® ⁵ , Google Chrome e Firefox
Aplicações e monitoramento	Interface Web, Intelbras SIM Next, Intelbras IP Utility, ISIC e Defense IA

Características Complementares

Ajuste de imagem	Brilho/ Contraste/ Saturação/ Nitidez/ Gama
Função espelho	Rotação Horizontal
Rotação de imagem	0°/ 90°/ 180°/ 270°
Idiomas do menu OSD	Português, Inglês e Espanhol
Redução digital de ruído	3D – ajustável (DNR)
Funções inteligentes	Mascaramento Detecção de movimento Área de interesse

Conexões

Saída de vídeo	Conector RJ – 45 Ethernet (8P8C)
Alimentação	Conector P4 fêmea

Características Elétricas

Consumo máximo de potência	< 4,8 W	< 4,2 W
Alimentação	12 Vdc, Poe Ativo (802.3af)	
Proteção anti-surto	15 kV (vídeo e alimentação)	

Características Mecânicas

Dimensões (A x Ø)	162,6 x 70 mm	85,5 x 109 mm
Peso	300 g	360 g
Cor do case	Preto (Tampa frontal) e Branco (gabinete traseiro)	Branco
Tipo case/material	Liga de Alumínio ADC12 (tampa frontal) e Plástico de Policarbonato (gabinete traseiro) ⁷	
Grau de proteção	IP67	
Local de instalação	Interno e externo	

Características Ambientais

Temperatura de operação - 30 à 60 °C

Umidade relativa de operação < 95 % RH

Certificações

FCC Parte 15, classe B

CE EN 60950 : 2000

¹ Disponível apenas no stream extra

² Para garantir o correto funcionamento da detecção de movimento utilizar o protocolo Intelbras-1.

³ 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.

⁴ Não compatível com os NVRs modelos NVD 3000 e NVD 3000-P.

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.

⁵ A compatibilidade pode variar conforme a versão do navegador.

⁶ Devido implementações de segurança na comunicação da câmera com os gravadores Intelbras, não serão compatíveis com gravadores Intelbras que possuem versão de firmware de 2017 ou anterior. Para maiores informações, favor consultar o suporte técnico.

⁷ Verifique se o seu cenário não reage com esses compostos do gabinete.

Conheça também:



NVD 3116 P com HD WD Purple



HDs WD Purple

ITEM 53 LOTE 3
LE282



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



COMPRESSÃO DE VÍDEO



INTELIGÊNCIA ARTIFICIAL



MICROFONE EMBUTIDO

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

Sensor de imagem	4 Megapixels 1/3" CMOS Starlight	
Obturador eletrônico	Automático / Manual (1/3s ~ 1/100000s)	
Pixels efetivos	2688 (H) x 1520 (V)	
Sensibilidade	0.005 Lux /F1.5 (Colorido, 30 IRE) 0.0005 Lux /F1.5 (P&B, 30 IRE) 0 Lux (P&B, IR ligado)	
Relação sinal-ruído	> 56 dB	
Infravermelho ¹	Filtro de infravermelho com atuador eletromecânico	
Distância máxima do infravermelho	60 metros	40 metros
Alcance de Pan/Tilt/Rotação	Pan: 0° a 360° Tilt: 0° a 90° Rotação: 0° a 360°	Pan: 0° a 355° Tilt: 0° a 80° Rotação: 0° a 355°
Controle do foco	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° Vertical: 54° a 16° Diagonal: 125° a 33				
DORI ²	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 ³

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 ⁴
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 ⁵
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); 1080p (1920 × 1080); 1.3M(1280 × 960); 720p (1280 × 720); D1 (704 × 576/704×480); 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) Stream extra 1: 704 × 576 (1 - 25 fps) / 704 x 480 (1 - 30 fps) Stream extra 2: 1920 × 1080 (1 - 25/30 fps) 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 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)
Balço 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 ⁶
Throughput Máximo (Cabo)	70 Mbps
Armazenamento	Cartão micro-SD de até 256 GB (vendido separadamente), FTP, SFTP, NAS
Navegadores	Microsoft Edge®, Chrome® e Firefox® ⁷
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	

Alimentação	12 VDC (tolerância de ±25%) ou PoE (802.3af)	
Proteção anti-surto	15 kV (vídeo e alimentação)	
Consumo	Mínimo: 2.8 W / 3.6 W (via PoE) Máximo: 7.9 W / 9.2 W (via PoE)	
Temperatura de operação	-30 °C ~ +60 °C / umidade < 95%	
Nível de proteção	IP67	IP67 e IK10
Material do case	Metal	
Dimensões (L x A x P)	244.1 mm x 79.0 mm x 75.9 mm	94 mm x Φ122 mm
Peso líquido	820g	713g
Certificados	UL, FCC e CE	

¹ 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.

² 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.

³ 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.

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

⁵ MJPEG disponível apenas no sub stream extra 1.

⁶ 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.

⁷ 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.

**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 não 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.

*** Este 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 045 – FLH 150 Radiant Heaters

- FLH radiant heaters are used in combination with a thermostat or hygrostat, predominantly for the avoidance of excessively low temperatures or excessively high humidity in the control cabinet.
- Different performance ratings from 45 to 150 Watts ensure that the correct heating power is always available. The total required heat can be distributed in a control cabinet according to needs.
- Available with either terminal or connecting cable.



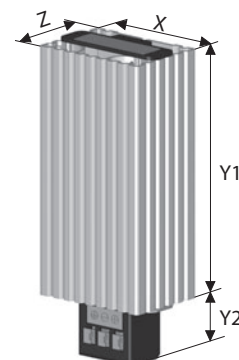
Data	FLH 045	FLH 060	FLH 075	FLH 100	FLH 150	Unit
Part number with terminal	17004505007	17006005007	17007505007	17010005007	17015005007	
Heating performance (Ta = +68 °F/+20 °C)	45	60	75	100	150	W
Max. surface temperature	221 (105)	221 (105)	248 (120)	266 (130)	302 (150)	°F (°C)
Power consumption	45	60	75	100	150	W
Starting current	1.8	2.5	4.5	5.0	7.5	A
Sytem of protection for intended purpose of use	IP20 (plug terminal connector)					
Weight		450	510	510	770	g
Rated voltage	230 V AC 50 / 60 Hz					
Functional range	110 - 250 V AC 50 / 60 Hz, 110-250 VDC					
Duty cycle	100%					
Operating temperature range	-40 ... +158 (-40 ... +70)					°F (°C)
Storage temperature range	-40 ... +158 (-40 ... +70)					
Installation orientation	as desired, preferably vertical					
Device construction	aluminum profile, brightly anodised					
Type of mounting	snap fastening for 35mm profile bars according to EN 60715					
Protection class	I					
Connection	plug terminal connection					
Clamping range of connecting terminal	single wire: 2 x 0.5 - 2.5 mm ² , fine-stranded: (tinned, with ferrule, with pin cable lug) 2 x 0.5 - 1.5 mm ²					
Approval	UL, cUL, CE					

Accessories	Piece	Part number	Information on page
Thermostat	1	17111000010	
Hygrostat	1	17207000000	

Approvals see page 168

Dimensions

Dimension	FLH 045	FLH 060 - 100	FLH 150
	inches (mm)		
X	2.76 (70)	2.76 (70)	2.76 (70)
Y1	2.56 (65)	5.51 (140)	8.46 (215)
Y2	1.38 (35)	1.38 (35)	1.38 (35)
Z	1.97 (50)	1.97 (50)	1.97 (50)
L	19.68 (500)	19.68 (500)	19.68 (500)

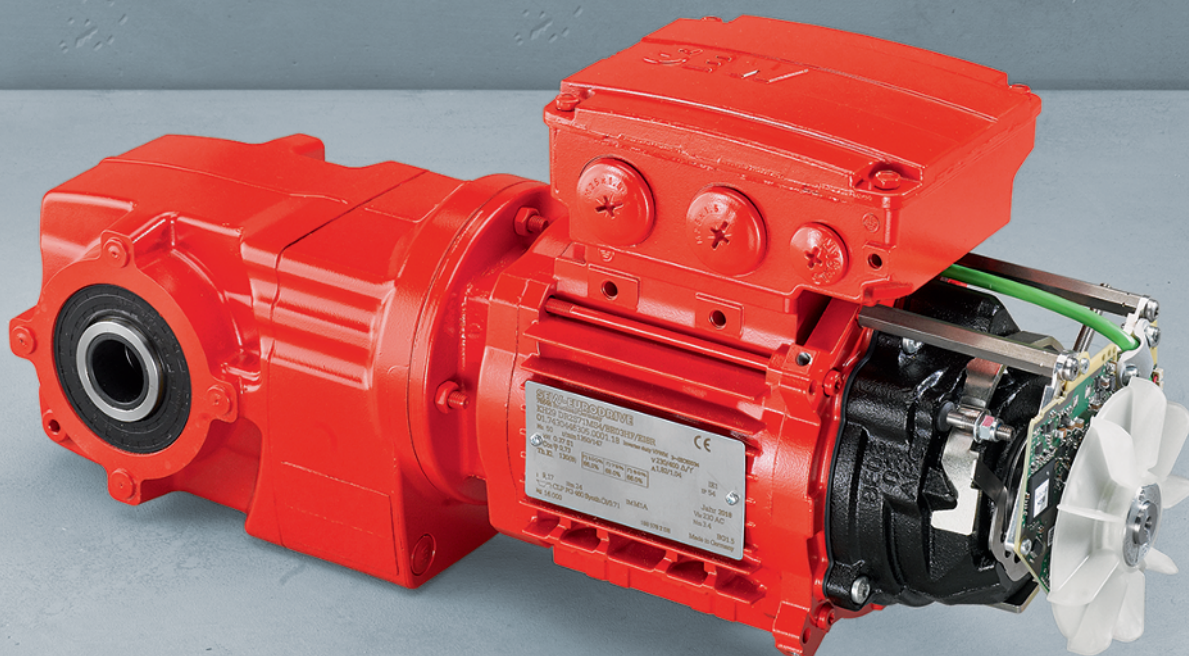




ITEM 55 LOTE 3
LE282

SEW
EURODRIVE

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
▲ DANGER	Imminent danger	Death or severe injuries
▲ WARNING	Possibly dangerous situation	Death or severe injuries
▲ CAUTION	Possibly dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the product or its environment
INFORMATION	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⁻¹). 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

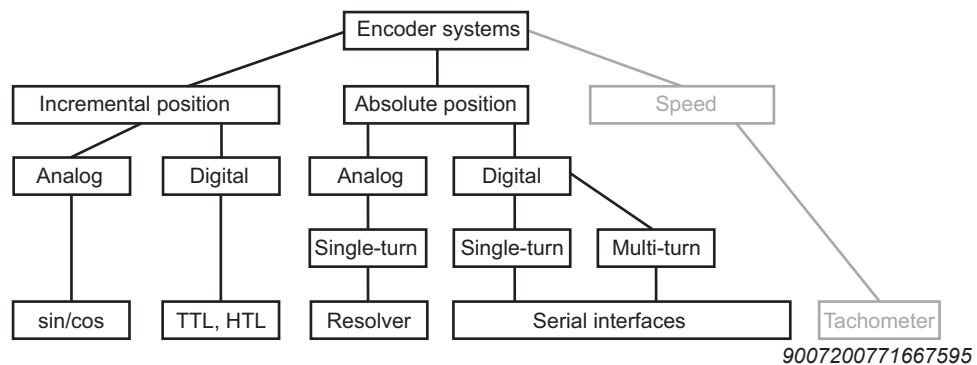
If the encoder system is operated in a closed loop system, the speed quality and control behavior can be significantly improved, even with major changes in load.

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

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.

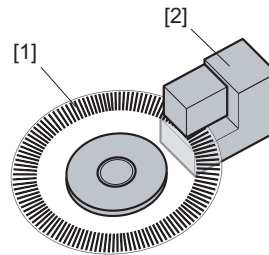
3.1.3 How do encoder systems work?

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

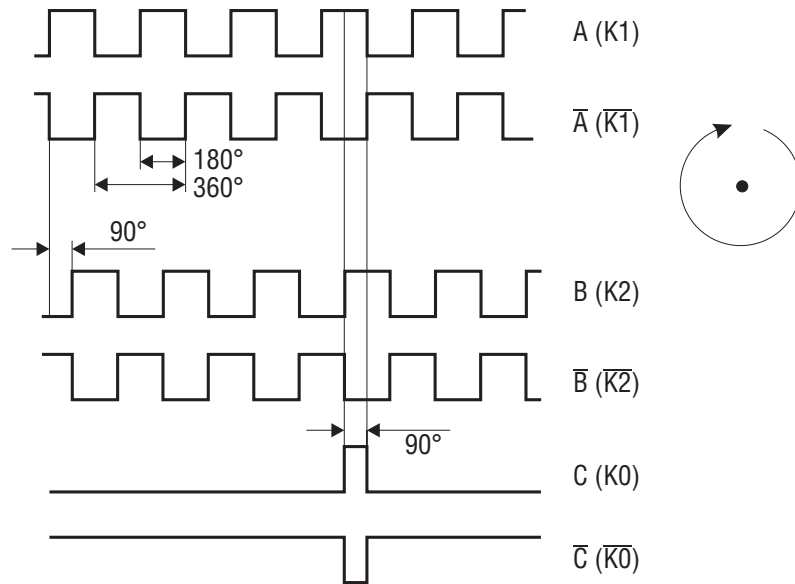
Magnetic system

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 E18. 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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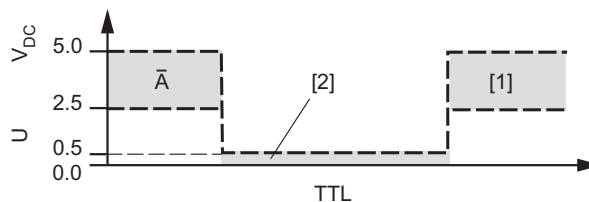
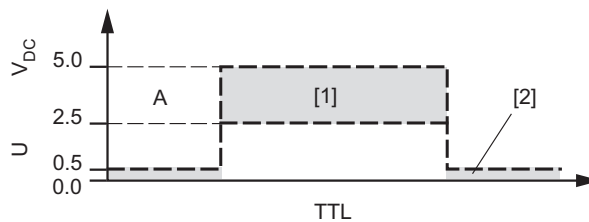
Signal level

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

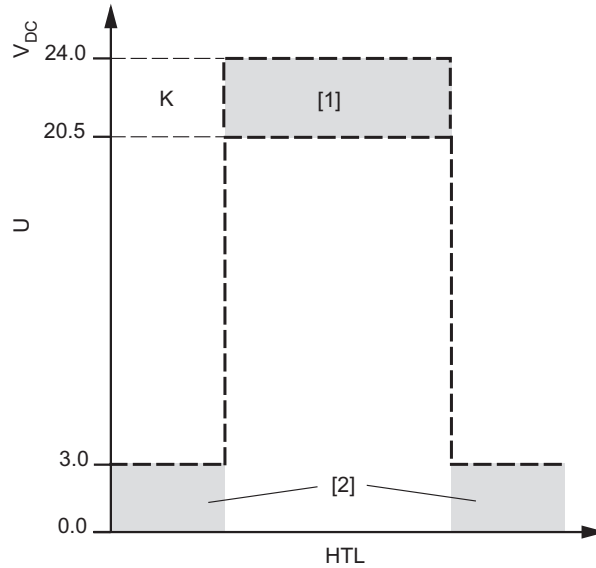
[2] "0" area

3 Encoder technology in practice

What are encoder systems?

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.

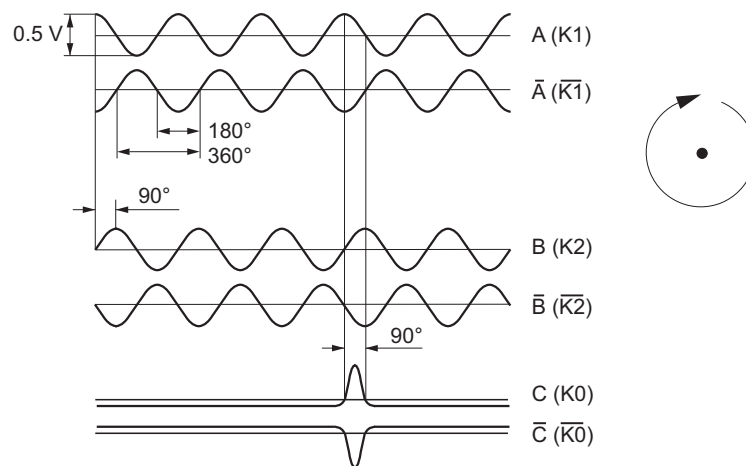
*Incremental rotary encoders with sin/cos tracks**Structure and functional principle*

Sin/cos encoders, also known as sine encoders, deliver two sinus signals offset by 90° . 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° , 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



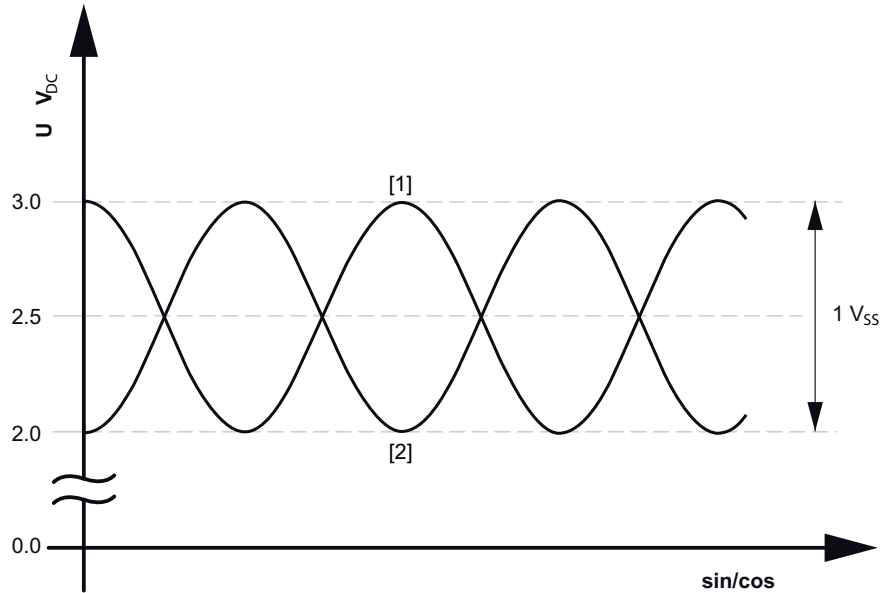
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3 Encoder technology in practice

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.



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[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.

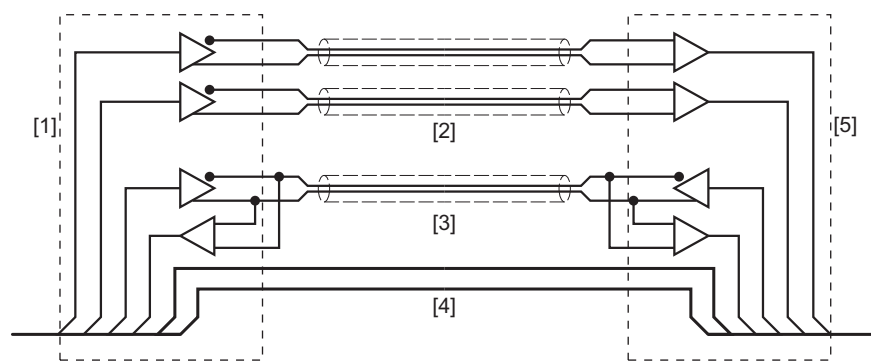
Absolute encoders with an asynchronous interface are available as:

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.

3 Encoder technology in practice

What are encoder systems?

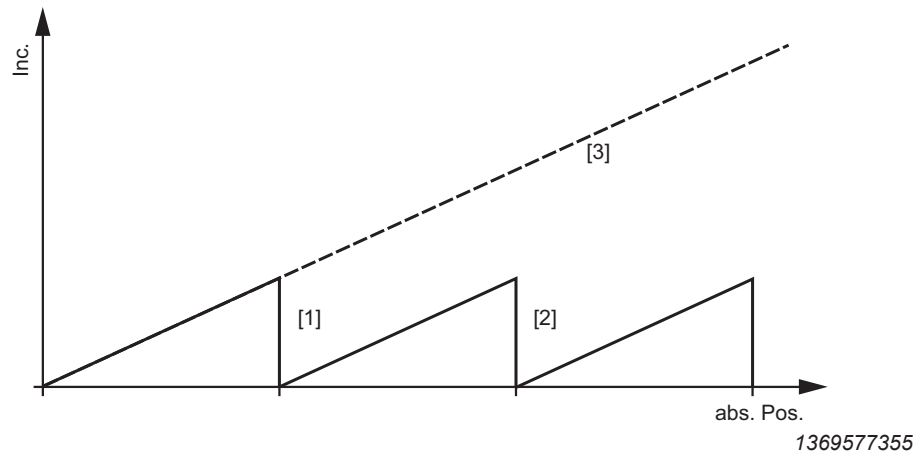
The encoder can be optionally designed as a single or multi-turn variant. Single-turn means that the absolute position information always refers to only one revolution. The multi-turn variant of the encoder can also provide information about the number of revolutions (typically e.g. 4096) via downstream 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 4096×4096)
- 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.



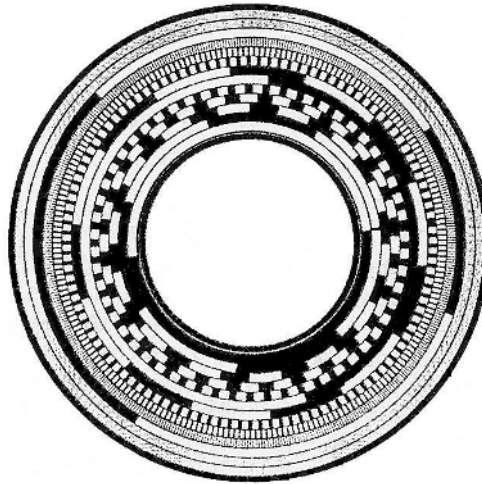
- [1] 1st encoder overflow
- [2] 2nd encoder overflow
- [3] Absolute position viewed by the user

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.

3 Encoder technology in practice

What are encoder systems?

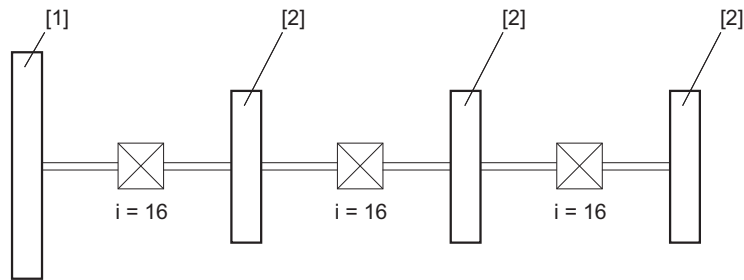
Multi-turn encoder

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

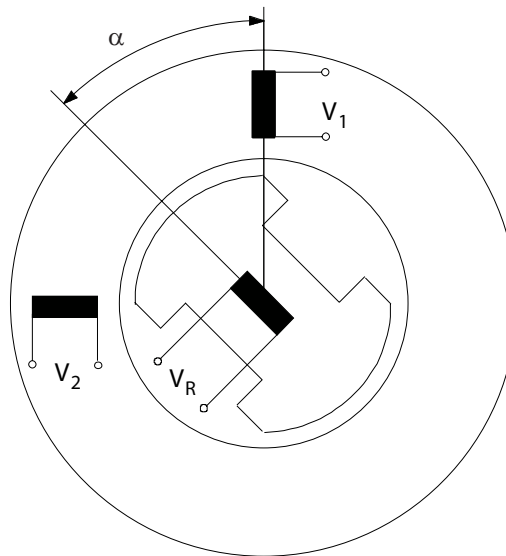
[2] Code disk to detect the number of revolutions

Resolver

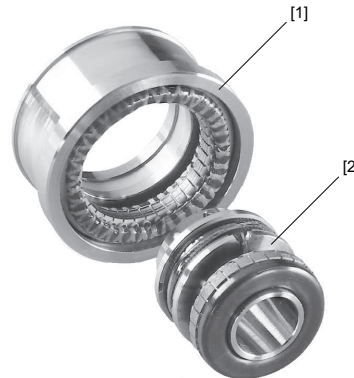
If designed as a two-pole version, a resolver can determine the absolute position of the motor shaft within one motor revolution. The speed and the absolute position per revolution are derived from the resolver signal.

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

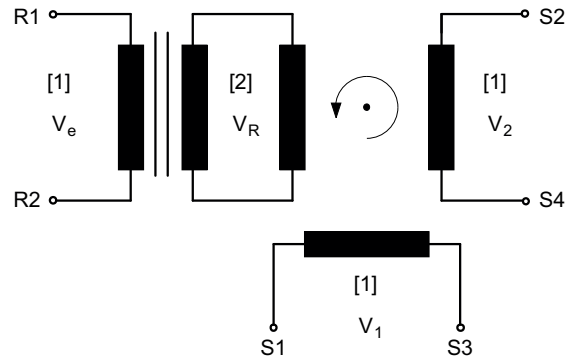
3 Encoder technology in practice

What are encoder systems?

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.

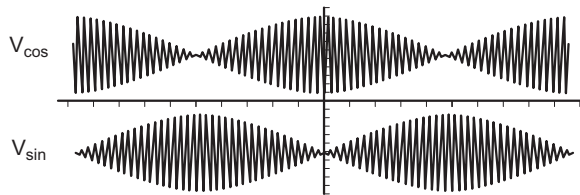
The rotation of the resolver's rotor induces voltages in the rotary transformer's stator winding; these voltages are based on the position of the rotor.



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[1] Stator

[2] Rotor



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Signal characteristics

The course of the signals is calculated as follows:

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

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

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

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

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

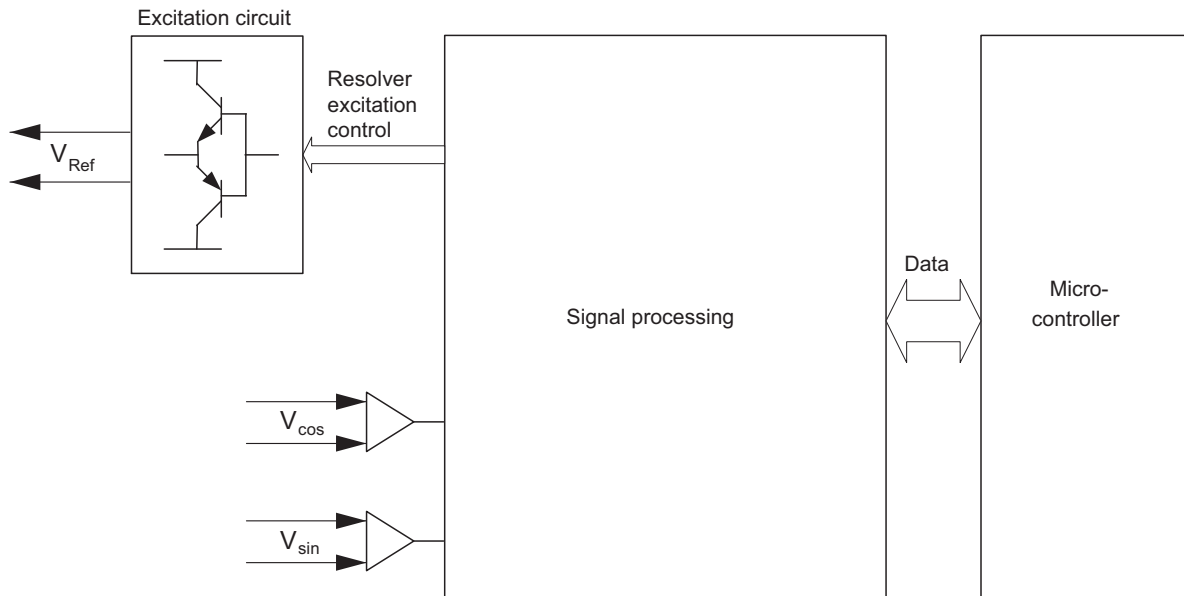
The amplitudes of voltages V_{sin} and V_{cos} change based on the position of the rotor and are each fed to the evaluation unit via a differential amplifier. The differential amplifiers filter out interference signals (common mode interference) on the isolated track signals V_{sin} and V_{cos} .

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

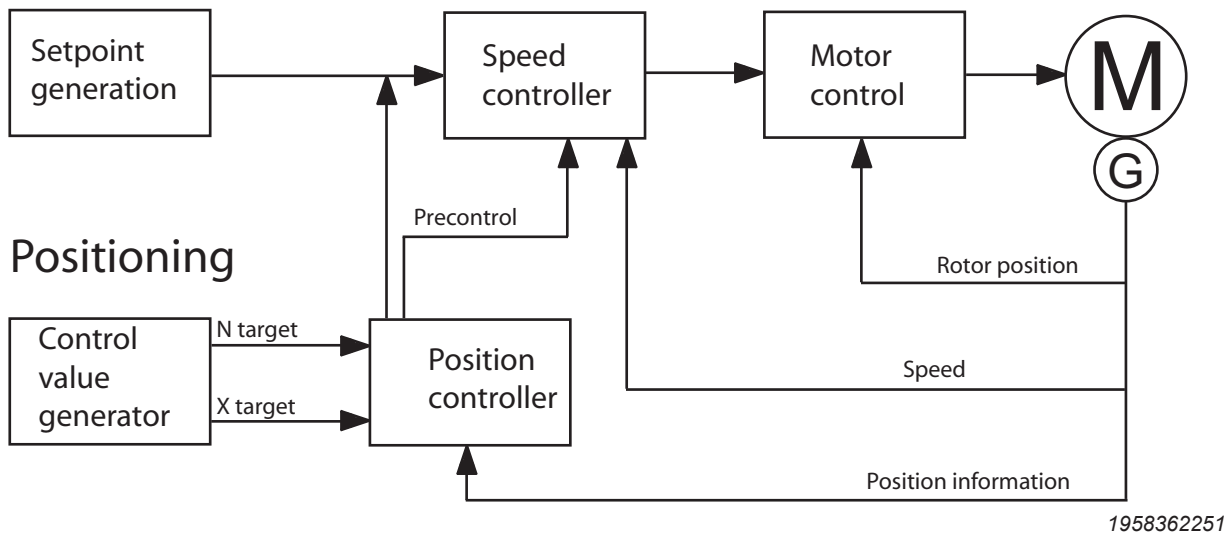
For precise positioning in systems that are prone to slip, it is necessary to install a measuring system on the track in addition to the encoders installed on the motor.

- 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 Incremental encoder	EI8Z/EI8C/EK8C/EV8C/ EK8R/EV8R Incremental encoder	EI71/EI72/EI76/EI7C 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

3

Encoder technology in practice

How are encoder systems used at SEW-EURODRIVE?

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

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

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

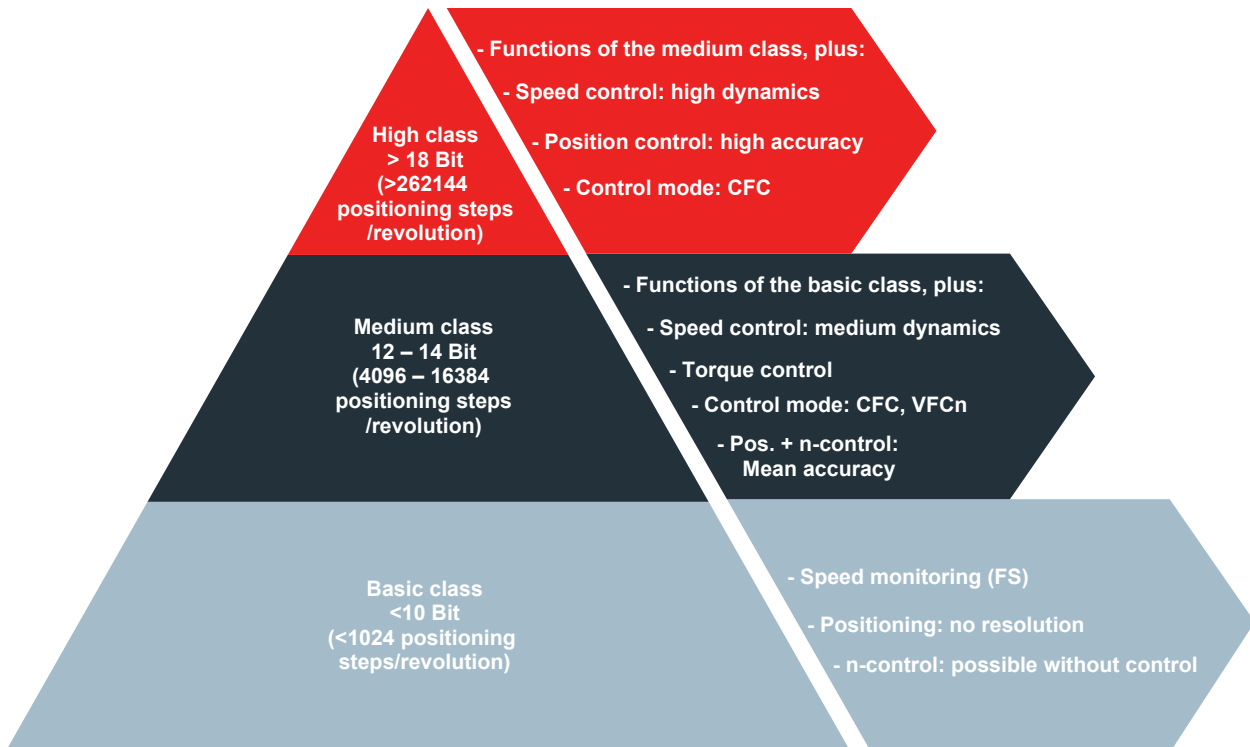
4.1.1 Manufacturer information about conical encoders

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

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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

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4.2 E17., E18. 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

E17. 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 E17C encoder is also available as an E17C FS safety encoder (not on size DR.63..).

E18. built-in encoders are suitable for the following applications:

- The E18Z 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

E17. 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 E17C 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.

E18. 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 Further information on the encoders

Functional safety (FS)

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 EN 61508	EN 61800-5-2	EN ISO 13849 -1
ES7S EG7S	✓	–	✓
AS7W AG7W	✓	–	✓
AS7Y AG7Y	✓	–	✓
EK8S EK8W AK8W AK8Y AK8H	✓	–	✓
EK8Z EK9Z AK8Z	–	✓	✓
E17C 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

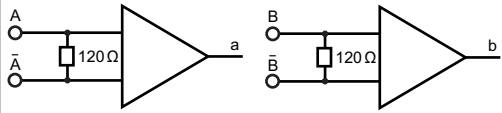
Switch the safety encoder off and on again at least once a year in accordance with EN 61800-5-2.

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

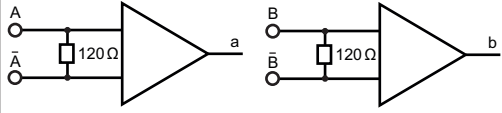
Designation	Requirement
Safety requirements	≥ SIL 2
Diagnostic coverage ("DC")	≥ 90%
Fault presumptions	According to EN 61800-5-2:2017, table D.8
Monitoring of the phasor length "r"	$r = \sqrt{a^2 + b^2}$ with a = A – \bar{A} for cosine signals and b = B – \bar{B} for sine signals
Safe state	Phasor length "r" outside of the range $350 \text{ mV} \leq r \leq 700 \text{ mV}$
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 Ω
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.

4 Further information on the encoders

Functional safety (FS)

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"	$r = \sqrt{a^2 + b^2}$ with a = A – \bar{A} for cosine signals and b = B – \bar{B} for sine signals
Safe state	Phasor length "r" outside of the range $350 \text{ mV} \leq r \leq 700 \text{ mV}$
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 Ω
Sampling frequency	For the frequency maximally occurring in the application at the encoder signal outputs, the following sampling frequency must be met: <ul style="list-style-type: none"> • minimum 8 times with synchronous sampling • minimum 5 times with asynchronous sampling

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.

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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 (E)DRN132M – 280	Shaft-centered	Plug-in shaft	4.5 – 30	HTL/TTL (RS422)	–	✓
EG7R	(E)DR.160 – 280 (E)DRN132M – 280	Shaft-centered	Plug-in shaft	7 – 30	TTL (RS422)	–	✓
EG7S	(E)DR.160 – 280 (E)DRN132M – 280	Shaft-centered	Plug-in shaft	7 – 30	1 V sin/cos + RS485 (peak-to-peak)	✓	✓
EH7C	(E)DR315	Shaft-centered	Hollow shaft	10 – 30	HTL	–	✓
EH7R	(E)DR../DRN315	Shaft-centered	Hollow shaft	10 – 30	TTL (RS422)	–	✓
EH7S	(E)DR315	Shaft-centered	Hollow shaft	10 – 30	1 V sin/cos (peak-to-peak)	–	✓
EH7T	(E)DR315	Shaft-centered	Hollow shaft	5	TTL (RS422)	–	✓
EI71	DR.71 – 132 DRN../DRU../DR2.71 – 132S	Integrated into motor	Standard shaft	9 – 30	HTL	–	–
EI72	DR..71 – 132 DRN../DRU../DR2.71 – 132S	Integrated into motor	Standard shaft	9 – 30	HTL	–	–
EI76	DR..71 – 132 DRN../DRU../DR2.71 – 132S	Integrated into motor	Standard shaft	9 – 30	HTL	–	–

Type	Motors	Mech. interface	Shaft design	Supply DC V	Electrical interface	FS	EX
EI7C	DR..71 – 132 DRN../DRU../DR2.63 – 132S	Integrated into motor	Standard shaft	9 – 30	HTL	–	–
EI7C FS	DR..71 – 132 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)	✓ ¹⁾²⁾	✓
EK8Z	DRN../DRU../DR2.71 – 225	Shaft-centered	Cone shaft	24	MOVILINK® DDI	✓ ¹⁾	–
ES7C	(E)DR.71 – 132 (E)DRN80 – 132S	Shaft-centered	Spread shaft	4.5 – 30	HTL/TTL (RS422)	–	77
ES7R	(E)DR.71 – 132 (E)DRN80 – 132S	Shaft-centered	Spread shaft	7 – 30	TTL (RS422)	–	✓
ES7S	(E)DR.71 – 132 (E)DRN80 – 132S	Shaft-centered	Spread shaft	7 – 30	1 V sin/cos + RS485 (peak-to-peak)	✓	✓
EV2C	DR.71 – 225 DRN71 – 225	Flange-centered		9 – 26	HTL	–	–
EV2R	DR.71 – 225 DRN71 – 225	Flange-centered		9 – 26	TTL	–	–
EV2S	DR.71 – 225 DRN71 – 225	Flange-centered		24	1 V sin/cos (peak-to-peak)	–	–
EV2T	DR.71 – 225 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 (E)DRN80 – 280	Flange-centered		4.5 – 30	HTL/TTL (RS422)	–	✓
EV7R	(E)DR.71 – 280 (E)DRN80 – 280	Flange-centered		7 – 30	TTL (RS422)	–	✓
EV7S	(E)DR.71 – 280 (E)DRN80 – 280	Flange-centered		7 – 30	1 V sin/cos + RS485 (peak-to-peak)	–	✓
EV8C	(E)DRN/DRU../ (E)DR2..71-355	Flange-centered		4.5 – 30	HTL/TTL (RS422)	–	✓
EV8R	(E)DRN/DRU../ DR2..71-355	Flange-centered		7 – 30	TTL (RS422)	–	✓
EV8S	(E)DRN/DRU../ 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- face	Shaft design	Supply DC V	Electrical interface	FS	EX
AG7W	(E)DR.160 – 280 (E)DRN132M – 280	Shaft-centered	Plug-in shaft	7 – 30	1 V sin/ cos + RS485 (peak-to- peak)	✓ ¹⁾	✓
AG7Y	(E)DR.160 – 280 (E)DRN132M – 280	Shaft-centered	Plug-in shaft	7 – 30	1 V sin/ cos + SSI (peak-to- peak)	✓ ¹⁾	✓
AH7Y	(E)DR315	Shaft-centered	Hollow shaft	9 – 30	TTL (RS422) + SSI	–	✓
AK8H	DRN../DRU../DR2.63 – 355	Shaft-centered	Cone shaft	7 – 12	HIPERFA CE®	✓ ²⁾	–
AK8W	(E)DRN../DRU../DR2.63 – 355	Shaft-centered	Cone shaft	7 – 30	1 V sin/ cos + RS485 (peak-to- peak)	✓ ²⁾³⁾	✓
AK8Y	(E)DRN../DRU../DR2.63 – 355	Shaft-centered	Cone shaft	7 – 30	1 V sin/ cos + SSI (peak-to- peak)	✓ ²⁾³⁾	✓
AK8Z	DRN../DRU../DR2.71 – 225	Shaft-centered	Cone shaft	24	MOVILINK® DDI	✓ ³⁾	–
AS7W	(E)DR.71 – 132 (E)DRN80 – 132S	Shaft-centered	Spread shaft	7 – 30	1 V sin/ cos + RS485 (peak-to- peak)	✓	✓
AS7Y	(E)DR.71 – 132 (E)DRN80 – 132S	Shaft-centered	Spread shaft	7 – 30	1 V sin/ cos + SSI (peak-to- peak)	✓	✓
AV1Y	DR.71 – 225 DRN71 – 280	Flange- centered		7 – 12	1 V sin/ cos + SSI (peak-to- peak)	–	–
AV1H	DR.71 – 225 DRN71 – 280	Flange- centered		7 – 12	HIPERFA CE®	–	–
AV7W	(E)DR.71 – 280 (E)DRN80 – 280	Flange- centered		7 – 30	1 V sin/ cos + RS485 (peak-to- peak)	–	✓

4 Further information on the encoders

Encoder designs

Type	Motors	Mech. inter- face	Shaft design	Supply DC V	Electrical interface	FS	EX
AV7Y	(E)DR.71 – 280 (E)DRN80 – 280	Flange- centered		7 – 30	1 V sin/ cos + SSI (peak-to- peak)	–	✓
AV8H	DRN../DRU../DR2.71 – 355	Flange- centered		7 – 12	HIPERFA CE®	–	–
AV8W	(E)DRN../DRU../DR2.71 – 355	Flange- centered		7 – 30	1 V sin/ cos + RS485 (peak-to- peak)	–	✓
AV8Y	(E)DRN../DRU../DR2.71 – 355	Flange- centered		7 – 30	1 V sin/ cos + SSI (peak-to- peak)	–	✓
EK8W	DR2C.71 – 180	Shaft-centered	Cone shaft	7 – 30	1 V sin/ cos + RS485 (peak-to- peak)	✓	✓
EK9Z	DR2C.71 – 180	Shaft-centered	Cone shaft	24	MOVILINK® DDI	✓	–
RK8M	DRN../DRU../DR2.63 – 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/ assembly in- formation
EG7A	DR.160 – 280 DRN132M – 280	.G7.	✓ ¹⁾	✓	(→ 231)
EI7A	DRN../DRU../DR2.63 – 132S	EI7.	–	–	(→ 167) (→ 179)
EI8A	DRN../DRU../DR2.71 – 132S	EI8.	–	–	(→ 186) (→ 190)
EK8A	DRN../DRU../DR2.63 – 355	EK8., RK8., AK8.	✓ ¹⁾	✓	(→ 195)
ES7A	DR.71 – 132 DRN80 – 132S	.S7.	✓ ¹⁾	✓	(→ 228)
XH.A	–	Third-party encoder, hollow shaft	–	–	(→ 228)
XV8A	DRN../DRU../DR2.71 – 315	.V8.	–	✓	(→ 223)
XV.A	DR.71 – 280 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 Further information on the encoders

Connection options

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

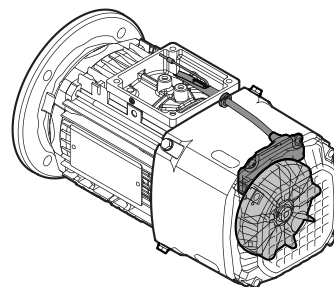
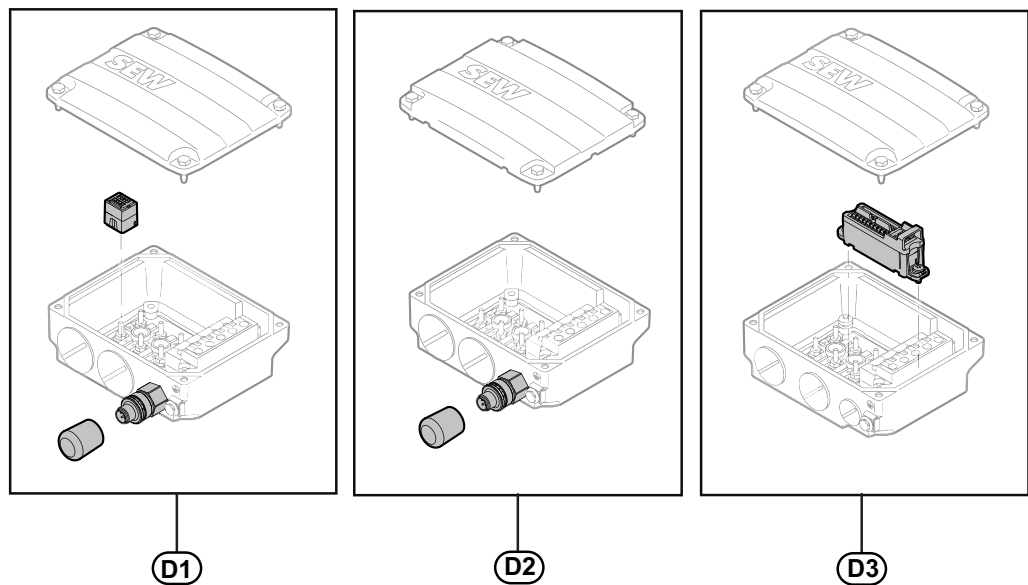
EI7. to M12: Encoder cable connected directly to the M12 connector. The litz wires for adjustment go to the configuration box. No FS

- 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.

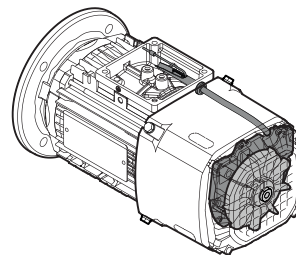
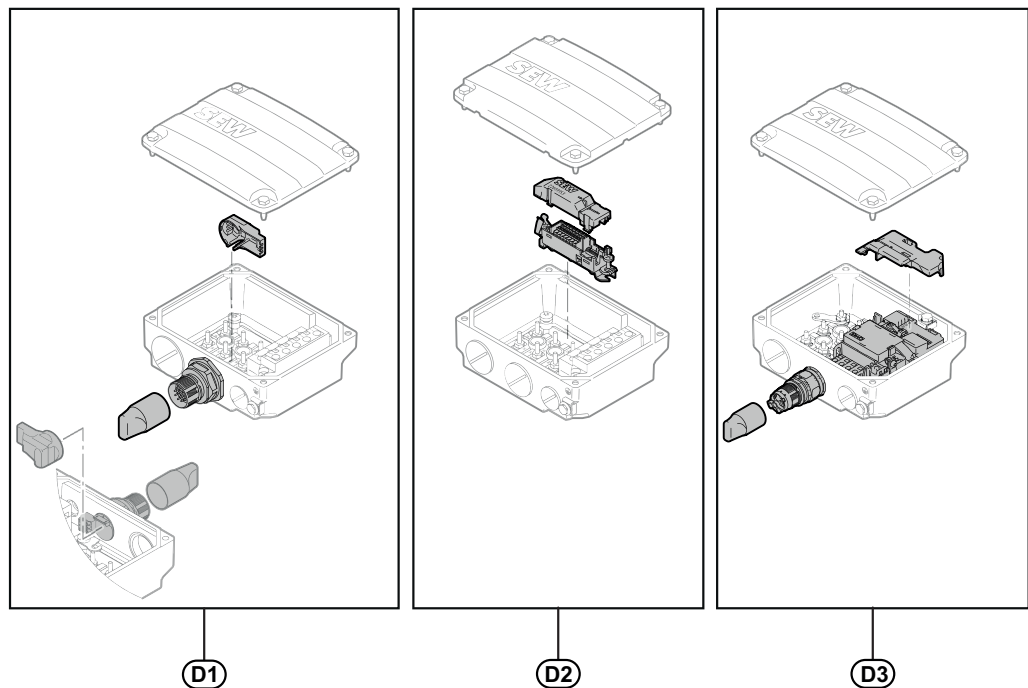


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4.6.2 /EI8.

- 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 Further information on the encoders

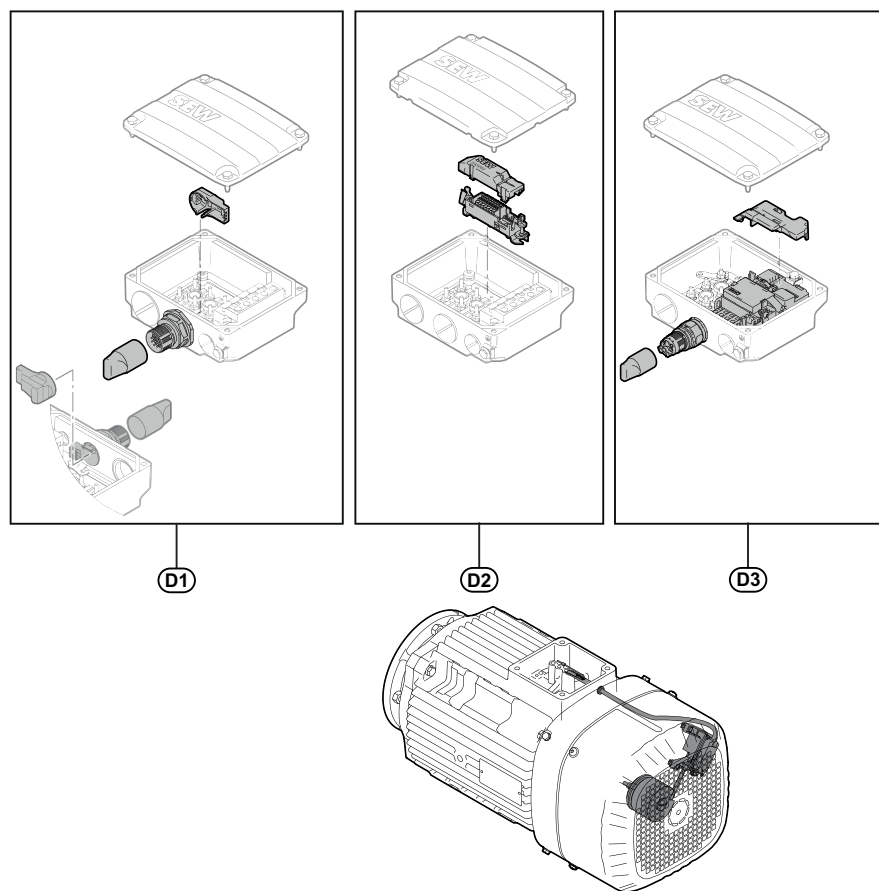
Connection options

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)

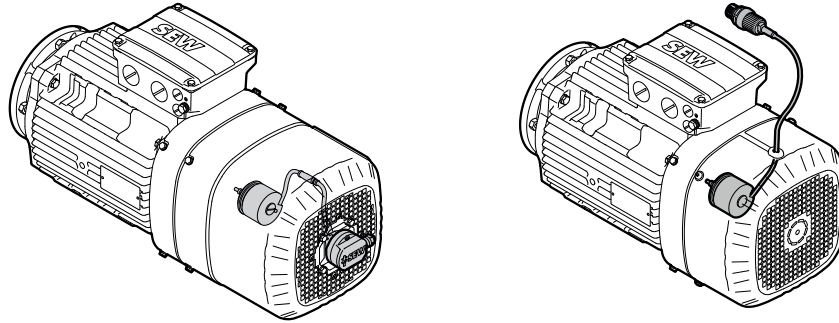


- With an integrated encoder connector, installed on the fan guard side or optionally on the rear of the fan guard:
 - Without A2GA connection cover
 - With A1GA connection cover
 - With A1GA connection cover, cable (length 0.36 m), and KIGA M23 connector
- Without integrated encoder connector:
 - With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

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

Predecessor plug-in shaft – Successor cone shaft

	Predecessor	Successor
Incremental	EG7S	EK8S
	EG7R	EK8R
	EG7C	EK8C
Multi-turn	AG7W	AK8W
	AG7Y	AK8Y

Predecessor hollow shaft – Successor cone shaft

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

Mounting adapters

	Predecessor	Successor
Mounting adapter	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
Incremental	EV7S	EV8S
	EV7R	EV8R
	EV7C	EV8C
Multi-turn	AV7W	AV8W
	AV7Y	AV8Y

Predecessor solid shaft – Successor cone shaft

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

Mounting adapters

	Predecessor	Successor
Mounting adapter	EV7A	XV8A
	XV7A	XV8A

4

Further information on the encoders

Phase-outs – Predecessor and successor encoder types

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		

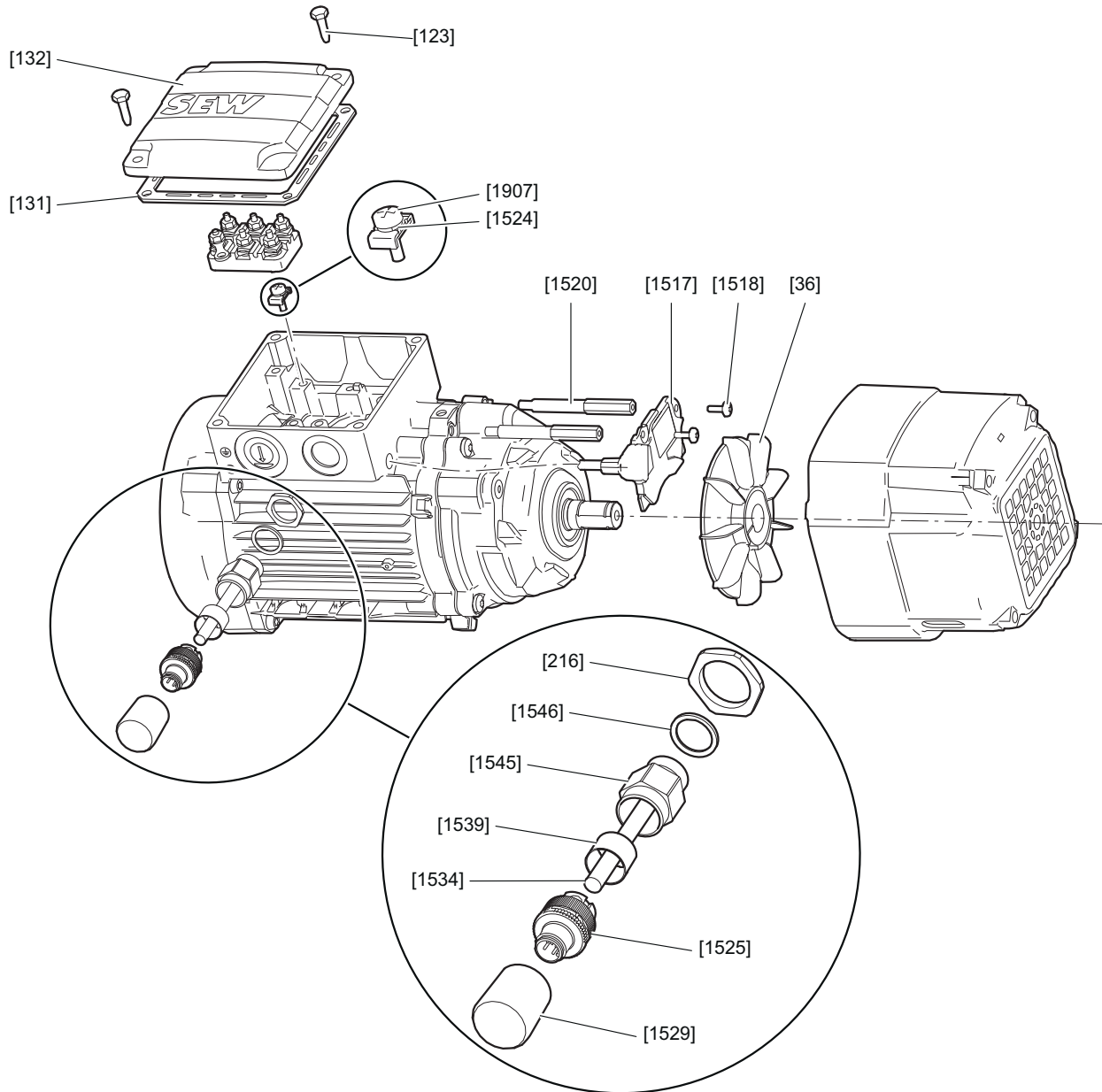
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5 Device structure

5.1 Device overview

5.1.1 Structure of built-in encoder

Structure of EI7C built-in encoder – DRN63 motors



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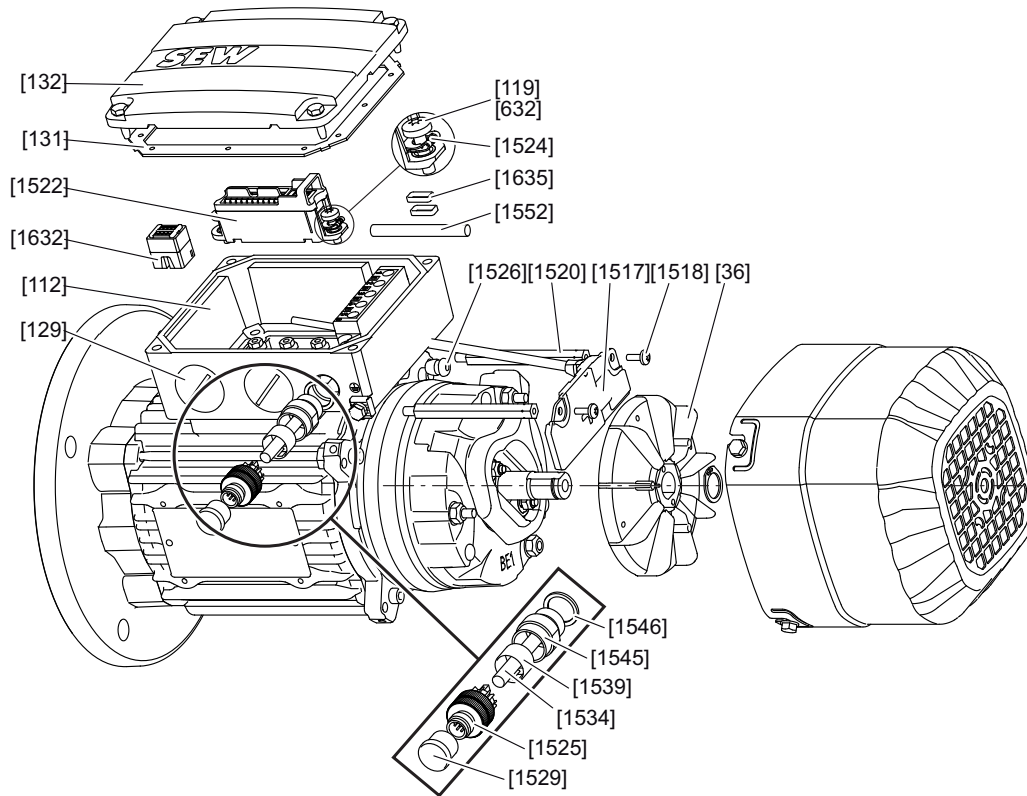
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[36]	Fan, complete	[1524]	Terminal washer
[123]	Screw	[1525]	Connector
[131]	Gasket for cover	[1529]	Protection cap
[132]	Terminal box cover	[1534]	Glass fiber sheathing
[216]	Nut	[1539]	Sleeve
[1517]	Encoder module	[1545]	Circular socket
[1518]	Flat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

5 Device structure

Device overview

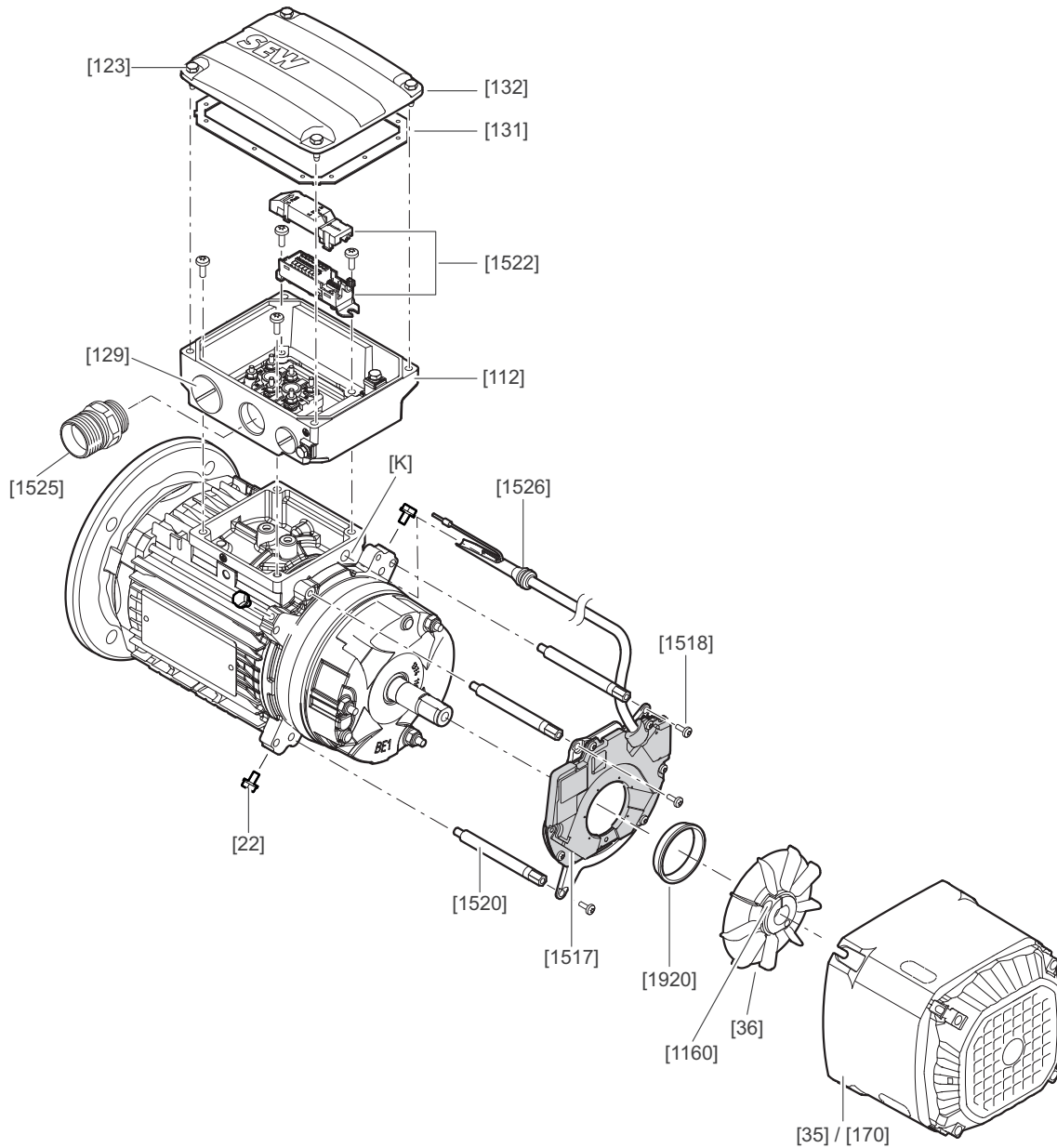
Structure of EI7C built-in encoder – DR./DRN71 – 132S motors



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[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 E18. built-in encoder – DRN../DRU../DR2..71 – 132S motors



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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		

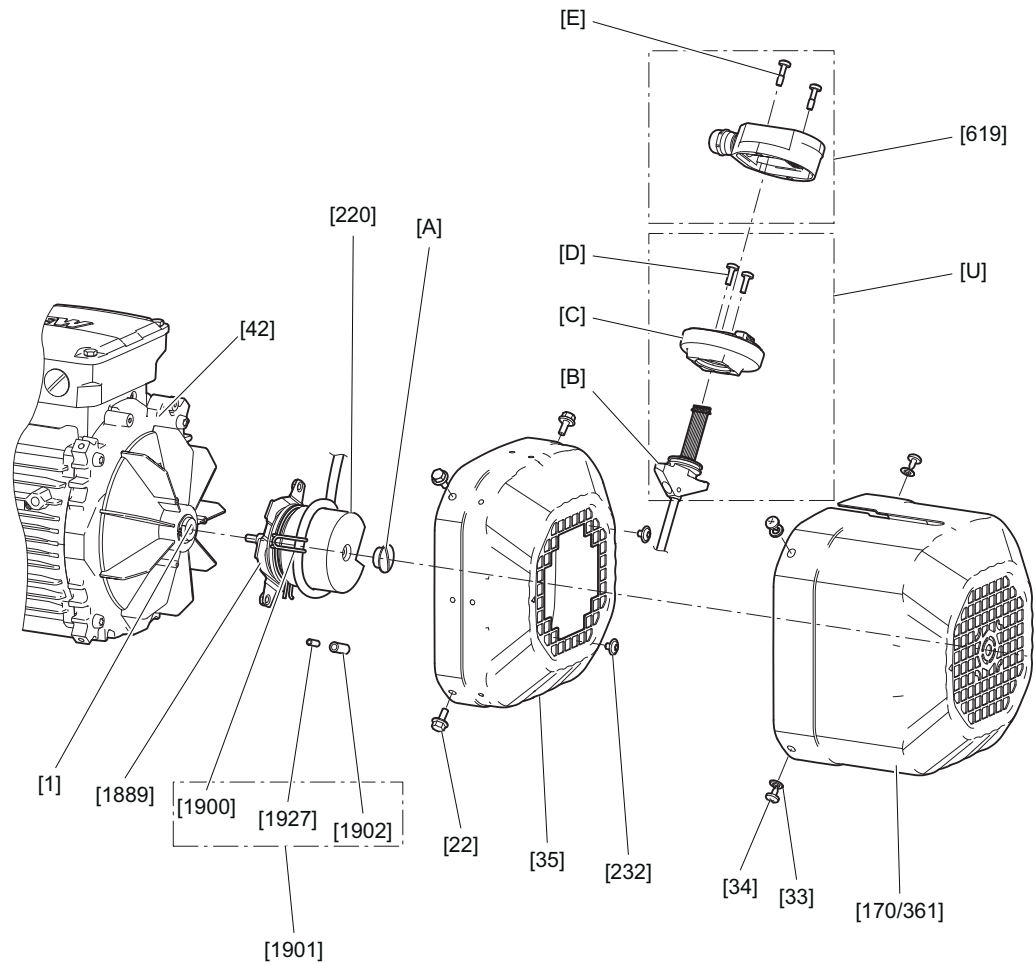
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5 Device structure

Device overview

5.1.2 Structure of conical encoders

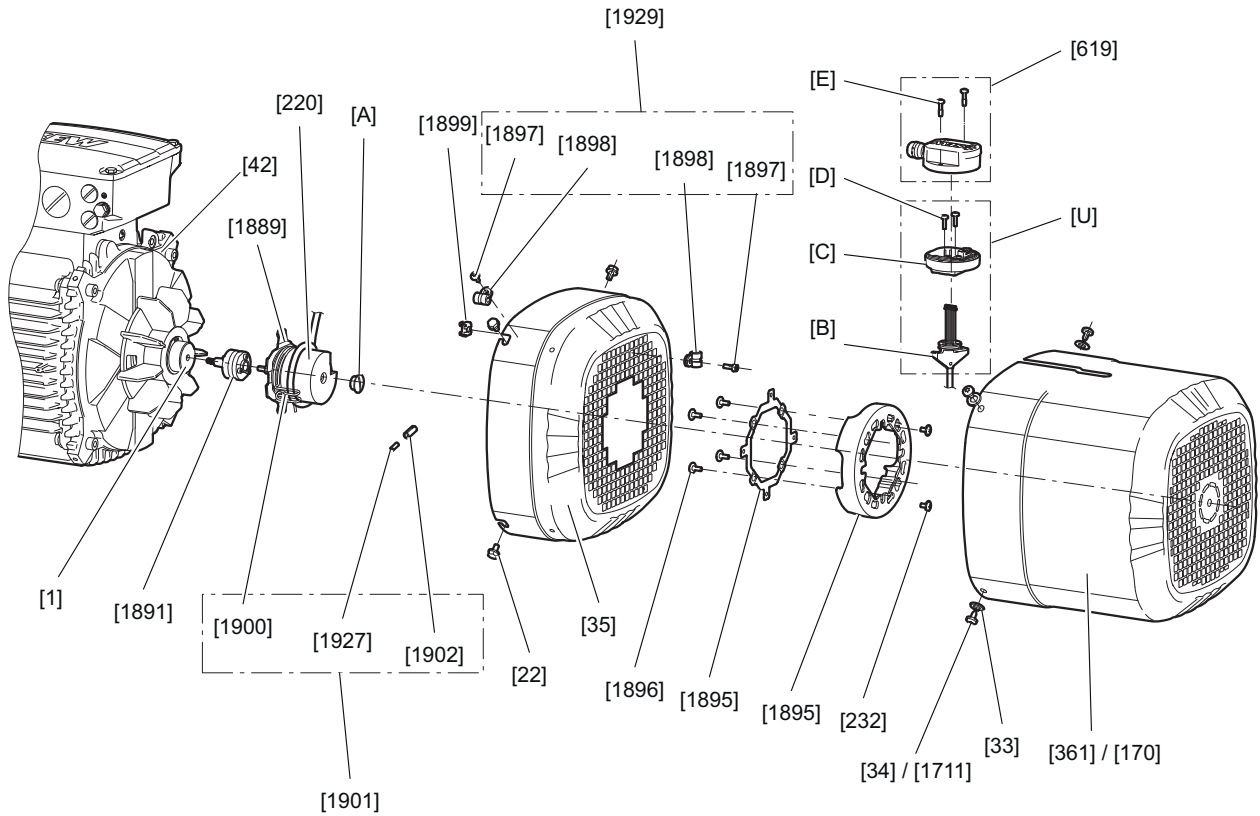
Structure of .K8./.K9. conical encoder – (E)DRN../DRU../DR2..63 – 132S motors with integrated A1GA encoder connector with connection cover or A2GA without connection cover



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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



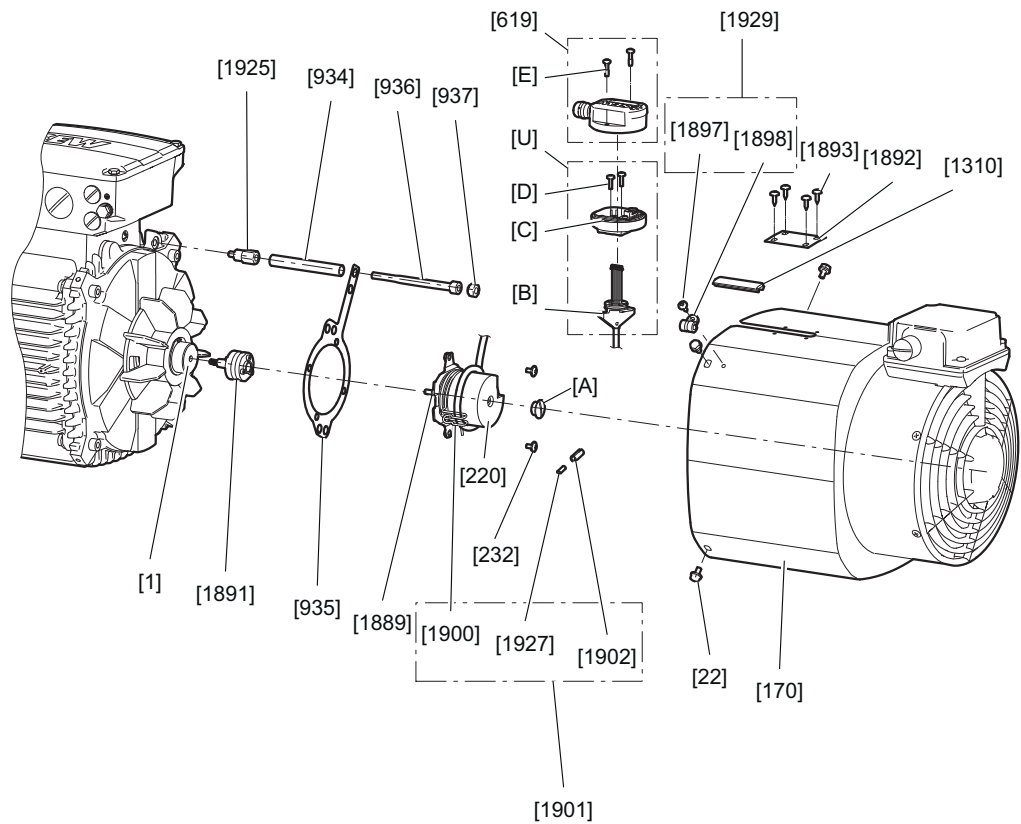
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[1]	Rotor	[1896]	Screw (hexalobular)
[22]	Screw (hexagonal)	[1897]	Screw (hexagon socket)
[33]	Washer	[1898]	Clamp
[34]	Screw (cross recess)	[1899]	Cage nut
[35]	Fan guard	[1900]	Cable retainer
[42]	B-side endshield	[1901]	Accessory bag
[170]	Forced 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		

5 Device structure

Device overview

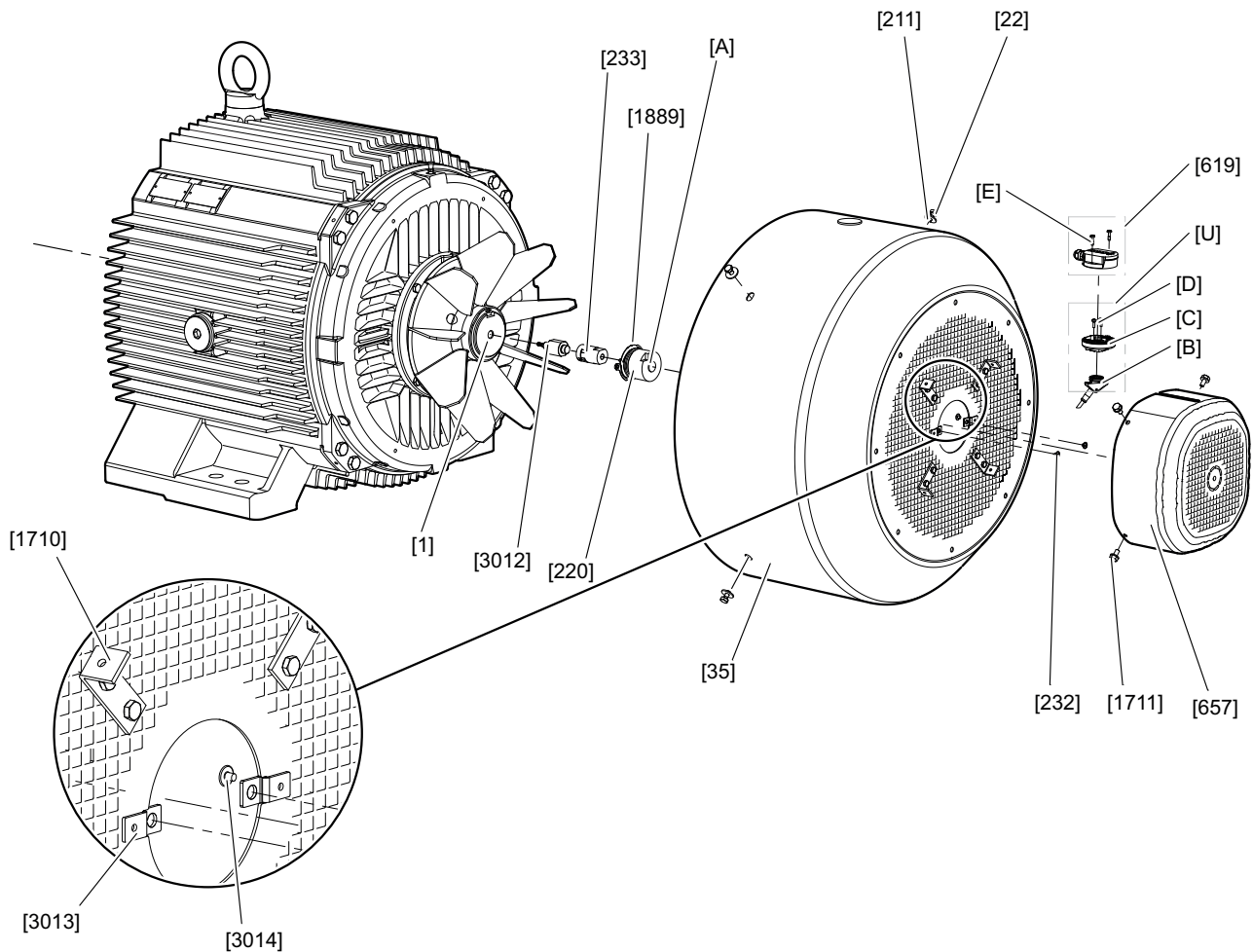
Structure of .K8./K9. conical encoder – (E)DRN../DRU../DR2..132M – 355 motors with forced cooling fan and integrated A1GA encoder connector with connection cover or A2GA without connection cover



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



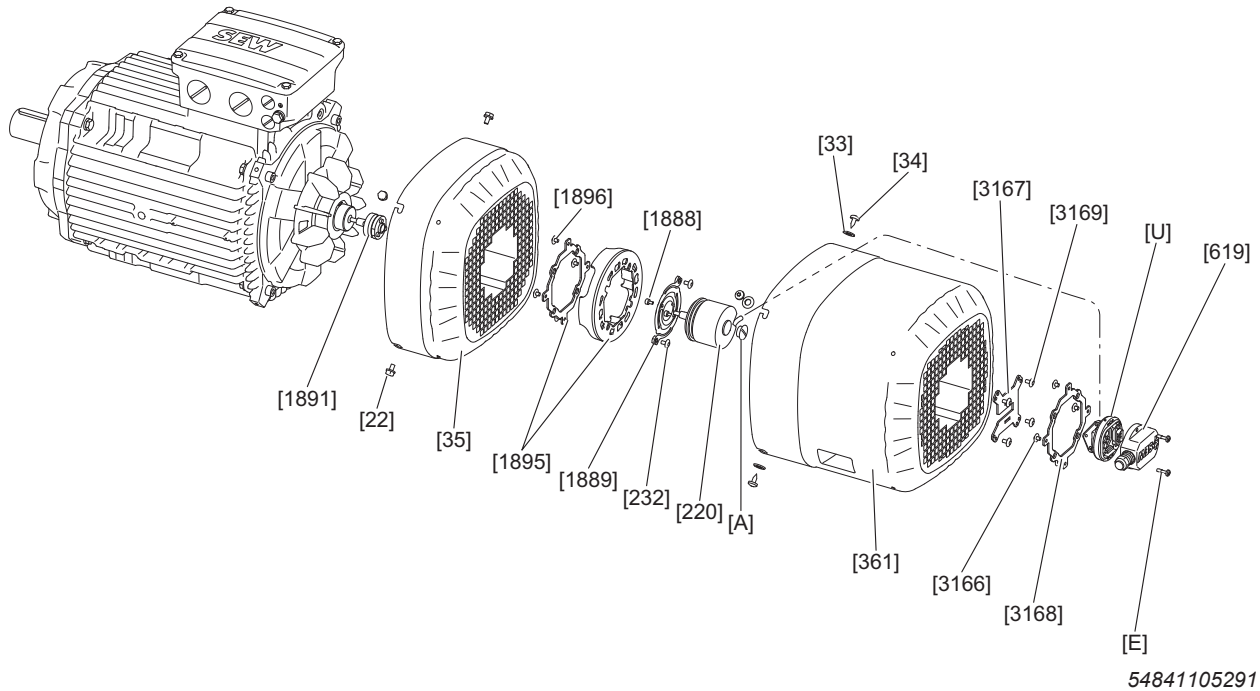
9007232638950155

[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

5 Device structure

Device overview

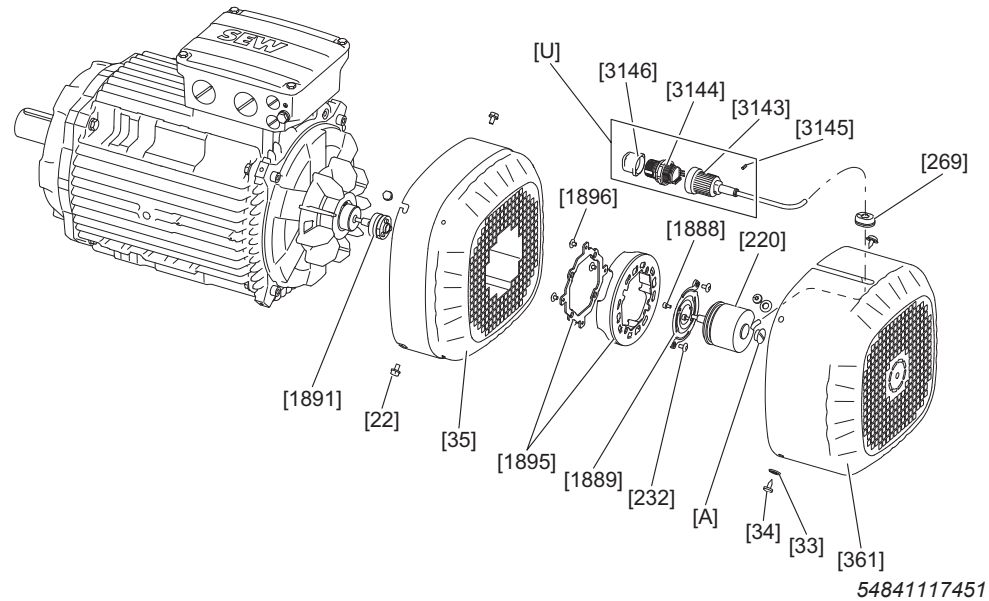
Structure of .K8./K9. conical encoder – (E)DRN../DRU../DR2..63 – 315 motors with integrated encoder connector on the rear of the guard with A1GA axial cover, without A2GA axial cover



[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		

54841105291

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

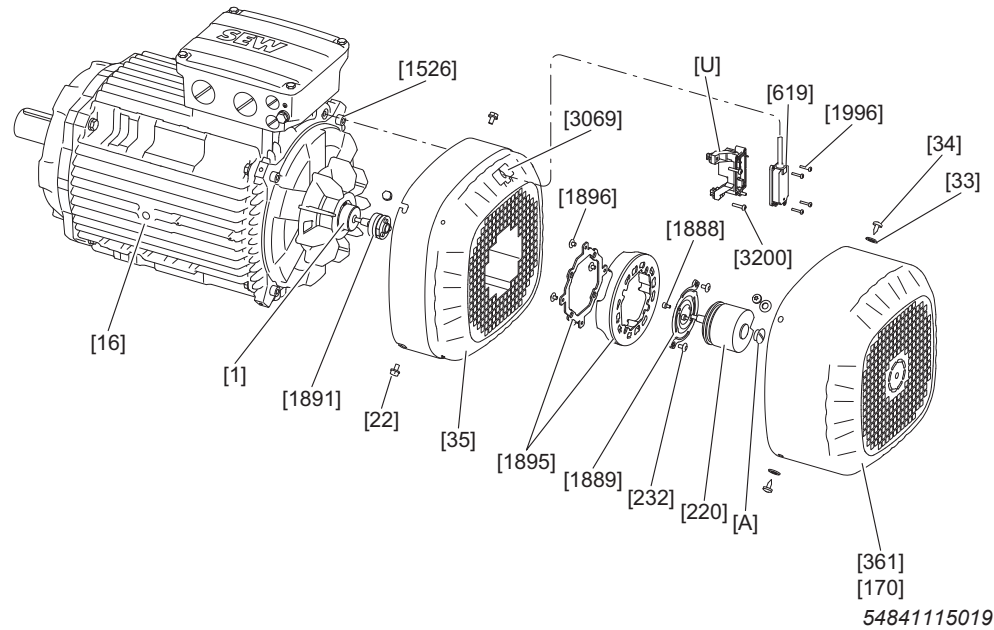


[22]	Screw (hexagonal)	[361]	Safety cover
[32]	Retaining ring	[619]	Complete connection cover
[33]	Washer	[U]	Connection adapter
[34]	Screw (cross recess)	[1889]	Torque bracket
[35]	Fan guard	[1891]	Insulation coupling
[36]	Fan	[1995]	Connection cover
[220]	Encoder	[1996]	Flat head screw
[232]	Screw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

5 Device structure

Device overview

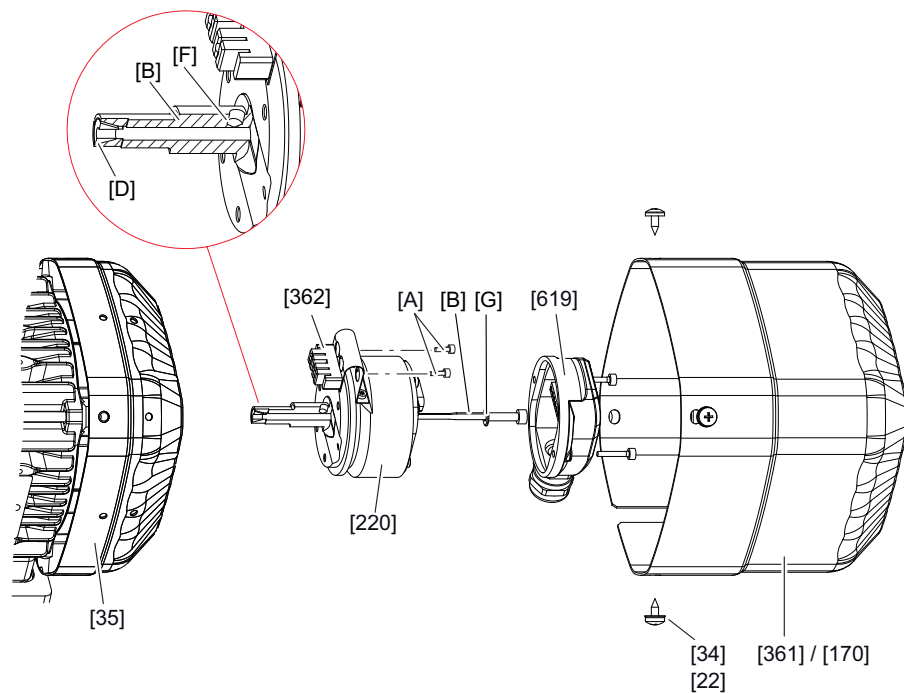
Structure of .K8./K9. conical encoder – (E)DRN../DRU../DR2..71 – 225 motors with A-BOX-U connection unit for connection option in/on the terminal box



[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)	[1995]	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



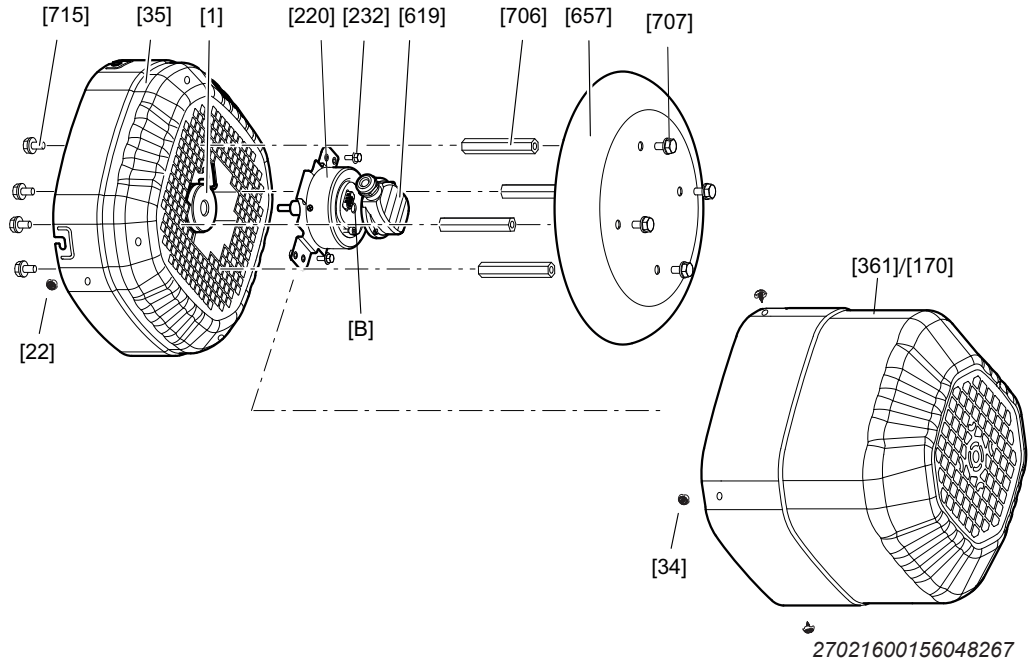
36028799602065163

- | | | | |
|-------|--------------------|-------|-------------------------------------|
| [22] | Screw | [619] | Connection cover |
| [34] | Tapping screw | [A] | Retaining screws for torque bracket |
| [35] | Fan guard | [B] | Central retaining screw |
| [220] | Encoder | [D] | Cone |
| [361] | Safety cover | [F] | Bore |
| [170] | Forced cooling fan | [G] | Tooth lock washer |
| [362] | Expansion anchor | | |

5 Device structure

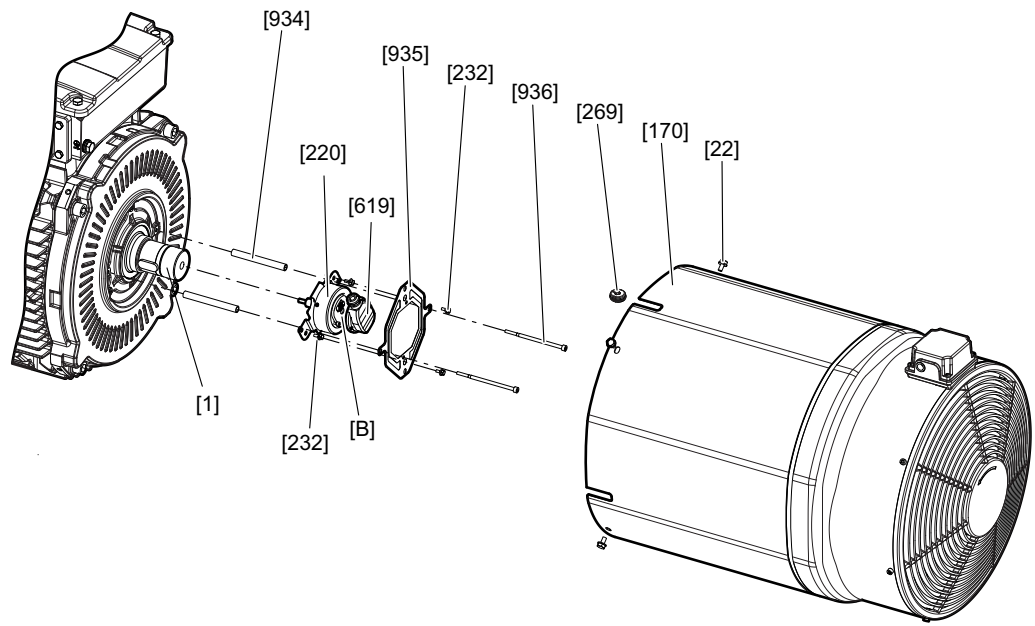
Device overview

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 |

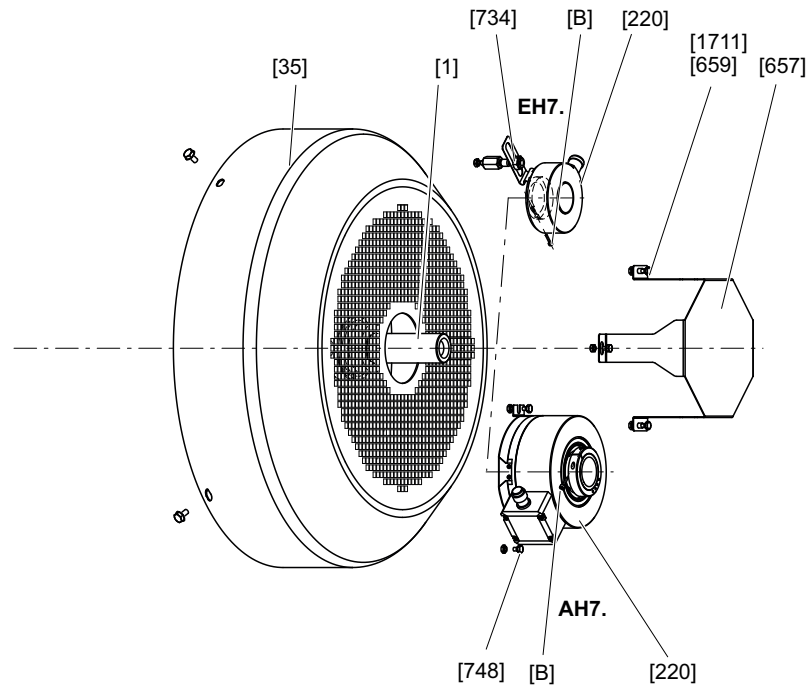
EG7., AG7. rotary encoder – (E)DR..160 – 280, (E)DRN132M – 280 motors – with forced cooling fan /V



27021605480184971

[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

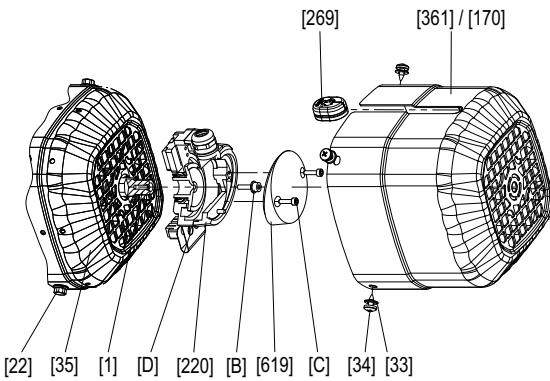


27021598171852427

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

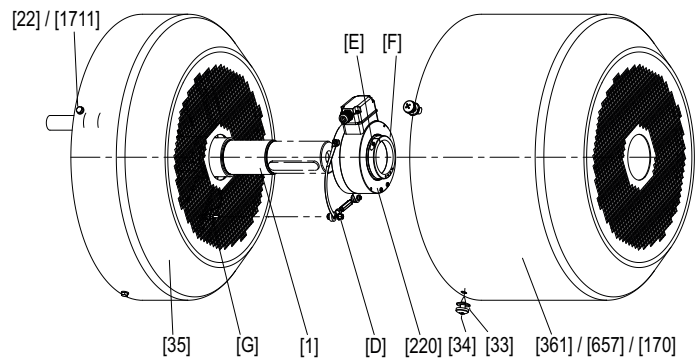
XH.A hollow-shaft rotary encoders – DR..71 – 225, DRN71 – 225, DR2..71 – 80 motors

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 ¹⁾

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

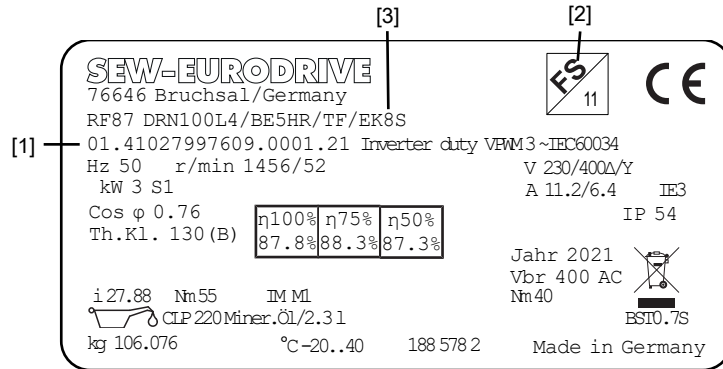
Two part numbers can be specified on the nameplate for the encoders.

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).



18014434577413387

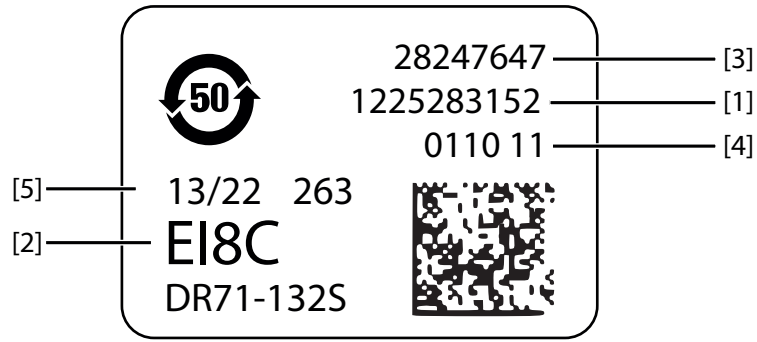
- [1] Motor serial number
- [2] FS logo for functional safety
- [3] Type designation

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



9007234990439179

Design 2



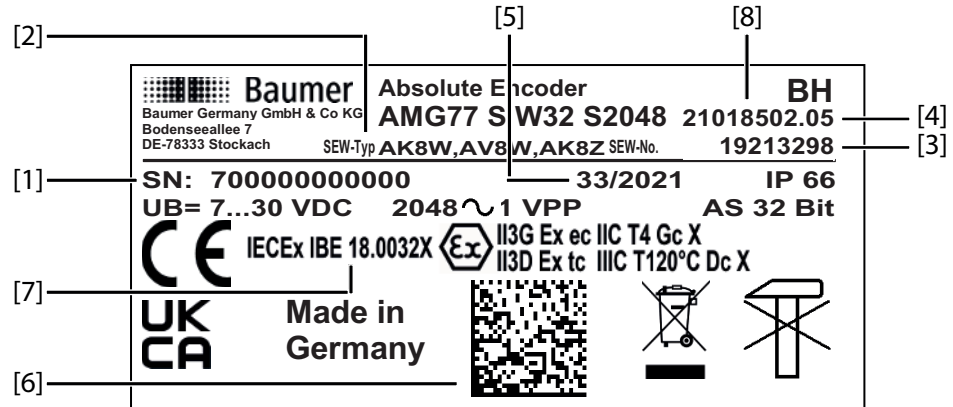
42411732491

- [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.

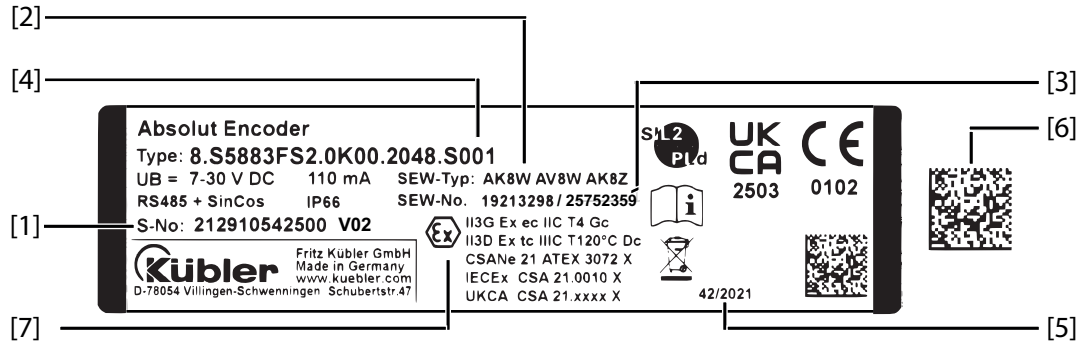
2nd part number [3] (listed below):

- 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).



27021633617587083

- [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):

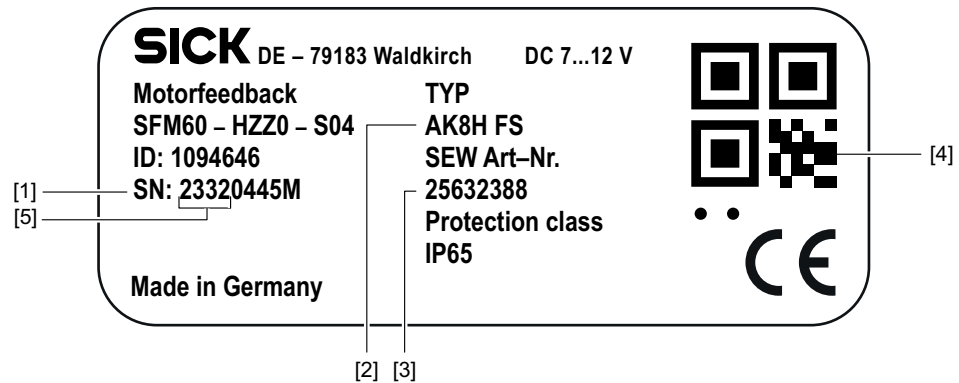
- Manufacturer-specific part number of the encoder.

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

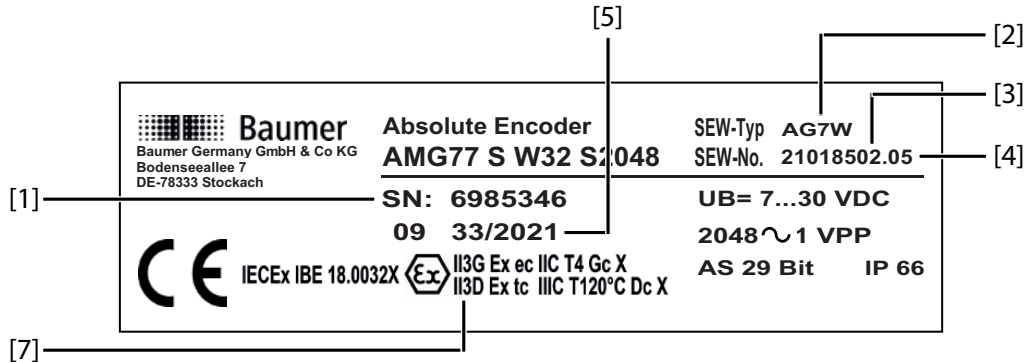
Manufacturing date as of CW32/2023 (date code 2332): Part number of encoders from SEW-EURODRIVE.

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 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 ¹⁾	EI72 ¹⁾	EI76 ¹⁾	EI7C ¹⁾
Motor series and size		DRN../DRU../DR2.63 – 132S			
Pulse output		HTL			
Supply voltage	V_B	DC 9 V – 30 V			
Maximum current consumption, free of load	I_{in}	120 mA			
Maximum pulse frequency	$f_{pulse\ max}$	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 (size 63: 24 only)			
	C	–			
Position resolution, increments per revolution	A, B	4, 8, 24, 96 (size 63: 96 only)			
Voltage output signal, differential (peak-to-peak) ($A' = A - \bar{A}$; $B' = B - \bar{B}$)	V_{t_diff}	–			
Voltage output signal, non-differential (peak-to-peak)	V_t	$V_{Low} \leq 3\ V$ $V_{High} \geq U_B - 3.5\ V$			
Signal level output, nominal offset against 0 V (A, B, C, \bar{A} , \bar{B} , \bar{C})	V_{t_o}	–			
Load current	I_L	60 mA			
Terminating resistor	k Ω	1 – 3			
Resistance between tracks and reference ground	R_{gnd}	–			
Load capacitance, output	C_o	–			
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 = constant	k, l	–			
Signal width track C	W_c	–			
Signal logic track C		–			
Pulse duty factor in accordance with IEC 60469-1, n = constant		50% \pm 20%			
Phase offset A : B; \bar{A} : \bar{B} n = constant	d	90° \pm 20°			
Incremental part accuracy		$\pm 3.75^\circ$ ($\pm 225'$)			
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			
Maximum speed	n_{max}	6000 min ⁻¹			
Maximum cable length ²⁾		50 m: MOVI-C® MOVITRAC® advanced inverters from SEW-EURODRIVE with connection to the binary input terminals and 24 V supply 100 m: Other inverters from SEW-EURODRIVE or third-party devices.			

Encoder	Size, unit	EI71 ¹⁾	EI72 ¹⁾	EI76 ¹⁾	EI7C ¹⁾
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: M12 (8-pin) Size 71 – 132S: M12 (8- or 4-pin) or connection unit (can be preassembled in the field) in a terminal box	
Ambient temperature of motor	°C			-40 to +60 DR2C: -30 to +60	
Storage temperature	°C			-15 to +70	
Maximum angular acceleration				10 ⁴ rad/s ²	
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.

E18.

E18R, E18C

Encoder	Unit, size	E18R ¹⁾	E18C ¹⁾
Motor series and size		DRN../DRU../DR2.71 – 132S	
Pulse output		TTL (RS422)	HTL
Supply voltage	V _B	DC 7 V – 30 V	DC 7 V – 30 V
Maximum current consumption, free of load	I _{in}	100 mA	
Maximum pulse frequency	f _{pulse max}	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) (A' = A - \bar{A} ; B' = B - \bar{B})	V _{t,diff}	–	
Voltage output signal, non-differential (peak-to-peak)	V _t	V _{Low} ≤ 0.5 V V _{High} ≥ 2.5 V	V _{Low} ≤ 3 V V _{High} ≥ V _B - 3.5 V
Signal level output, offset, nominal against 0 V (A, B, C, \bar{A} , \bar{B} , \bar{C})	V _{t,o}	–	
Load current	I _L	25 mA	60 mA
Terminating resistor	kΩ	0.12	1 – 3
Resistance between tracks and reference ground	R _{gnd}	–	
Load capacitance, output	C _o	–	
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}	V _{Low} ≤ 0.5 V V _{High} ≥ 2.5 V	V _{Low} ≤ 3 V V _{High} ≥ V _B - 2.5 V
Phase angle track C', n = constant	k, l	–	
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 = 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 _{max}	6000 min ⁻¹	
Maximum cable length ²⁾		100 m	50 m: MOVI-C® MOVITRAC® advanced inverters from SEW-EURODRIVE with connection to the binary input terminals and 24 V supply 100 m: Other inverters from SEW-EURODRIVE or third-party devices.
Duration until fault message (deactivated outputs)		–	

Encoder	Unit, size	EI8R ¹⁾	EI8C ¹⁾
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"> • M23 connector • Connection unit with terminals in the terminal box that can be assembled in the field • M12 connector (without negated tracks in non-differential/single-ended operation) 	
Ambient temperature of motor	°C	-30 to +60	
Storage temperature	°C	-15 to +70	
Maximum angular acceleration		10 ⁴ rad/s ²	
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 With motor-external brake control: BE.. brake, BE.. safety brake
Combination of motor protection/temperature		Motor protection: TF (in winding) 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 • Control cabinet devices: MOVIDRIVE® modular, MOVIDRIVE® technology, MOVIDRIVE® system, MOVITRAC® advanced • Decentralized inverters mounted close to the motor: MOVIMOT® flexible • 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 ¹⁾ (deactivated outputs)	ms	–
Response time ²⁾ (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 ³⁾		±0.2° (±720")
Accuracy of the absolute section		–
Maximum permitted magnetic field external to the motor		Outer contour of the motor: 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 _{max}	6000 min ⁻¹
Maximum angular acceleration		–
Degree of protection in accordance with EN 60529		IP66
Corrosion and surface protection		KS, OS1 – OS4, OSG
Installation altitude ⁴⁾	h	≤ 3866 m
Ambient temperature of motor ⁴⁾	°C	With control cabinet inverters from the MOVI-C® modular automation system and MOVIMOT® flexible decentralized inverter: -30 – +60 With MOVIMOT® advanced decentralized inverters: See the MOVIMOT® advanced operating instructions/manual
Cable length, maximum ⁵⁾	l	200 m

	Size, unit	EI8Z
Connection technology		KD1: M23 hybrid connector on the terminal box, 1.5 – 4.0 mm ² motor connection, 1.0 mm ² brake connection KDB: M40 hybrid connector on the terminal box, 6.0 – 10.0 mm ² motor connection, 1.5 mm ² brake connection KD: Cable gland on the terminal box for hybrid cables with 1.5 – 10 mm ² motor connection and 1 – 1.5 mm ² brake connection 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 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 $V_{High} \geq U_B - 3.5$ V
Pulse duty factor in accordance with IEC 60469-1, $n = \text{constant}$		$50\% \pm 20\%$
Phase offset A : B; \bar{A} : \bar{B} $n = \text{constant}$	d	$90^\circ \pm 20^\circ$
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}	$3600\ \text{min}^{-1}$
Maximum angular acceleration	n_{max}	$3000\ \text{rad/s}^2$
Maximum cable length ¹⁾		100 m
Duration until fault message ²⁾ (deactivated outputs)		min. 100 ms – max. 300 ms
Output leakage current in deactivated state (= fault message) ²⁾		250 μ A
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 ³⁾
Ambient temperature of motor	$^\circ\text{C}$	-30 to +60
Storage temperature	$^\circ\text{C}$	-15 to +70
Maximum angular acceleration		$10^4\ \text{rad/s}^2$
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_{mot}	Mass moment of inertia of the motor
J_{EI7}, J_{EI8}	Mass moment of inertia of the pole ring fan of the EI7. or EI8. encoder
J_{PO}	Mass moment of inertia of the standard plastic fan of the motor

EI7., EI7C FS

Motor	$J_{mot} + J_{EI7} - J_{PO}$ 10^{-4} kgm^2	Increase in inertia %
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	$J_{mot} + J_{EI8} - J_{PO}$ 10^{-4} kgm^2	Increase in inertia %
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

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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	$0.5\ V \pm 10\%$	$V_{Low} \leq 0.5\ V$ $V_{High} \geq 2.5\ V$	$V_B \leq 6\ V$: TTL $V_{Low} \leq 0.5\ V$ $V_{High} \geq 2.5\ V$
				$V_B > 6\ V$: HTL $V_{Low} \leq 3\ V$ $V_{High} \geq (V_B - 2.5\ V)$
Signal level output, nominal offset against 0 V ($A, B, C, \bar{A}, \bar{B}, \bar{C}$)	$V_{t\ o}$	$2.5\ V \pm 0.3\ V$	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	$120\ \Omega \pm 10\%$	$120\ \Omega \pm 10\%$	$V_B \leq 6\ V$: $120\ \Omega \pm 10\%$
				$V_B > 6\ V$: $1 - 3\ k\Omega$
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)	$V_{t\ c}$	Without specification	$V_{Low} \leq 0.5\ V$ $V_{High} \geq 2.5\ V$	$V_B \leq 6\ V$: TTL $V_{Low} \leq 0.5\ V$ $V_{High} \geq 2.5\ V$
				$V_B > 6\ V$: HTL $V_{Low} \leq 3\ V$ $V_{High} \geq (V_B - 2.5\ V)$
Phase angle track C', n = constant	k, l	$k = 180^\circ \pm 90^\circ$ $l = 180^\circ \pm 90^\circ$	See "Signal logic track C"	See "Signal logic track C"
Signal width track C	W_C	See "Phase relationships" (→ 136)	90° electrical	90° electrical
Signal logic track C		See "Phase relationships" (→ 136)	$C = \log 1$, when $A = B = \log 1$	$C = \log 1$, when $A = B = \log 1$
Pulse duty factor in accordance with IEC 60469-1, n = constant		Without specification	$50\% \pm 10\%$	$50\% \pm 10\%$
Phase offset A : B; \bar{A} : \bar{B} n = constant	d	$90^\circ \pm 2^\circ$	$90^\circ \pm 20^\circ$	$90^\circ \pm 20^\circ$
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 ¹⁾			±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 _{max}	6000 min ⁻¹		
Maximum cable length ²⁾			100 m	300 m ³⁾	50 – 300 m ⁴⁾
Duration until fault message ⁵⁾ (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) II3G Ex ec IIC T4 Gc II3D Ex tc IIIC T120°C Dc IECEX EPL .c (3G-c, 3D-c, 3GD-c) Ex ec IIC T4 Gc Ex tc IIIC T120°C Dc		
IECEX certificate of conformity depending on encoder			IECEX IBE 18.0032X IECEX CSA 21.0010X		
Corrosion protection; surface protection			KS, OS1 – OS4, OSG		
Connection			<ul style="list-style-type: none"> • M23 connector on the terminal box (optionally with or without temperature sensor) • Terminal strip in the terminal box (optionally with or without temperature sensor) • M23 connector with 0.36 m cable directly on the encoder (without temperature sensor) • Integrated encoder connector on the fan guard side (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor • Integrated encoder connector at the rear of the fan guard (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor⁶⁾ 		
Ambient temperature of motor	DRN../DR2../DRU63 – 132L	°C	-30 to +80 With FS encoder: -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 ⁴ rad/s ²		
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[®] 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.
- 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_{L_diff}	Typical: ≥ 2 V
Voltage output signal non-differential (peak-to-peak)	V_t	$V_B \leq 6$ V: TTL $V_{Low} \leq 0.5$ V $V_{High} \geq 2.5$ V
		$V_B > 6$ V: HTL $V_{Low} \leq 3$ V $V_{High} \geq (V_B - 2.5)$ 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: 120 $\Omega \pm 10\%$
		$V_B > 6$ V: 1 – 3 k Ω
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)	$V_{L_diff_e}$	Typical: ≥ 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 $V_{Low} \leq 0.5$ V $V_{High} \geq 2.5$ V
		$V_B > 6$ V: HTL $V_{Low} \leq 3$ V $V_{High} \geq (V_B - 2.5)$ V
Phase angle track C', n = 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 = constant		50% $\pm 10\%$
Phase offset A : B; \bar{A} : \bar{B} n = constant	d	90° $\pm 20^\circ$
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)
Accuracy of the incremental section ¹⁾		$\pm 0.033^\circ$ ($\pm 120''$)
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 ⁻¹
Maximum cable length ²⁾		50 – 300 m ³⁾

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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		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) II3G Ex ec IIC T4 Gc II3D Ex tc IIIC T120°C Dc IECEX EPL .c (3G-c, 3D-c, 3GD-c) Ex ec IIC T4 Gc Ex tc IIIC T120°C Dc
IECEX certificate of conformity depending on encoder			IECEX IBE 18.0032X IECEX CSA 21.0010X
Corrosion protection; surface protection			KS, OS1 – OS4, OSG
Connection			<ul style="list-style-type: none"> Terminal strip in the terminal box (optionally with or without temperature sensor) Integrated encoder connector on the fan guard side (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor Integrated encoder connector at the rear of the fan guard (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor⁴⁾
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			2×10^4 rad/s ²
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 $\pm 0.6^\circ$ (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) 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) (RS485)
Voltage output signal, differential (peak-to-peak) (A' = A - \bar{A} ; B' = B - \bar{B})	V_{t_diff}	1 V ± 10%
Voltage output signal non-differential (peak-to-peak)	V_t	0.5 V ± 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 ± 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 Ω ± 10%
Resistance between track and reference ground	R_{gnd}	≥ 1 kΩ
Load capacitance, output		≤ 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 = constant	k, l	–
Signal width track C	W_C	–
Signal logic track C		–
Voltage output signal, differential (peak-to-peak) (D' = D - \bar{D})	V_{t_diff}	Typical: 6.6 V – 10 V (± 10%)
Voltage output signal non-differential (peak-to-peak) (D, /D)	V_t	Typical: 3.3 V – 5 V (± 10%)
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 – 10 V (± 10%)
Voltage input signal, non-differential (peak-to-peak) (D, /D)	V_t	Typical: 3.3 V – 5 V (± 10%)

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Technical data

Add-on encoders

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} n = constant		90° ±2°
Accuracy of the incremental section ¹⁾		±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 ⁻¹
Maximum cable length ²⁾		100 m
Duration until fault message (deactivated outputs) ³⁾		≤ 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 ⁴ rad/s ²
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 With motor-external brake control: BE.. safety brake
Combination of motor protection/temperature		Motor protection: TF (in winding) 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 ¹⁾ (deactivated outputs)	ms	26 ms
Response time ²⁾ (Position, speed, acceleration)	ms	1 ms
Incremental resolution (Position increments per motor revolution)		65536 inc (16 bits)
Single-turn resolution (Position resolution per motor revolution)		–
Multi-turn resolution (maximum counter value for complete motor revolutions)		–
Accuracy of the incremental section ³⁾		±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 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 _{max}	6000 min ⁻¹
Maximum angular acceleration		2 × 10 ⁴ rad/s ²
Degree of protection in accordance with EN 60529		IP66
Corrosion and surface protection		KS, OS1 – OS4, OSG
Installation altitude ⁴⁾	h	≤ 3800 m
Ambient temperature of motor ⁴⁾	°C	With MOVI-C® control cabinet inverters and MOVIMOT® flexible decentralized inverter: -30 to +60 ⁴⁾ With MOVIMOT® advanced decentralized inverters: See the MOVIMOT® advanced operating instructions/manual
Cable length, maximum ⁵⁾	l	200 m EK8Z safety encoder: 100 m
Connection technology		<ul style="list-style-type: none"> • KD1: M23 hybrid connector on the terminal box, 1.5 – 4.0 mm² motor connection, 1.0 mm² brake connection • KDB: M40 hybrid connector on the terminal box, 6.0 – 10.0 mm² motor connection, 1.5 mm² brake connection • KD: Cable gland on the terminal box for hybrid cables with 1.5 – 10 mm² motor connection and 1 – 1.5 mm² brake connection • KDD: Motor and brake connection via cable gland; M23 signal connector on the terminal box
Explosion protection		–

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Technical data

Add-on encoders

	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 With motor-external brake control: BE.. safety brake
Combination of motor protection/temperature		Motor protection: TF (in winding) 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 ¹⁾ (deactivated outputs)	ms	≤ 25 ms + 3/4 revolution
Response time ²⁾ (Position, speed, acceleration)	ms	1 ms
Incremental resolution (Position increments per motor revolution)		65536 inc (16 bits)
Single-turn resolution (Position resolution per motor revolution)		65536 inc (16 bits)
Multi-turn resolution (maximum counter value for complete motor revolutions)		–
Accuracy of the incremental section ³⁾		±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 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 _{max}	6000 min ⁻¹
Maximum angular acceleration		2 × 10 ⁴ rad/s ²
Degree of protection in accordance with EN 60529		IP66
Corrosion and surface protection		KS, OS1 – OS4, OSG
Installation altitude ⁴⁾	h	≤ 3800 m
Ambient temperature of motor ⁴⁾	°C	With MOVI-C® control cabinet inverters and MOVIMOT® flexible decentralized inverter: -30 to +60 ⁴⁾ With MOVIMOT® advanced decentralized inverters: See the MOVIMOT® advanced operating instructions/manual
Cable length, maximum ⁵⁾	l	200 m EK9Z safety encoder: 100 m
Connection technology		<ul style="list-style-type: none"> • KD1: M23 hybrid connector on the terminal box, 1.5 – 4.0 mm² motor connection, 1.0 mm² brake connection • KDB: M40 hybrid connector on the terminal box, 6.0 – 10.0 mm² motor connection, 1.5 mm² brake connection • KD: Cable gland on the terminal box for hybrid cables with 1.5 – 10 mm² motor connection and 1 – 1.5 mm² brake connection • KDD: Motor and brake connection via cable gland; M23 signal connector on the terminal box
Explosion protection		–

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Technical data

Add-on encoders

	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 ¹⁾	EV8R ²⁾	EV8C ²⁾
Motor series and size		DRN71 – 355		
Signal output		Sin/cos	TTL (RS422)	HTL
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 _{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}	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 ± 10%	Typical: ≥ 2 V	Typical: ≥ 2 V
Voltage output signal non-differential (peak-to-peak)	V _t	0.5 V ± 10%	V _{Low} ≤ 0.5 V V _{High} ≥ 2.5 V	V _B ≤ 6 V: TTL V _{Low} ≤ 0.5 V V _{High} ≥ 2.5 V
				V _B > 6 V: HTL V _{Low} ≤ 3 V V _{High} ≥ (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}	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 _L /I _L	120 Ω ± 10%	120 Ω ± 10%	V _B ≤ 6 V: 120 Ω ± 10%
				V _B > 6 V: 1 – 3 kΩ
Resistance between tracks and reference ground	R _{gnd}	≥ 1 kΩ	–	–
Load capacitance, output	C _o	≤ 20 nF	–	–
Voltage output signal, differential (C' = C - \bar{C}) (peak-to-peak)	V _{t,diff e}	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, \bar{C}) (peak-to-peak)	V _{t,C}	–	V _{Low} ≤ 0.5 V V _{High} ≥ 2.5 V	V _B ≤ 6 V: TTL V _{Low} ≤ 0.5 V V _{High} ≥ 2.5 V
				V _B > 6 V: HTL V _{Low} ≤ 3 V V _{High} ≥ (V _B - 2.5 V)
Phase angle track C', n = constant	k, l	k = 180° ± 90° l = 180° ± 90°	–	–
Signal width track C	W _C	See figure	90° electrical	90° electrical
Signal logic track C		See figure	C = log 1, when A = B = log 1	C = log 1, when A = B = log 1
Pulse duty factor in accordance with IEC 60469-1, n = constant		–	50% ± 10%	50% ± 10%
Phase offset A : B; \bar{A} : \bar{B} n = constant	d	90° ± 2°	90° ± 20°	90° ± 20°
Accuracy of the incremental section ³⁾		±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)		

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Technical data

Add-on encoders

Encoder	Size, unit	EV8S ¹⁾	EV8R ²⁾	EV8C ²⁾
Shock resistance in accordance with EN 60068-2-27		≤ 100 g (t = 6 ms, 18 pulses)		
Maximum speed	n _{max}	6000 min ⁻¹		
Maximum cable length ⁴⁾		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 ⁵⁾ (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) II3G Ex ec IIC T4 Gc II3D Ex tc IIIC T120°C Dc IECEX EPL .c (3G-c, 3D-c, 3GD-c) Ex ec IIC T4 Gc 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"> M23 connector with 0.36 m cable directly on the encoder (without temperature sensor) Integrated encoder connector on the fan guard side (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor 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 		
Ambient temperature of motor	DRN71 – 132L	°C	–	-30 to +60
	DRN160 – 355	°C	–	-30 to +60
	DRN71 – 225	°C	-30 to +80	-30 to +60
	DRN250	°C	-30 to +60	-30 to +60
	DRN280	°C	-30 to +40	-30 to +40
	EDRN71 – 280	°C	-30 to +60	-30 to +60
	EDRN71 – 280S	°C	-30 to +60	-30 to +60
EDRN280M	°C	-30 to +40	-30 to +40	
Storage temperature	°C	-15 to +70		
Maximum angular acceleration		2x10 ⁴ rad/s ²		
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)		

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Encoder	Size, unit	EV8S ¹⁾	EV8R ²⁾	EV8C ²⁾
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 α . The secondary windings are mechanically offset by 90° .

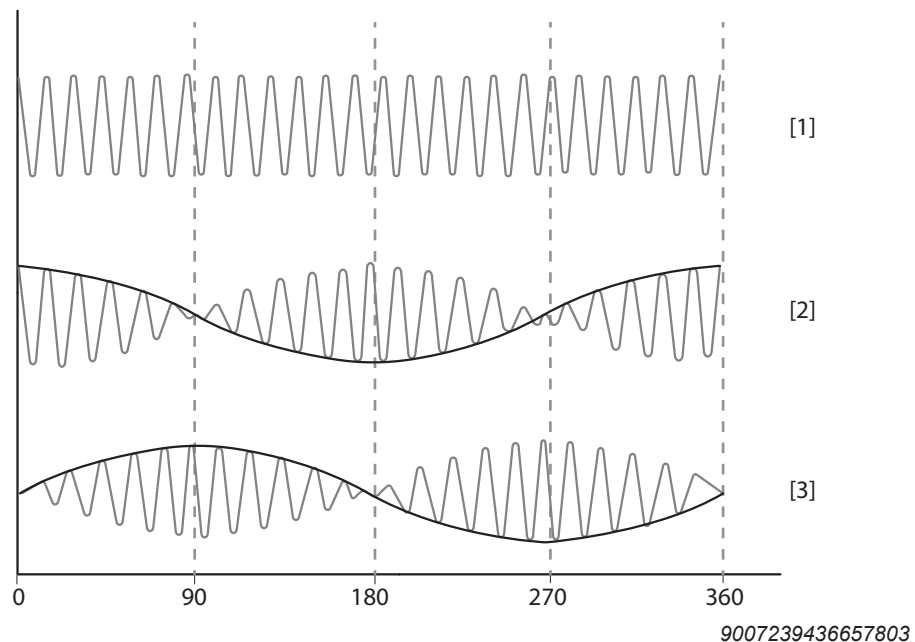
This results in 2 signals (sine and cosine) that are phase-shifted by 90° . These signals can be interpreted by the encoder evaluation unit in order to calculate an absolute position within a rotor revolution.

The sin and cos signal voltage are calculated according to the following calculation rule:

$$V_{S1-S3} = T_R \times U_{\text{Ref1-Ref2}} \times \cos(\alpha)$$

$$V_{S2-S4} = T_R \times V_{\text{Ref1-Ref2}} \times \sin(\alpha)$$

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} 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		$60 mA_{rms} (\leq 100 mA)$ 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. $25 mV_{rms}$
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} R_{S2-S4}	$62 \Omega \pm 10\%$
Temperature coefficient		$0.39\%/K$

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Technical data

Add-on encoders

Encoder		Size, unit	RK8M
Connection			<ul style="list-style-type: none"> • M23 signal connector on the terminal box (optionally with or without temperature sensor) • Terminal strip in the terminal box (optionally with or without temperature sensor) • M23 with 0.36 m cable directly on the encoder (without temperature sensor) • Integrated encoder connector on the fan guard side (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor • Integrated encoder connector at the rear of the fan guard (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor¹⁾
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 ⁻¹
Maximum mechanical speed		n_{max}	6000 min ⁻¹
Vibration resistance in accordance with EN 60068-2-6			10g = 98.1 m/s ²
Shock resistance in accordance with EN 60068-2-27			100g = 981 m/s ²
Maximum angular acceleration			≤ 2 × 10 ⁴ rad/s ²
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 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 _B	DC 7 V – 30 V	DC 10 V – 30 V
Maximum current consumption, effective value	I _{in}	140 mA	
Maximum pulse frequency	f _{max}	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 _{high}	1 V	
	V _{low}		
Output current per track, effective value	I _{out}	10 mA	
Pulse duty factor in accordance with IEC 60469-1, n = constant		–	
Phase offset A : B n = constant		90° ±2°	90° ±10°
Accuracy ¹⁾		0.0194°	–
Vibration resistance in accordance with EN 60068-2-6		≤ 100 m/s ² (at 10 Hz to 2 kHz)	
Shock resistance in accordance with EN 60068-2-27		≤ 2000 m/s ²	
Maximum speed	n _{max}	6000 min ⁻¹	
Maximum cable length		100 m	
Duration until fault message (deactivated outputs) ²⁾		25 ms	–
Activation time of rotary encoder internal diagnostics after switching on		–	
Storage temperature	°C	-15 to +70	
Maximum angular acceleration		10 ⁴ rad/s ²	
Degree of protection according to EN 60529		IP66	IP65
Explosion protection mark ATEX/IECEX		ATEX equipment category 3 (3G, 3D, 3GD) 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 ³⁾	DRN../DR2../DRU315	°C	-30 to +60
	DRN../DR2../DRU132 – 280	°C	-30 to +60
	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 _B	DC 7 V – 30 V	DC 7 V – 30 V
Maximum current consumption, effective value		I _{in}	140 mA	
Maximum pulse frequency		f _{max}	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 _{high}	1 V	
		V _{low}		
Output current per track, effective value		I _{out}	10 mA	
Pulse duty factor in accordance with IEC 60469-1, n = constant			–	
Phase offset A : B n = constant			90° ±2°	90° ±2°
Accuracy ¹⁾			0.0194°	0.0194°
Vibration resistance in accordance with EN 60068-2-6			≤ 100 m/s ² (at 10 Hz to 2 kHz)	
Shock resistance in accordance with EN 60068-2-27			≤ 1000 m/s ²	≤ 1000 m/s ²
Maximum speed		n _{max}	6000 min ⁻¹	
Maximum cable length			100 m	
Duration until fault message (deactivated outputs) ²⁾			25 ms	25 ms
Activation time of rotary encoder internal diagnostics after switching on			–	
Storage temperature		°C	-15 to +70	
Maximum angular acceleration			10 ⁴ rad/s ²	
Degree of protection according to EN 60529			IP66	IP66
Explosion protection mark ATEX/IECEX			ATEX equipment category 3 (3G, 3D, 3GD) 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 ³⁾	DRN../DR2../DRU71 – 132S	°C	-30 to +80 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 _B	DC 7 V – 30 V	DC 10 V – 30 V
Maximum current consumption, effective value	I _{in}	160 mA	140 mA
Maximum pulse frequency	f _{max}	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 _{high}	≥ DC 2.5 V	
	V _{low}	≤ DC 0.5 V	
Output current per track, effective value	I _{out}	25 mA	20 mA
Pulse duty factor in accordance with IEC 60469-1, n = constant		50% ± 10%	50% ± 20%
Phase offset A : B n = constant		90° ± 20°	
Vibration resistance in accordance with EN 60068-2-6		≤ 100 m/s ²	
Shock resistance in accordance with EN 60068-2-27		≤ 2000 m/s ²	≤ 2000 m/s ²
Maximum speed	n _{max}	6000 min ⁻¹	
Maximum cable length		100 m	
Storage temperature	°C	-15 to +70	
Maximum angular acceleration		10 ⁴ rad/s ²	
Degree of protection according to EN 60529		IP66	IP65
Explosion protection mark ATEX/IECEX		ATEX equipment category 3 (3G, 3D, 3GD) 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	–
	EDRN80MS – 132S	°C	–
	EDRN132M – 200L	°C	-30 to +60
	EDRN225	°C	-30 to +60
	EDRN250 – 280	°C	-30 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}	≥ DC 2.5 V	
		V _{low}	≤ DC 0.5 V	
Output current per track, effective value		I _{out}	25 mA	
Pulse duty factor in accordance with IEC 60469-1, n = constant			50% ± 10%	
Phase offset A : B n = constant			90° ± 20°	
Vibration resistance in accordance with EN 60068-2-6			≤ 100 m/s ²	
Shock resistance in accordance with EN 60068-2-27			≤ 1000 m/s ²	
Maximum speed		n _{max}	6000 min ⁻¹	
Maximum cable length			100 m	
Storage temperature		°C	-15 to +70	
Maximum angular acceleration			10 ⁴ rad/s ²	
Degree of protection according to EN 60529			IP66	
Explosion protection mark ATEX/IECEX			ATEX equipment category 3 (3G, 3D, 3GD) 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../DRU71 – 132S	°C	-30 to +60	–
	DRN../DR2../DRU280	°C	–	-30 to +40
	EDRN80MS – 132S	°C	-30 to +60	–
	EDRN132M – 200L	°C	–	-30 to +50
	EDRN225	°C	–	-30 to +60
	EDRN250 – 280	°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 _B	DC 4.75 V – 30 V	DC 10 V – 30 V
Maximum current consumption, effective value	I _{in}	240 mA	225 mA
Maximum pulse frequency	f _{max}	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 _{high}	V _B -2.5 V	V _B -2 V
	V _{low}	≤ DC 1.1 V	≤ DC 2.5 V
Output current per track, effective value	I _{out}	60 mA	30 mA
Pulse duty factor in accordance with IEC 60469-1, n = constant		50% ± 10%	50% ± 20%
Phase offset A : B n = constant		90° ±20°	
Vibration resistance in accordance with EN 60068-2-6		≤ 100 m/s ²	
Shock resistance in accordance with EN 60068-2-27		≤ 2000 m/s ²	
Maximum speed	n _{max}	6000 min ⁻¹	
Maximum cable length		50 – 100 m 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 if the maximum encoder supply is 12 V; 100 m: in all other cases.	100 m
Storage temperature	°C	-15 to +70	
Maximum angular acceleration		10 ⁴ rad/s ²	
Degree of protection according to EN 60529		IP66	IP65
Explosion protection mark ATEX/IECEX		ATEX equipment category 3 (3G, 3D, 3GD) 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	–
	EDRN132M – 200L	°C	-30 to +60
	EDRN225	°C	-30 to +60
	EDRN250 – 280	°C	-30 to +60
Functional safety		–	–

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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 n = constant			90° ±20°	
Vibration resistance in accordance with EN 60068-2-6			≤ 100 m/s ²	
Shock resistance in accordance with EN 60068-2-27			≤ 1000 m/s ²	
Maximum speed		n_{max}	6000 min ⁻¹	
Maximum cable length			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 if the maximum encoder supply is 12 V; 100 m: in all other cases	
Storage temperature		°C	-15 to +70	
Maximum angular acceleration			10 ⁴ rad/s ²	
Degree of protection according to EN 60529			IP66	
Explosion protection mark ATEX/IECEX			ATEX equipment category 3 (3G, 3D, 3GD) 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 $n = \text{constant}$		90° \pm 20°	
Vibration resistance in accordance with EN 60068-2-6 at 10 Hz – 2 kHz		\leq 100 m/s ²	
Shock resistance in accordance with EN 60068-2-27		\leq 2000 m/s ²	
Maximum speed	n_{max}	6000 min ⁻¹	
Storage temperature	°C	-15 to +70	
Maximum angular acceleration		10 ⁴ rad/s ²	
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) HIPERFACE®	65536 (16 bits) (RS485)
Accuracy of the incremental section ¹⁾		$\pm 0.0125^\circ$ ($\pm 45''$)	$\pm 0.0194^\circ$ ($\pm 70''$)
Accuracy of the absolute section		$\pm 0.014^\circ$ ($\pm 52''$)	± 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 Ω \pm 10%	
Resistance between track and reference ground	R_{gnd}	≥ 1 k Ω	
Load capacitance, output		≤ 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" (\rightarrow 136)	
Signal width track C	W_C	See "Phase relationships" (\rightarrow 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, /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_{L_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_{L_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 ²⁾	-
Safety-related measuring step		0.09° , 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		≤ 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 ⁻¹	
Service life of the ball bearings		3.6×10^9 revolutions	-
Maximum cable length ³⁾		100 m	
Duration until fault message (deactivated outputs) ⁴⁾		HIPERFACE®	≤ 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 FS encoder: IP65 in assembled state	IP66
Installation altitude	h	≤ 2000 m above sea level	≤ 4000 m above sea level
Explosion protection mark ATEX/IECEX		-	ATEX equipment category 3 (3G, 3D, 3GD) II3G Ex ec IIC T4 Gc II3D Ex tc IIIC T120°C Dc IECEX EPL .c (3G-c, 3D-c, 3GD-c) Ex ec IIC T4 Gc Ex tc IIIC T120°C Dc
IECEX certificate of conformity depending on encoder		-	IECEX IBE 18.0032X IECEX CSA 21.0010X
Corrosion protection; surface protection		KS, OS1 – OS4, OSG	KS, OS1 – OS4, OSG

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Encoder		Size, unit	AK8H	AK8W
Connection			<ul style="list-style-type: none"> M23 signal connector on the terminal box (optionally with or without temperature sensor) Terminal strip in the terminal box (optionally with or without temperature sensor) M23 with 0.36 m cable directly on the encoder (without temperature sensor) Integrated encoder connector on the fan guard side (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor Integrated encoder connector at the rear of the fan guard (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor⁵⁾ 	
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 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 ¹⁾
Motor series and size		DRN../DRU../DR2.63 – 355
Pulse output		sin/cos + SSI, RS422
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	4096 (12 bits) (SSI, RS422)
Accuracy of the incremental section ²⁾		$\pm 0.0194^\circ$ ($\pm 70''$)
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_{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 Ω \pm 10%
Resistance between track and reference ground	R_{gnd}	≥ 1 k Ω
Load capacitance, output		≤ 20 nF
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) ($D, /D$)	V_t	Typical: 3.3 V to 5 V ($\pm 10\%$)
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
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	–

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Encoder	Size, unit	AK8Y ¹⁾	
Signal width track C	W _C	–	
Signal logic track C		–	
Pulse duty factor in accordance with IEC 60469-1, n = constant		–	
Phase offset A : B; \bar{A} : \bar{B} 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 ³⁾	
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 ⁻¹	
Maximum cable length ⁴⁾		100 m	
Duration until fault message (deactivated outputs) ⁵⁾		≤ 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) II3G Ex ec IIC T4 Gc II3D Ex tc IIIC T120°C Dc IECEX EPL c (3G-c, 3D-c, 3GD-c) Ex ec IIC T4 Gc Ex tc IIIC T120°C Dc	
IECEX certificate of conformity depending on encoder		IECEX IBE 18.0032X IECEX CSA 21.0010X	
Corrosion protection; surface protection		KS, OS1 – OS4, OSG	
Connection		<ul style="list-style-type: none"> • M23 signal connector on the terminal box (optionally with or without temperature sensor) • Terminal strip in the terminal box (optionally with or without temperature sensor) • M23 with 0.36 m cable directly on the encoder (without temperature sensor) • Integrated encoder connector on the fan guard side (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor • Integrated encoder connector at the rear of the fan guard (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor⁶⁾ 	
Storage temperature	°C	-15 to +70	
Maximum angular acceleration		2×10 ⁴ rad/s ²	
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 ¹⁾
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 With motor-external brake control: BE.. brake, BE.. safety brake
Combination of motor protection/temperature		Motor protection: TF (in winding) 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 ¹⁾ (deactivated outputs)	ms	26 ms + 3/4 revolution
Response time ²⁾ (Position, speed, acceleration)	ms	1 ms
Incremental resolution (Position increments per motor revolution)		–
Single-turn resolution (Position resolution per motor revolution)		65536 inc (16 bits)
Multi-turn resolution (maximum counter value for complete motor revolutions)		65536 inc (16 bits)
Accuracy of the incremental section ³⁾		±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 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 _{max}	6000 min ⁻¹
Maximum angular acceleration		2 × 10 ⁴ rad/s ²
Degree of protection in accordance with EN 60529		IP66
Corrosion and surface protection		KS, OS1 – OS4, OSG
Installation altitude ⁴⁾	h	≤ 3800 m
Ambient temperature of motor ⁴⁾	°C	With MOVI-C® control cabinet inverters and MOVIMOT® flexible decentralized inverter: -40 to +60 With MOVIMOT® advanced decentralized inverters: See the MOVIMOT® advanced operating instructions/manual
Cable length, maximum ⁵⁾	l	200 m AK8Z safety encoder: 100 m
Connection technology		<ul style="list-style-type: none"> • KD1: M23 hybrid connector on the terminal box, 1.5 – 4.0 mm² motor connection, 1.0 mm² brake connection • KDB: M40 hybrid connector on the terminal box, 6.0 – 10.0 mm² motor connection, 1.5 mm² brake connection • KD: Cable gland on the terminal box for hybrid cables with 1.5 – 10 mm² motor connection and 1 – 1.5 mm² brake connection • KDD: Motor and brake connection via cable gland; M23 signal connector on the terminal box
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 ¹⁾	AV8H ²⁾
Motor series and size		DRN../DRU../DR2.71 – 355		
Signal output		sin/cos + SSI, RS422	sin/cos + RS485	HIPERFACE®
Supply voltage	V _B	DC 7 V – 30 V	DC 7 V – 30 V	DC 7 V – 12 V
Supply voltage for design as safety encoder	V _{B,FS}	DC 7 V – 30 V	DC 7 V – 30 V	–
Maximum current consumption, free of load	I _{in}	100 mA (at V _B = 7 V)	100 mA (at V _B = 7 V)	80 mA
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)	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) (SSI, RS422)	65536 (16 bits) (RS485)	32768 (15 bits) HIPERFACE®
Accuracy of the incremental section ³⁾		±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) (A' = A - \bar{A} ; B' = B - \bar{B})	V _{t,diff}	1 V ± 10%	1 V ± 10%	Typical: 6.6 V to 10 V (± 10%)
Voltage output signal non-differential (peak-to-peak)	V _t	0.5 V ± 10%	0.5 V ± 10%	Typical: 3.3 V to 5 V (± 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 ± 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 _L /I _L	120 Ω ± 10%	120 Ω ± 10%	120 Ω ± 10%
Resistance between track and reference ground	R _{gnd}	≥ 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 _{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 = constant	k, l	–	–	See "Phase relationships" (→ 136)
Signal width track C	W _c	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} 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 ⁴⁾	–	–

Encoder	Size, unit	AV8Y	AV8W ¹⁾	AV8H ²⁾	
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 _{max}	6000 min ⁻¹			
Maximum cable length ⁵⁾		100 m			
Duration until fault message (deactivated outputs) ⁶⁾		≤ 25 ms + 3/4 revolution	≤ 25 ms + 3/4 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	≤ 4000 m above sea level	≤ 4000 m above sea level	≤ 2000 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) 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 18.0032X	IECEX IBE 18.0032X	–	
Corrosion protection; surface protection		KS, OS1 – OS4, OSG			
Connection		<ul style="list-style-type: none"> • M23 connector with 0.36 m cable directly on the encoder (without temperature sensor) • Integrated encoder connector on the fan guard side (can be preassembled and plugged in the field); optionally with M23 connector; without temperature sensor • 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 			
Storage temperature	°C	-15 to +70			
Maximum angular acceleration		2×10 ⁴ rad/s ²	2×10 ⁴ rad/s ²	10 ⁴ 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	-30 to +60
	DRN../DR2../DRU280	°C	-30 to +40	-30 to +40	-30 to +40
	EDRN71 – 280S	°C	-30 to +60	-30 to +60	–
	EDRN280M	°C	-30 to +40	-30 to +40	–
	DR2C71 – 180	°C	–	-30 to +60	-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 ±0.6° (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_B	DC 7 V – 30 V		
Maximum current consumption	I_{in}	150 mA		
Maximum pulse frequency	f_{max}	200 kHz		
Incremental tracks; periods per revolution	A, B	2048 (11 bits)		
	C	–		
Output amplitude per track	V_{high}	1 V _{pp}		
	V_{low}			
Signal output		Sin/cos		
Output current per track	I_{out}	10 mA		
Pulse duty factor in accordance with IEC 60469-1, n = constant		–		
Phase offset A : B n = constant		90° ± 2°		
Accuracy of the incremental section ¹⁾		±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 ²		
Shock resistance in accordance with EN 60068-2-27		≤ 1000 m/s ²	≤ 1000 m/s ²	≤ 2000 m/s ²
Maximum speed	n_{max}	6000 min ⁻¹		
		In area at risk of explosion: -30 to +40 °C at maximum 6000 min ⁻¹ > 40 °C at maximum 4500 min ⁻¹		
Duration until fault message (deactivated outputs) ²⁾		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) 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, unit	AS7W	AV7W	AG7W
Storage temperature		°C	-15 to +70		
Maximum angular acceleration			10 ⁴ rad/s ²		
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 _B	DC 7 V – 30 V	DC 9 V – 30 V
Maximum current consumption	I _{in}	150 mA	
Maximum pulse frequency	f _{limit}	200 kHz	120 kHz
Incremental tracks; periods per revolution	A, B	2048 (11 bits)	
	C	–	
Output amplitude per track	V _{high}	1 V _{pp}	≥ DC 2.5 V _{pp}
	V _{low}	1 V _{pp}	≤ DC 0.5 V _{pp}
Output current per track	I _{out}	10 mA	20 mA
Pulse duty factor in accordance with IEC 60469-1, n = constant		Not available	50 ±20%
Phase offset A : B n = constant		90° ± 2°	90° ± 20°
Accuracy of the incremental section ¹⁾		±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 ²	
Shock resistance in accordance with EN 60068-2-27		≤ 2000 m/s ²	≤ 2000 m/s ²
		6000 min ⁻¹ In area at risk of explosion: -30 to +40 °C at maximum 6000 min ⁻¹ > 40 °C at maximum 4500 min ⁻¹	3500 min ⁻¹
Duration until fault message (deactivated outputs) ²⁾		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		≤ 4000 m above sea level	
	h	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) 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 ⁴ rad/s ²	

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

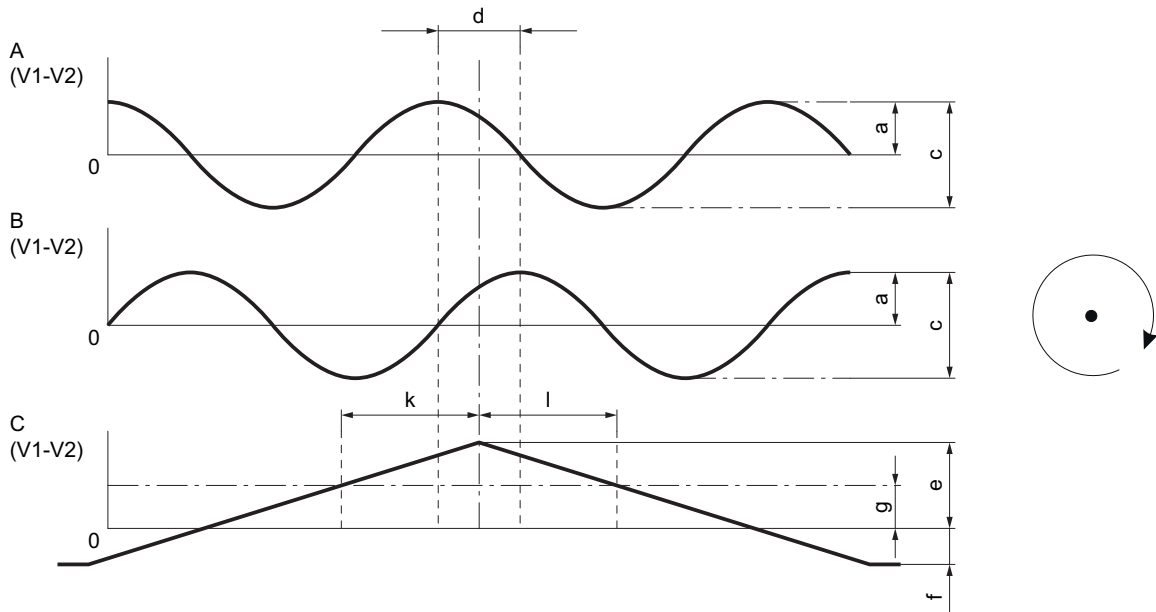
Encoder	Size, unit	AS7Y	AV7Y
Motor series and size		DRN../DRU../DR2.71 – 315	
Signal output		Sin/cos	Sin/cos
Supply voltage	V_B	DC 7 V – 30 V	DC 7 V – 30 V
Maximum current consumption	I_{in}	150 mA	
Maximum pulse frequency	f_{limit}	200 kHz	200 kHz
Incremental tracks; periods per revolution	A, B	2048 (11 bits)	
	C	–	
Output amplitude per track	V_{high}	1 V _{pp}	1 V _{pp}
	V_{low}	1 V _{pp}	1 V _{pp}
Output current per track	I_{out}	10 mA	10 mA
Pulse duty factor in accordance with IEC 60469-1, n = constant		–	
Phase offset A : B n = constant		90° ± 2°	90° ± 2°
Accuracy of the incremental section ¹⁾		±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 ²	
Shock resistance in accordance with EN 60068-2-27		≤ 1000 m/s ²	≤ 1000 m/s ²
Maximum speed	n_{max}	6000 min ⁻¹	6000 min ⁻¹
Duration until fault message (deactivated outputs) ²⁾		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		≤ 4000 m above sea level	
	h	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) 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 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 ⁴ rad/s ²	
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.

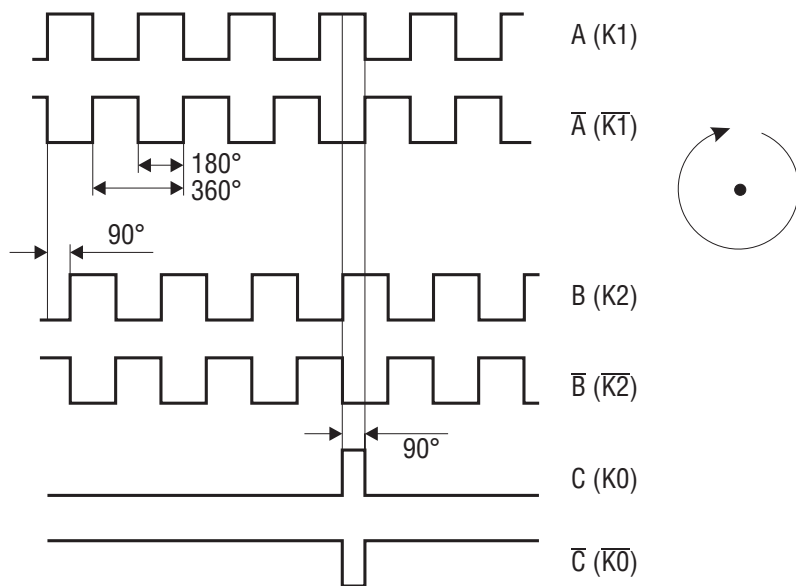
6.5 Phase relationships

6.5.1 sin/cos



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6.5.2 HTL/TTL



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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.

6.6.1 E17C 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 _D value ¹⁾	8.0 × 10 ⁻⁸ 1/h = 80 FIT (T _{amb} ≤ 60 °C)	
MTTF _D value ¹⁾	–	202 years (T _{amb} ≤ 60 °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 _D value ¹⁾ (without mounting on the motor)	$1.53 \times 10^{-8} \text{ 1/h} = 15.3 \text{ FIT (} T_{\text{amb}} \leq 45 \text{ °C)}$ $1.88 \times 10^{-8} \text{ 1/h} = 18.8 \text{ FIT (} T_{\text{amb}} \leq 60 \text{ °C)}$	
MTTF _D value ¹⁾ (without mounting on the motor)	–	1311 years ($T_{\text{amb}} \leq 45 \text{ °C}$) 934 years ($T_{\text{amb}} \leq 60 \text{ °C}$)
PFH _D value ¹⁾ (with mounting on the motor; takes into account a derating due to motor reheating)	$5.0 \times 10^{-8} \text{ 1/h} = 50 \text{ FIT (} T_{\text{amb}} \leq 60 \text{ °C)}$	
MTTF _D value ¹⁾ (with mounting on the motor; takes into account a derating due to motor reheating)	–	212 years ($T_{\text{amb}} \leq 60 \text{ °C}$)
Service life/proof test interval	20 years	
Motor/encoder connection (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.

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 _D value ¹⁾ (without mounting on the motor)	$1.42 \times 10^{-8} \text{ 1/h} = 14.2 \text{ FIT (} T_{\text{amb}} \leq 45 \text{ °C)}$ $1.77 \times 10^{-8} \text{ 1/h} = 17.7 \text{ FIT (} T_{\text{amb}} \leq 60 \text{ °C)}$	
MTTF _D value ¹⁾ (without mounting on the motor)	–	1489 years ($T_{\text{amb}} \leq 45 \text{ °C}$) 1030 years ($T_{\text{amb}} \leq 60 \text{ °C}$)
PFH _D value ¹⁾ (with mounting on the motor; takes into account a derating due to motor reheating)	$5.0 \times 10^{-8} \text{ 1/h} = 50 \text{ FIT (} T_{\text{amb}} \leq 60 \text{ °C)}$	
MTTF _D value ¹⁾ (with mounting on the motor; takes into account a derating due to motor reheating)	–	212 years ($T_{\text{amb}} \leq 60 \text{ °C}$)
Service life/proof test interval	20 years	
Motor/encoder connection (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.

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 _D value ¹⁾ (without mounting on the motor)	1.7 × 10 ⁻⁸ 1/h = 17.0 FIT (T _{amb} ≤ 60 °C)	
PFH _D value ¹⁾ (with mounting on the motor; takes into account a derating due to motor reheating)	5.0 × 10 ⁻⁸ 1/h = 50 FIT (T _{amb} ≤ 60 °C)	
Service life/proof test interval	20 years	
Motor/encoder connection (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.

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 _D value ¹⁾ (with mounting on the motor; takes into account a derating due to motor reheating)	6.0 × 10 ⁻⁸ 1/h = 60 FIT (T _{amb} ≤ 60 °C)	
Service life/proof test interval	Motor without forced cooling fan:	20 years (T _{amb} ≤ 40 °C) 15 years (T _{amb} ≤ 50 °C) 12 years (T _{amb} ≤ 60 °C)
	Motor with forced cooling fan:	20 years (T _{amb} ≤ 60 °C)
Motor/encoder connection (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 _D value ¹⁾ (without mounting on the motor)	8.5 × 10 ⁻⁹ 1/h = 8.5 FIT (T _{amb} ≤ 45 °C) 1.3 × 10 ⁻⁸ 1/h = 13 FIT (T _{amb} ≤ 60 °C)	
MTTF _D value ¹⁾ (without mounting on the motor)	–	1306 years (T _{amb} ≤ 45 °C) 895 years (T _{amb} ≤ 60 °C)
PFH _D value ¹⁾ (with mounting on the motor; takes into account a derating due to motor reheating)	5.0 × 10 ⁻⁸ 1/h = 50 FIT (T _{amb} ≤ 60 °C)	
MTTF _D value ¹⁾ (with mounting on the motor; takes into account a derating due to motor reheating)	–	212 years (T _{amb} ≤ 60 °C)
Service life/proof test interval	20 years	
Motor/encoder connection (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.

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 _D value ¹⁾ (without mounting on the motor)	9.3×10^{-9} 1/h = 9.3 FIT ($T_{amb} \leq 45$ °C) 1.4×10^{-8} 1/h = 14 FIT ($T_{amb} \leq 60$ °C)	
MTTF _D value ¹⁾ (without mounting on the motor)	–	1155 years ($T_{amb} \leq 45$ °C) 753 years ($T_{amb} \leq 60$ °C)
PFH _D value ¹⁾ (with mounting on the motor; takes into account a derating due to motor reheating)	5.0×10^{-8} 1/h = 50 FIT ($T_{amb} \leq 60$ °C)	
MTTF _D value ¹⁾ (with mounting on the motor; takes into account a derating due to motor reheating)	–	212 years ($T_{amb} \leq 60$ °C)
Service life/proof test interval	20 years	
Motor/encoder connection (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.

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

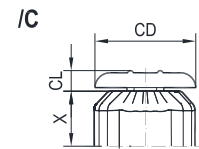
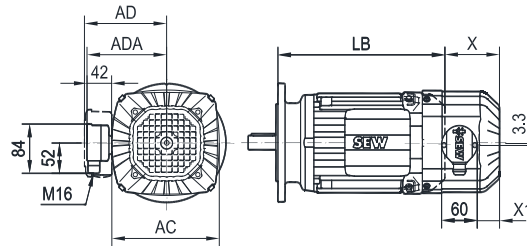
Drehstrommotor
DR2G63-355 / .K8. / .K9.
A1GA, A2GA; AIGA, AIGB; KIGA

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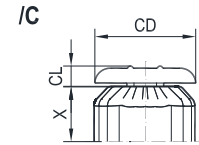
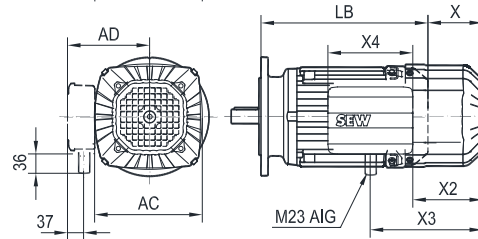


DR2.63 – 100

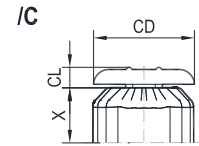
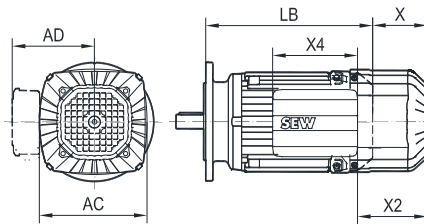
DR..63-100
/.K8.
A1GA
A2GA
radial



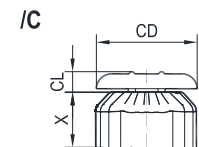
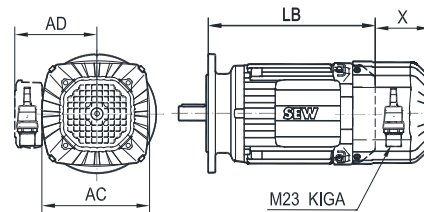
DR..71-100
/.K8.
AIGA
AIGB



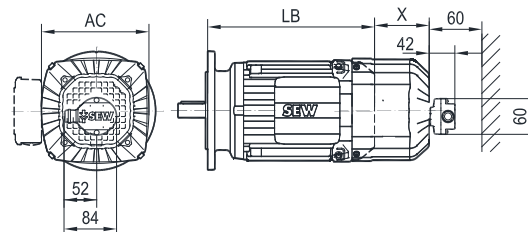
DR..71-100
/.K8. / .K9.



DR..63-100
/.K8.
KIGA



DR..71-100
/.K8.
A1GA
A2GA
axial



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Drehstrommotor

DR2G63-355 / .K8. / .K9.

A1GA, A2GA; AIGA, AIGB; KIGA

DR2.63 – 100

Motortyp	LB (B5/ B14)	LB (B3)	AD	AC	ADA	X	X1	X2	X3	X4	CD	CL
DRN63MS DR2S63MS DR2S63MSR	182	180	98	122	102	81	11	-	-	-	112	35
DRN63M DRN63MR DR2S63MR DR2S63MQ	196	194										
DRN71MS DRN71MSR DR2C71MSA DR2S71MS DR2L71MS DR2M71MS	200	198	118	139	110	92	18	105	171	143	131	33,5
DRN71M DR2S71MR DR2S71M DR2L71M DR2M71M DR2C71MA	220	218										
DRN80MK DR2C80MKA DR2S80MK DR2L80MK	239	237	128	156	118	93	16	112	178	143	147	33,5
DRN80MS DR2S80MS	257	255										
DRN80M DR2C80MA DR2S80M DR2L80M	285	283										
DRN90S DRN90SR DR2S90S DRU90S	279	277	140	179	130	85	28	111	177	143	147	33,5
DRN90L DRU90L DR2S90L	311	309										
DRN100LS DR2S100LS DRU100LS/R	309	307	157	197	139	88	34	111	177	143	Ø170	34
DRN100LM DR2S100LM DRN100L DR2S100L DRU100L	359	357										

Maßblatt

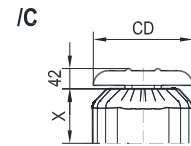
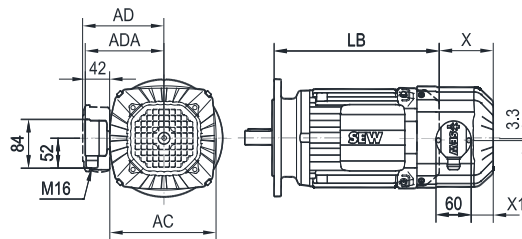
Drehstrommotor
DR2G63-355 / .K8. / .K9.
A1GA, A2GA; AIGA, AIGB; KIGA

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63374684.02

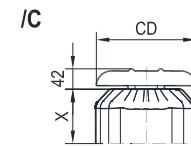
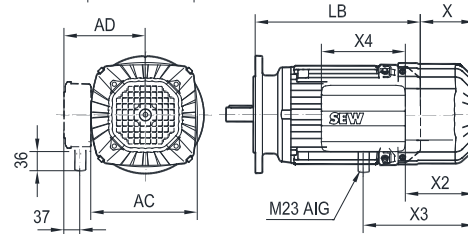


DR2.112 – 180

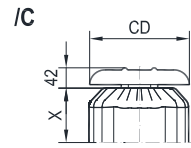
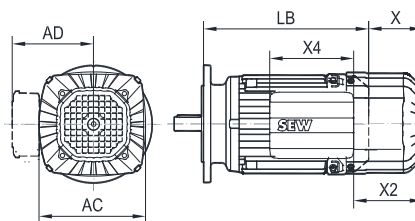
/.K8.
A1GA
A2GA
radial



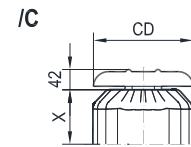
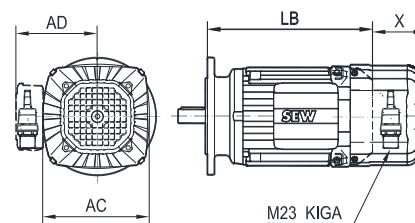
/.K8.
AIGA
AIGB



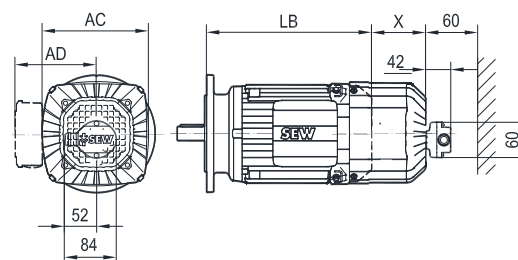
/.K8.
/.K9.



/.K8.
KIGA



/.K8.
A1GA
A2GA
axial



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EURODRIVE**Maßblatt**

Drehstrommotor

DR2G63-355 / .K8. / .K9.

A1GA, A2GA; AIGA, AIGB; KIGA

DR2.112 – 180

Motortyp	LB (B5/ B14)	LB (B3)	AD	AC	ADA	X	X1	X2	X3	X4	CD
DRN112M DR2S112M	387	385	170	221	151	125	38	170	236	143	Ø221
DRN112M (6)	379										
DRN132S DR2S132S DR2S132SR DRU132S	437	435	228	261	172	84	27	141	216	186	Ø262
DRN132M DR2S132M DRU132M	439	437									
DRN132L (8) DR2L132L	462	462									
DRN132L (4,6)	464	462									
DRN160M DR2S160M DR2L160M DRU160M DRU160MP DRN160L DRU160LR DRU160L DR2S160L DR2L160L	532	529	253	316	199	84	38	159	234	186	Ø309
DRN180M DR2S180M DR2L180M DRU180M DRN180L DRU180L DR2S180L DR2L180L	555	554	268	357	220	84	38	159	234	186	Ø354

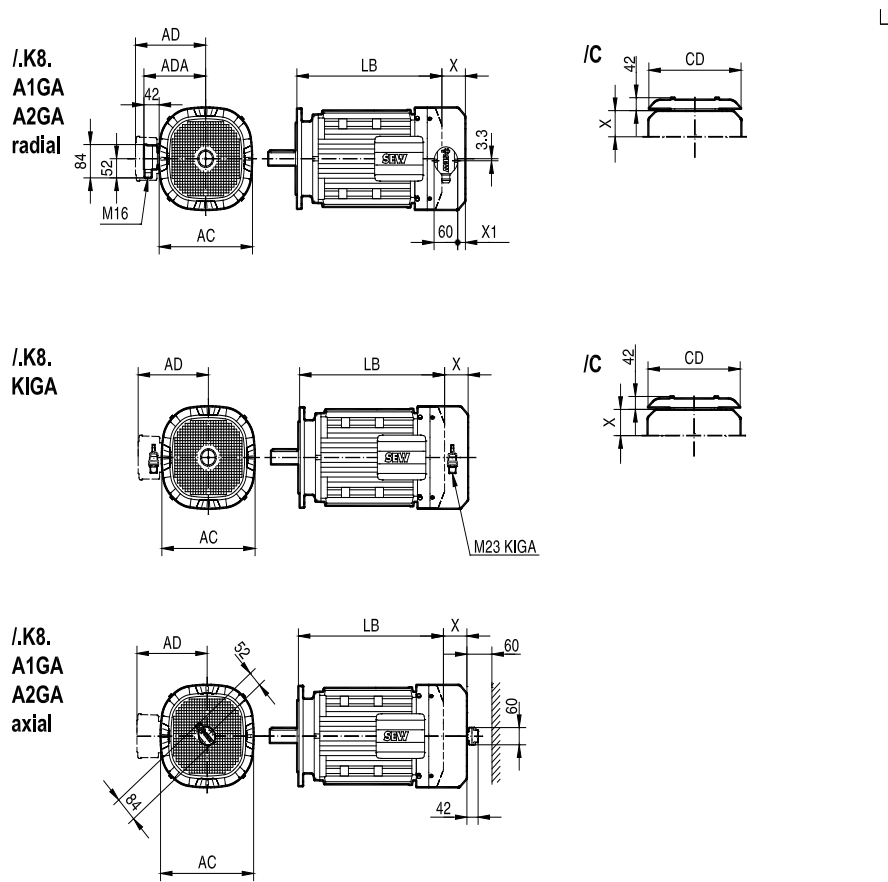
Maßblatt

Drehstrommotor
DR2G63-355 / .K8. / .K9.
A1GA, A2GA; AIGA, AIGB; KIGA

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DR2.200 – 280



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Maßblatt

Drehstrommotor

DR2G63-355 / .K8. / .K9.

A1GA, A2GA; AIGA, AIGB; KIGA

08 388 02 23

63374684.02

**DR2.200 – 280**

Motortyp	LB (B5/ B14)	LB (B3)	AD	AC	ADA	X	X1	CD
DRN200L DRU200L DRU200LR DR2S200L DR2L200L	649	646	283	Ø394	237	84	35	Ø415
DRN225S DR2S225S DR2L225S DRU225S DRN225M	617	614	305	Ø434	259	84	29	Ø415
DRN225ME DRU225ME	697	694						
DRN250M DRN250ME DRU250M DRU250ME	752	750	394	Ø495	290	79	69	Ø490
DRN280S	752	750	394	Ø495	290	79	69	Ø490
DRN280M DRU280MR	847	845						

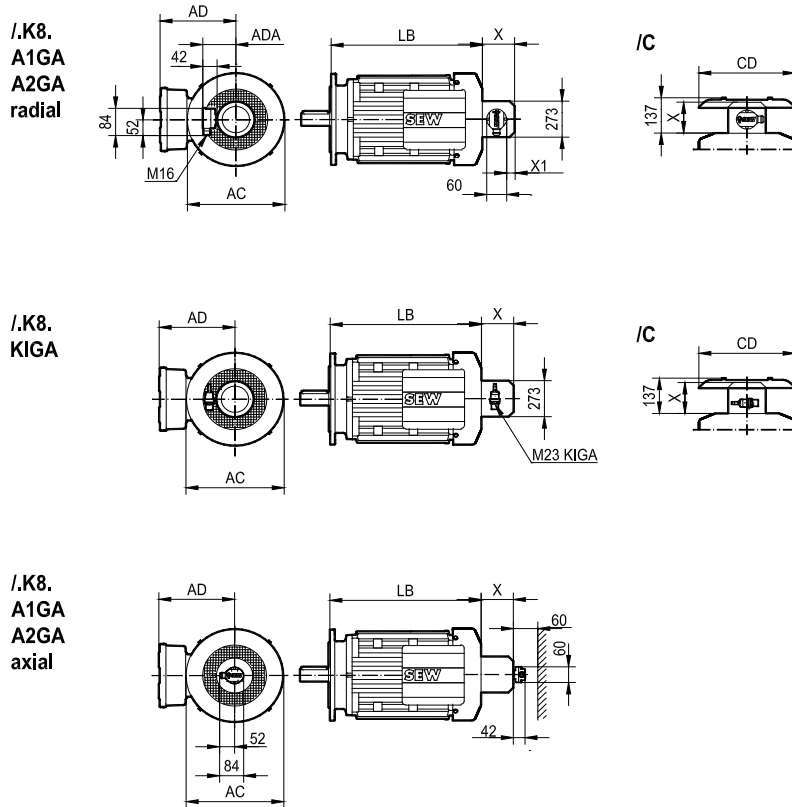
Maßblatt

Drehstrommotor
DR2G63-355 / .K8. / .K9.
A1GA, A2GA; AIGA, AIGB; KIGA

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DR2.315 – 355



Maßblatt

Drehstrommotor

DR2G63-355 / K8. / K9.

A1GA, A2GA; AIGA, AIGB; KIGA

08 388 02 23

63374684.02

**DR2.315 – 355**

Motortyp	LB (B5/ B14)	LB (B3)	AD	AC	ADA	X	X1	CD
DRN315S DRN315M DRU315SR DRU315S DRU315M DRU315L DRU315LR	941	939	506	Ø624	199	129	29	Ø590
DRN315ME	1071	1069						
DRN315L DRN315H DRU315H DRU315HB DRU315HG DRU315HR	1071	1069	518	Ø624	199	129	29	Ø590
DRN355MS DRN355MR DRN355M DRN355ML DRU355ML DRU355MS DRU355M DRU355ML	1367	1352	600	Ø700	178	129	29	Ø697

6.7.2 Dimension sheets for DRN..., DR2..., DRU..., DR2C.. brakemotors with encoders

Maßblatt

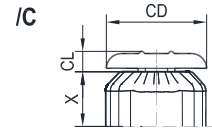
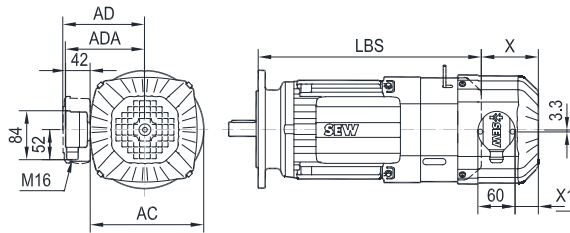
Drehstrombremsmotor
DR2G63-315 /.K8. /.K9.
A1GA, A2GA; AIGA, AIGB; KIGA

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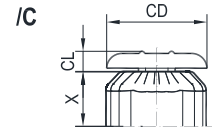
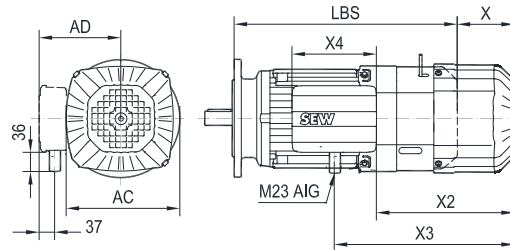


DR2.63 – 100/BE

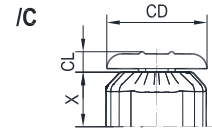
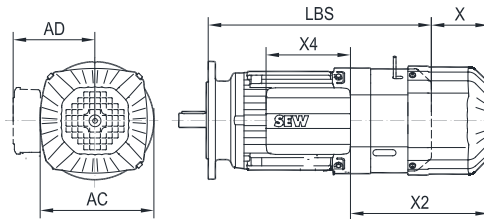
DR..63-100
/.K8./BE
A1GA
A2GA
radial



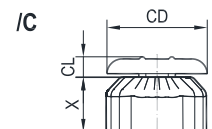
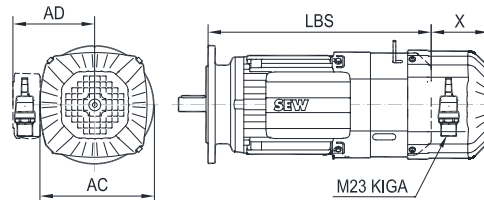
DR..71-100
/.K8./BE
AIGA
AIGB



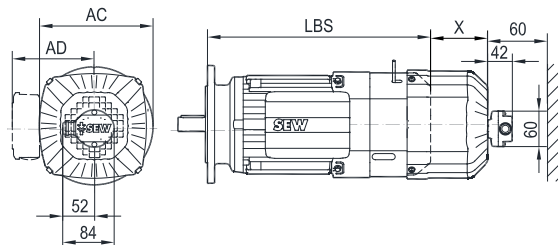
DR..71-100
/.K8./K9./BE



DR..63-100
/.K8./BE
KIGA



DR..71-100
/.K8./BE
A1GA
A2GA
axial



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Maßblatt

Drehstrombremsmotor
 DR2G63-315 / .K8. / .K9.
 A1GA, A2GA; AIGA, AIGB; KIGA

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 63411431.02

SEW
 EURODRIVE

DR2.63 – 100/BE

Motortyp	LBS (B5/B14)	LBS (B3)	AD	AC	ADA	X	X1	X2	X3	X4	CD	CL
DRN63MS DR2S63MS DR2S63MSR	238	236	98	122	102	75	11	-	-	-	112	35
DRN63M DRN63MR DR2S63MR DR2S63MQ	252	250										
DRN71MS DRN71MSR DR2C71MSA DR2S71MS DR2L71MS DR2M71MS	268	266	129	139	110	92	18	173	239	143	131	33,5
DRN71M DR2S71MR DR2S71M DR2L71M DR2M71M DR2C71MA	288	286										
DRN80MK DR2C80MKA DR2S80MK DR2L80MK	320	318	139	156	118	93	16	193	259	143	147	33,5
DRN80MS DR2S80MS	338	336										
DRN80M DR2C80MA DR2S80M DR2L80M	366	364										
DRN90S DRN90SR DR2S90S DRU90S	373	371	150	179	130	83	28	202	268	143	147	33,5
DRN90L DRU90L DR2S90L	405	403										
DRN100LS DR2S100LS DRU100LS/R	402	400	158	197	139	86	34	203	269	143	Ø170	33,5
DRN100LM DR2S100LM DRN100L DR2S100L DRU100L	452	450										

Maßblatt

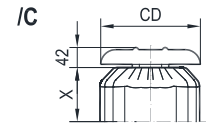
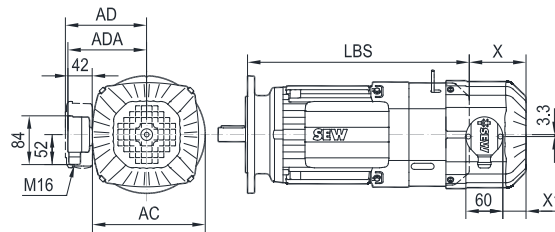
Drehstrombremsmotor
DR2G63-315 /K8./K9.
A1GA, A2GA; AIGA, AIGB; KIGA

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63411431.02

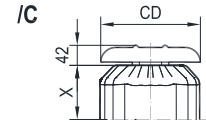
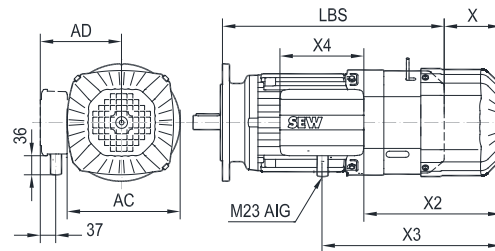


DR2.112 – 180/BE

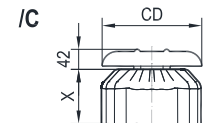
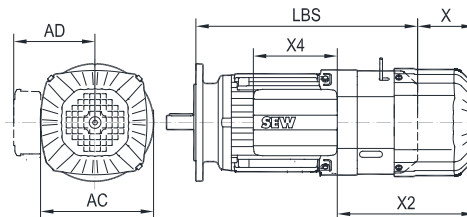
/K8./BE
A1GA
A2GA
radial



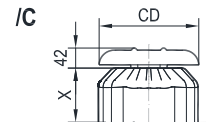
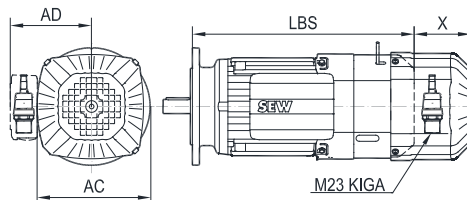
/K8./BE
AIGA
AIGB



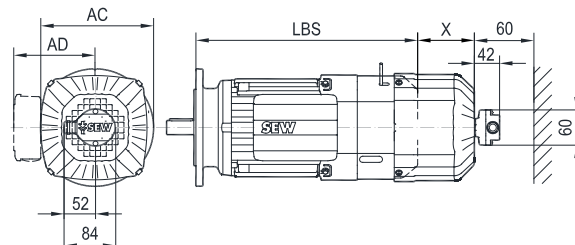
/K8./K9./BE



/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 (B5/B14)	LBS (B3)	AD	AC	ADA	X	X1	X2	X3	X4	CD
DRN112M DR2S112M	499	497	172	221	151	121	38	278	344	143	Ø221
DRN112M (6)	491										
DRN132S DR2S132S DR2S132SR DRU132S	549	547	228	261	172	84	27	278	353	186	Ø262
DRN132M DR2S132M DRU132M	576	574									
DRN132L (8) DR2L132L	599	597									
DRN132L (4,6)	601	599	253	316	199	84	38	348	423	186	Ø309
DRN160M DR2S160M DR2L160M DRU160M DRU160MP DRN160L DRU160LR DRU160L DR2S160L DR2L160L	721	718									
DRN180M DR2S180M DR2L180M DRU180M DRN180L DRU180L DR2S180L DR2L180L	748	745	268	357	220	84	38	348	423	186	Ø354

Maßblatt

Drehstrombremsmotor
DR2G63-315 / .K8. / .K9.
A1GA, A2GA; AIGA, AIGB; KIGA

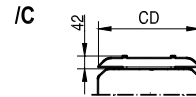
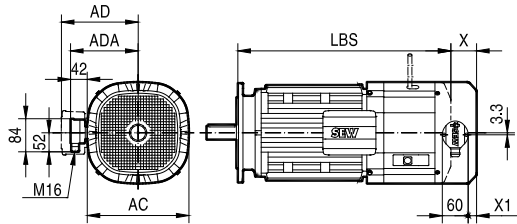
09 265 02 23
63411431.02



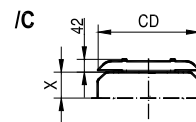
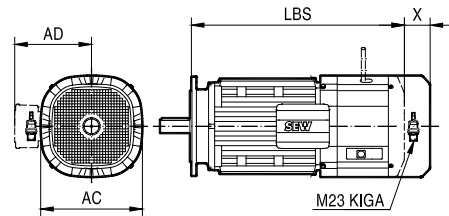
DR2.200 – 280/BE

L

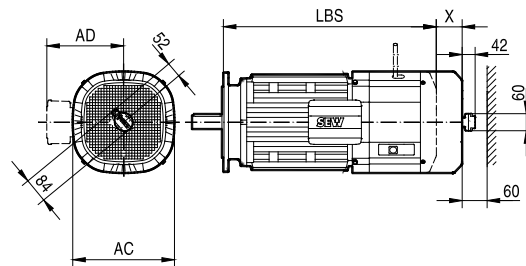
/.K8.BE
A1GA
A2GA
radial



/.K8.BE
KIGA



/.K8.BE
A1GA
A2GA
axial



└

31974473/EN – 03/2025

Maßblatt

Drehstrombremsmotor
 DR2G63-315 / .K8. / .K9.
 A1GA, A2GA; AIGA, AIGB; KIGA

09 265 02 23
 63411431.02

**DR2.200 – 280/BE**

Motortyp	LBS (B5/B14)	LBS (B3)	AD	AC	ADA	X	X1	CD
DRN200L DRU200L DRU200LR DR2S200L DR2L200L	854	851	283	Ø394	237	84	35	Ø415
DRN225S DR2S225S DR2L225S DRU225S DRN225M	822	819	305	Ø434	259	84	29	Ø415
DRN225ME DRU225ME	902	899						
DRN250M DRN250ME DRU250M DRU250ME	992	990	394	Ø495	290	79	69	Ø490
DRN280S	992	990	394	Ø495	290	79	69	Ø490
DRN280M DRU280MR	1087	1085						

Maßblatt

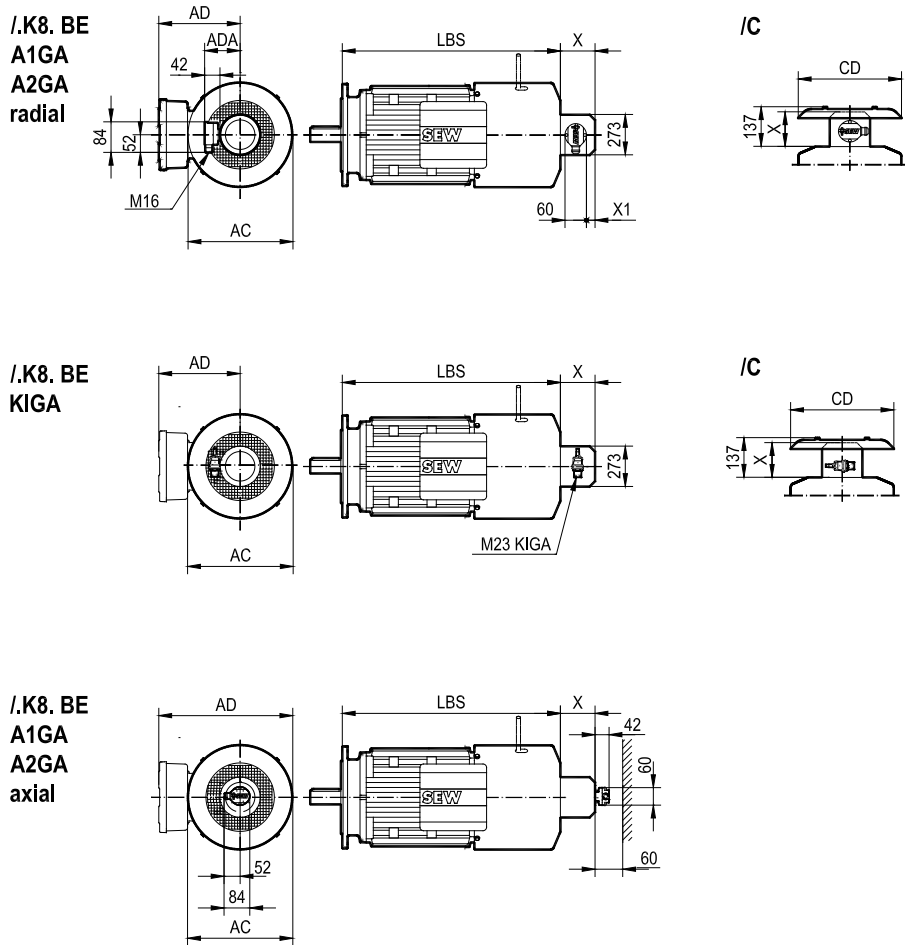
Drehstrombremsmotor
DR2G63-315 / .K8. / .K9.
A1GA, A2GA; AIGA, AIGB; KIGA

09 265 02 23
63411431.02



DR2.315/BE

L



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Maßblatt

Drehstrombremsmotor
 DR2G63-315 / .K8. / .K9.
 A1GA, A2GA; AIGA, AIGB; KIGA

09 265 02 23
 63411431.02

**DR2.315/BE**

Motor type	LBS (B5/B14)	LBS (B3)	AD	AC	ADA	X	X1	CD
DRN315S DRN315M DRU315SR DRU315S DRU315M DRU315L DRU315LR	1192	1190	506	Ø624	199	129	29	Ø590
DRN315ME	1322	1320						
DRN315L DRN315H DRU315H DRU315HB DRU315HG 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 DRN../EDRN315	099480214
EK8A	DRN63 – 355 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 DRN../EDRN 250 – 315	63115379
	DR71 – 225	63139375
	DRN71 – 225	63089378
XV2A	DR../EDR 250 – 315 DRN../EDRN 250 – 315	63115379
	DR71 – 225	63060647
	DRN71 – 225	63008653
XV3A	DR../EDR 250 – 315 DRN../EDRN 250 – 315	63115379
	DR71 – 225	63060647
	DRN71 – 225	63008653
XV4A	DR../EDR 250 – 315 DRN../EDRN 250 – 315	63115379
	DR71 – 225	63060647
	DRN71 – 225	63008653

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Encoder mounting adapters	Motors	Document number
XV5A	DR../EDR 250 – 315 DRN../EDRN 250 – 315	63115379
	DR71 – 225	63060647
	DRN71 – 225	63008653
XV6A	DRN71 – 225	63008653
XV7A	DR../EDR 250 – 315 DRN../EDRN 250 – 315	63115379
	DR71 – 225	63139375
	DRN71 – 225	63089378
XV8A	DR../EDR 250 – 315 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). E17C FS: Replacing the safety encoder is not permitted. 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).

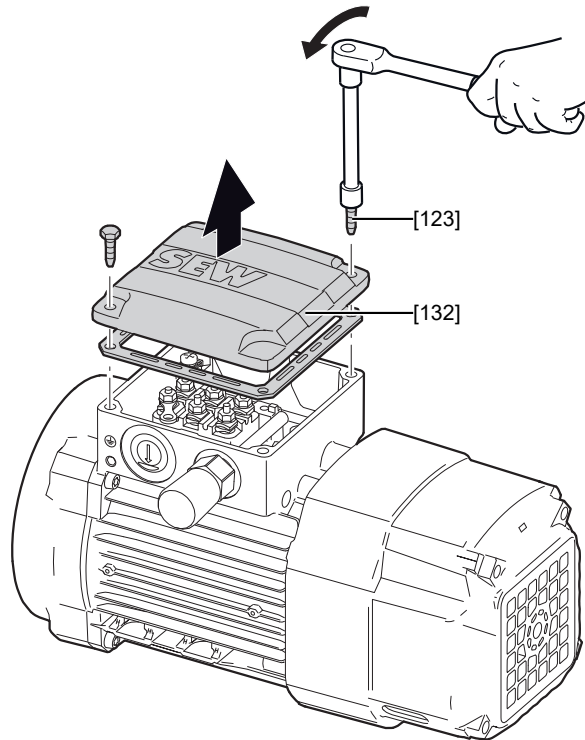
First, check the FS logo on the motor nameplate to ascertain whether a safety encoder is installed (see chapter "FS mark").

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

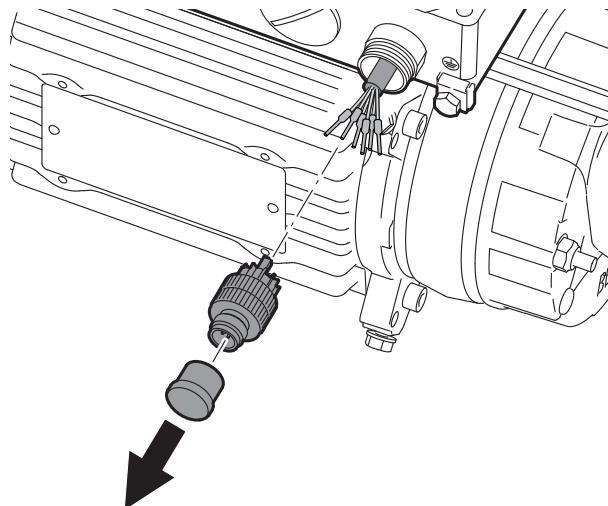
Removing EI7. – DRN63 motors

1. Unscrew the screws [123] to remove the terminal box cover [132].



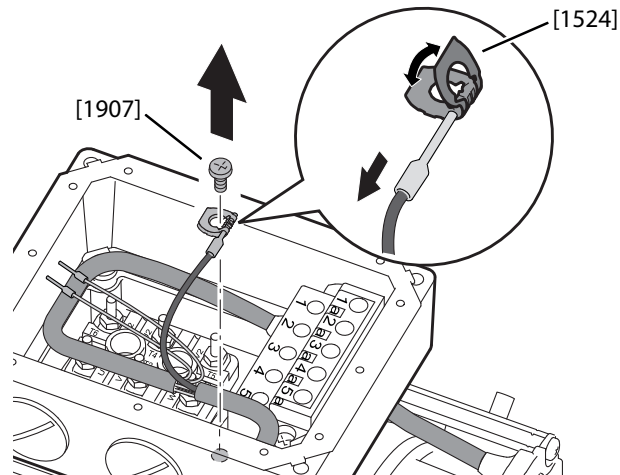
29491623563

2. Unscrew the M12 connector and disconnect the cores.



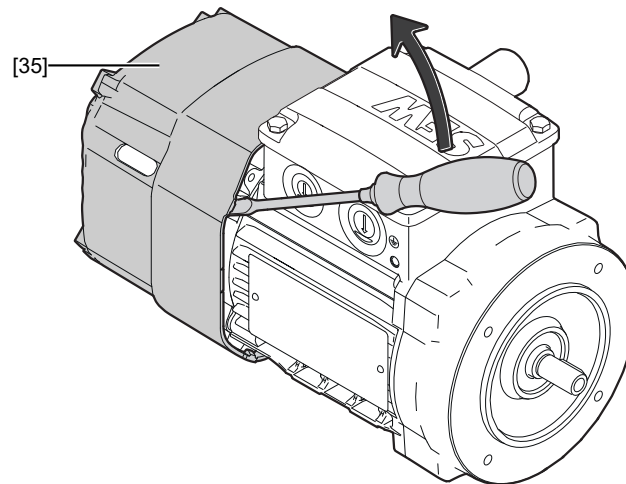
18014408102446347

- Loosen the screw [1907] used for fastening the shielding to the terminal box.



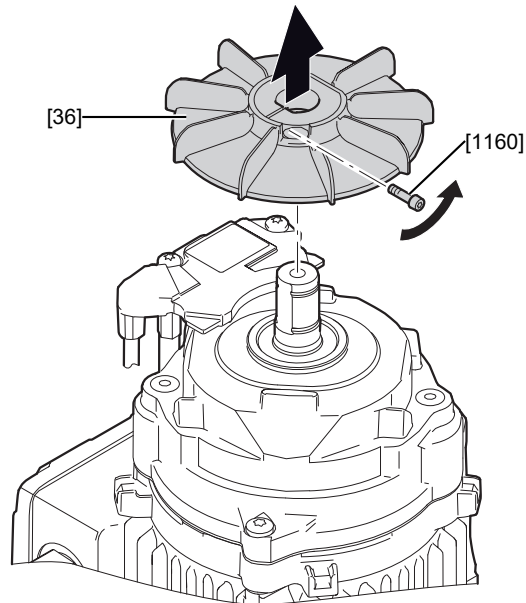
9007229317055755

- Bend open the terminal washer [1524] and pull out the shielding of the encoder cable.
 - ⇒ Dispose of the terminal washer [1524].
- 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.



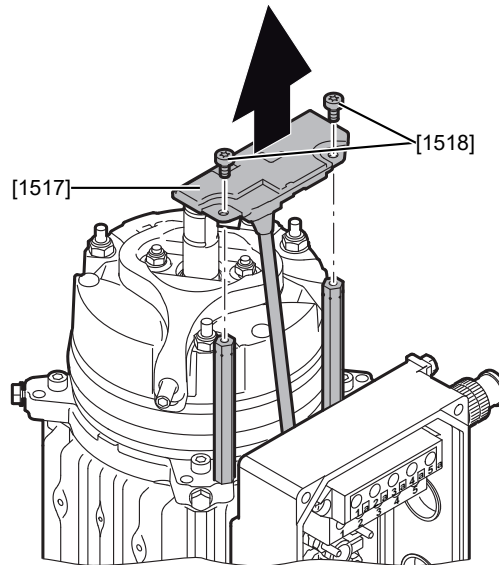
30062320139

6. Loosen the clamping screws [1160] and remove the fan [36]. If necessary, remove the retaining rings prior to this step.



29495711627

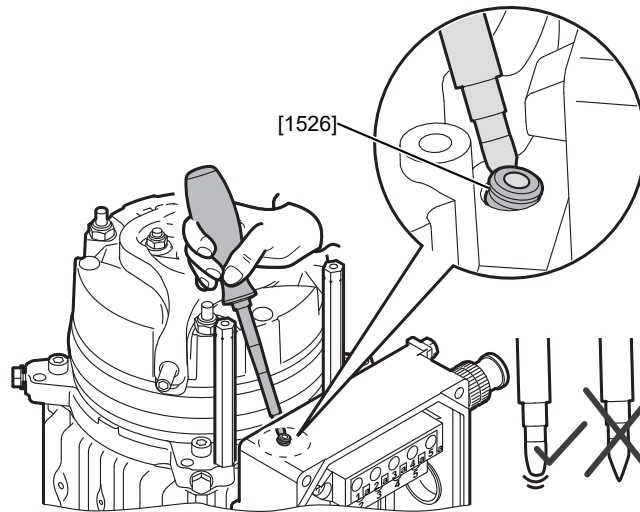
7. Loosen the screws [1518] and pull the encoder module [1517] out of the knock-out and the grommet.



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⇒ Dispose of the screws.

8. Remove the grommet [1526] from the knock-out.



30064502539

- ⇒ 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.

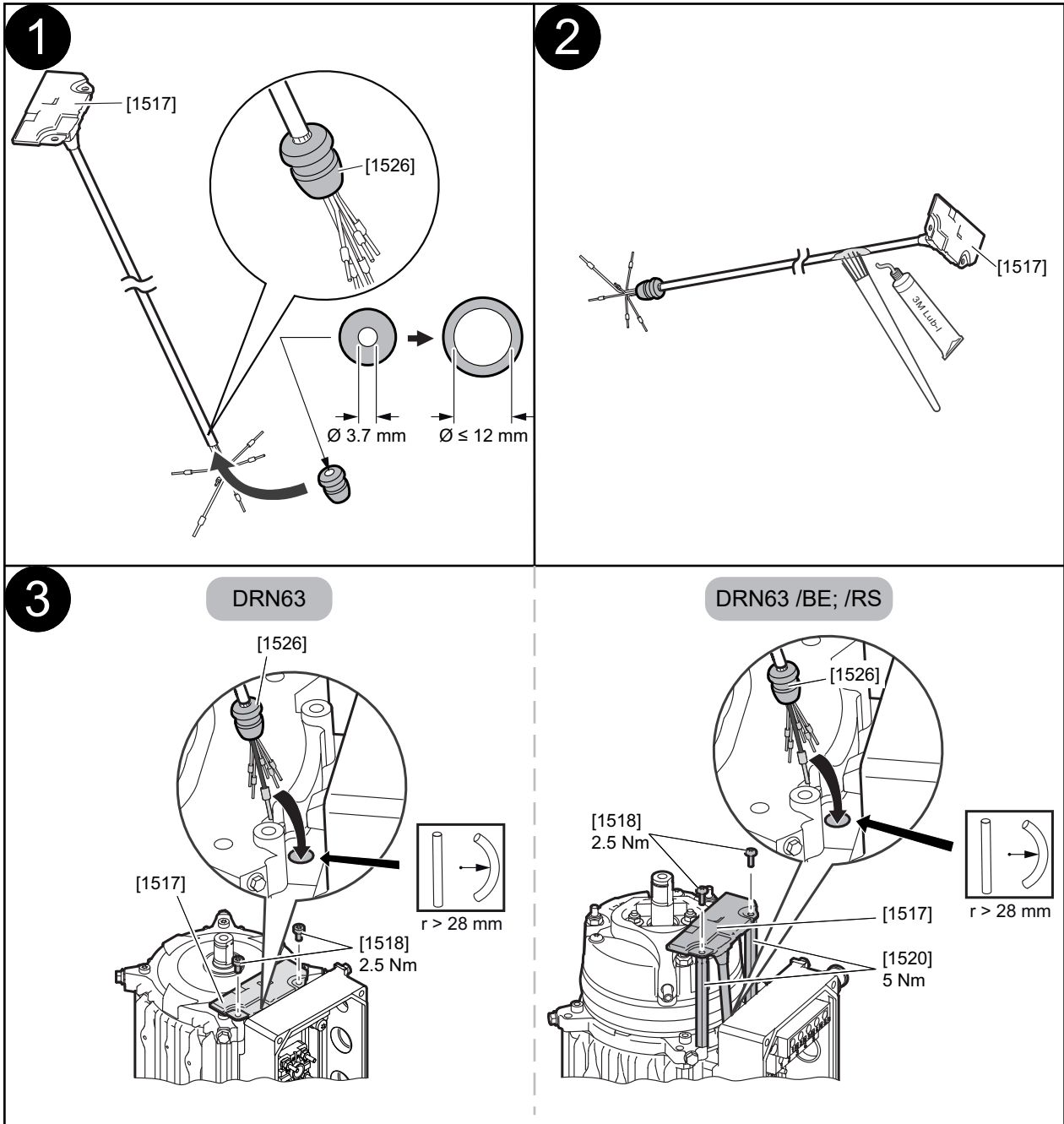
The screws [1518] are also included in the respective retrofit sets and service kits.

Before installation, a terminal washer [1524] with part number 13262130 must be obtained from SEW-EURODRIVE.

7 Mechanical installation

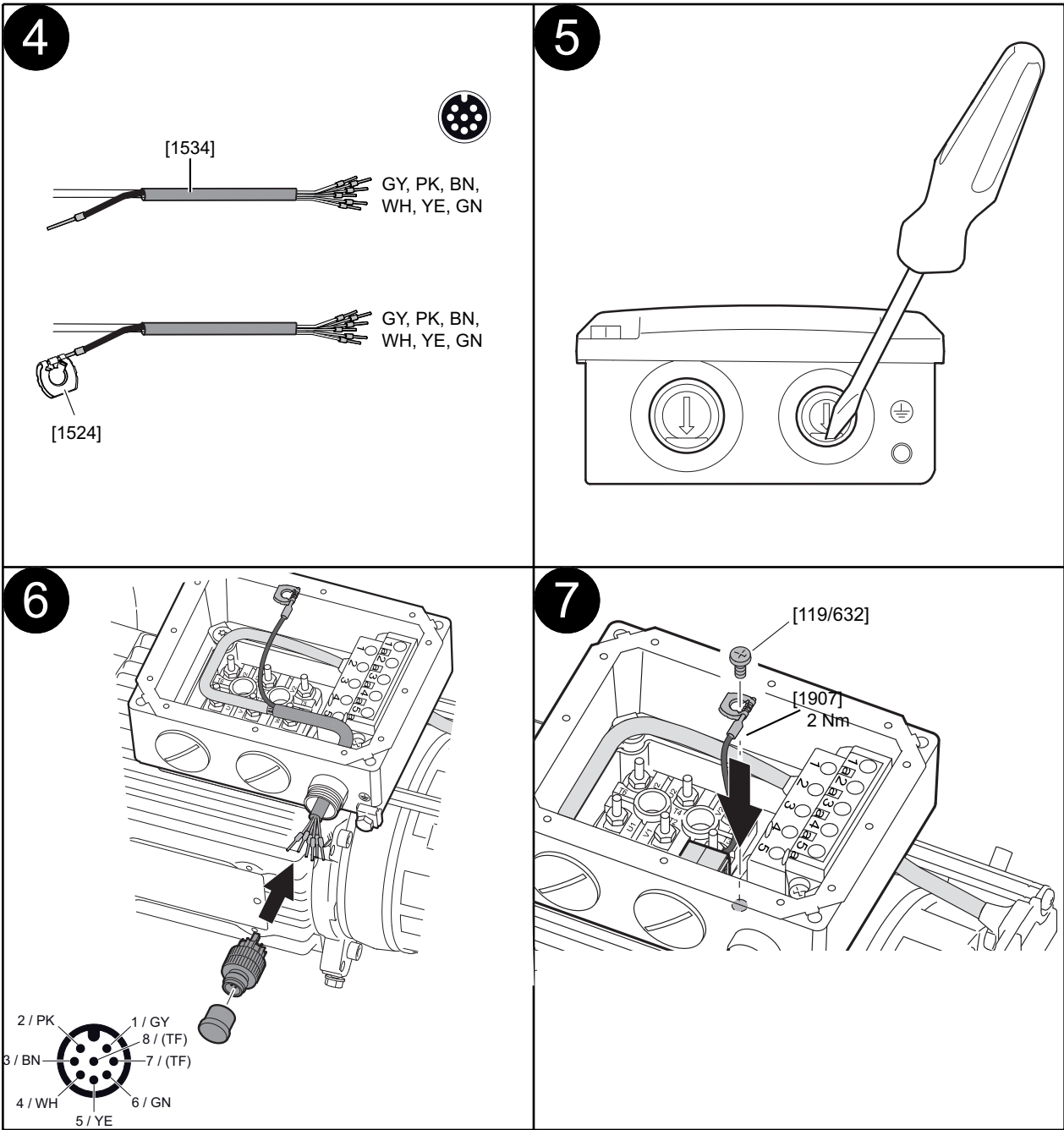
Removing/installing built-in encoders and encoder mounting adapters for built-in encoders

The terminal washer [1524] is also included in the respective retrofit sets and service kits.



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31974473/EN – 03/2025

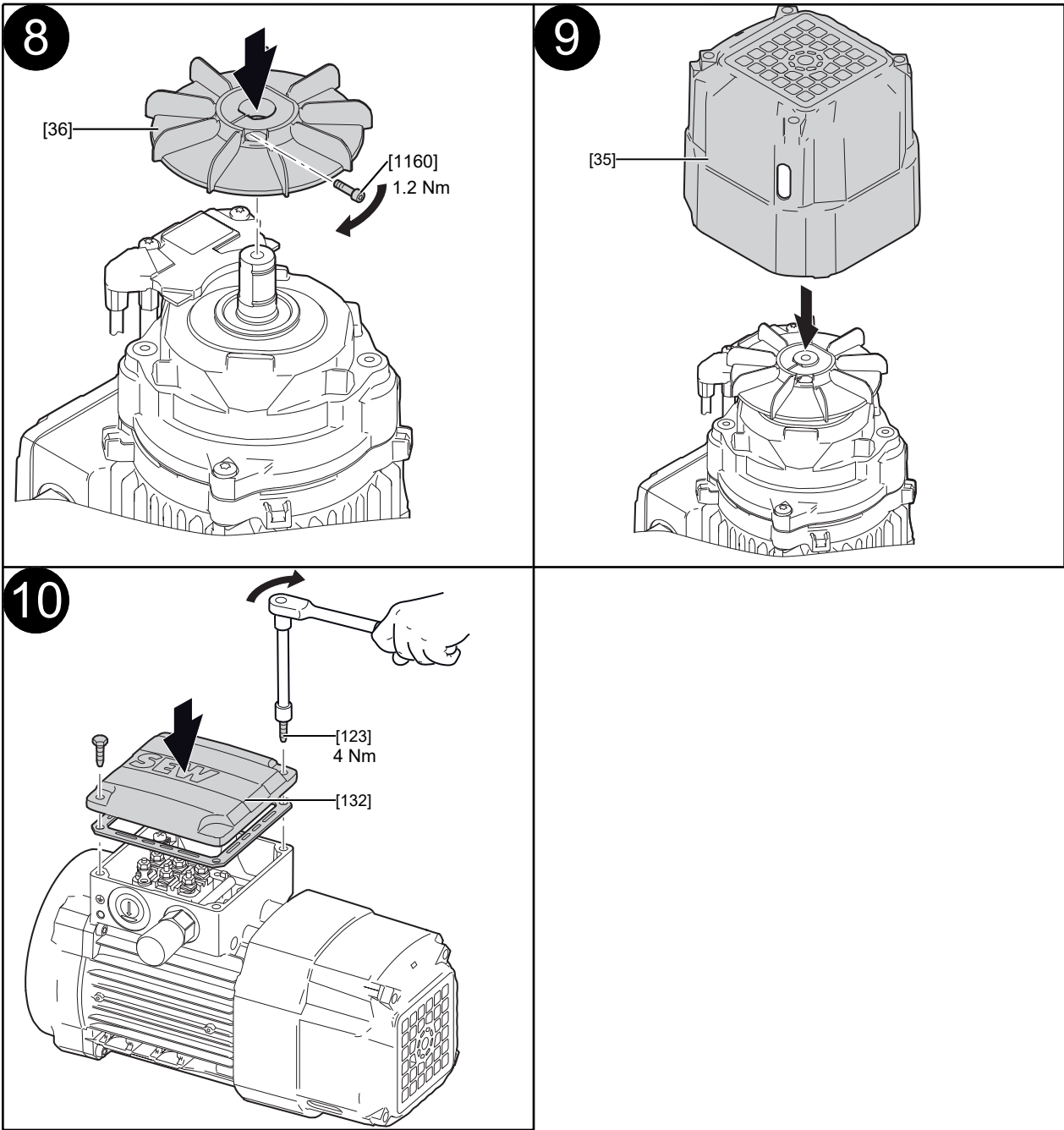


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7

Mechanical installation

Removing/installing built-in encoders and encoder mounting adapters for built-in encoders



18014435001862411

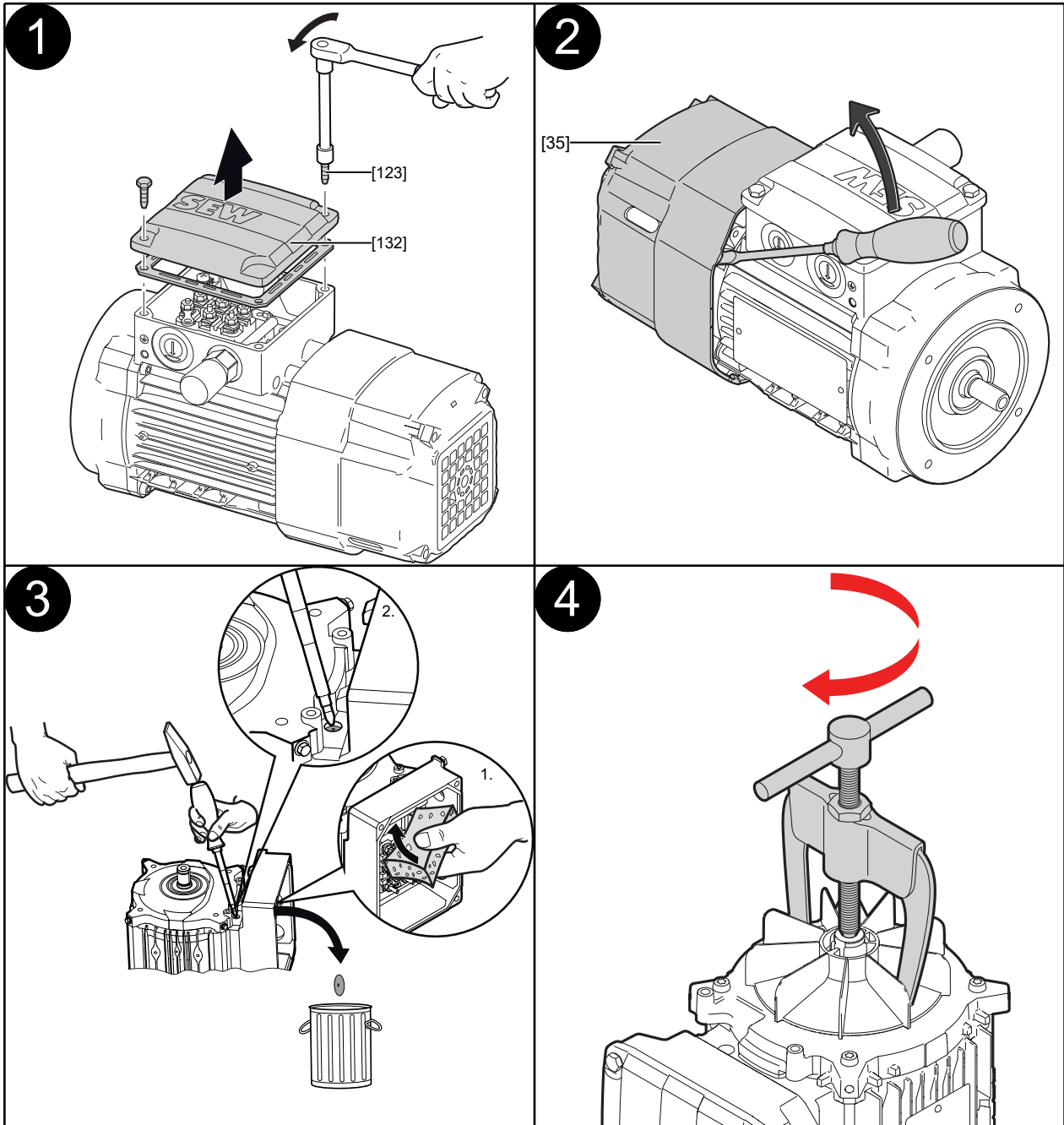
31974473/EN – 03/2025

Retrofitting EI7. – DRN63 motors

INFORMATION



The required small parts are included in the retrofit set.

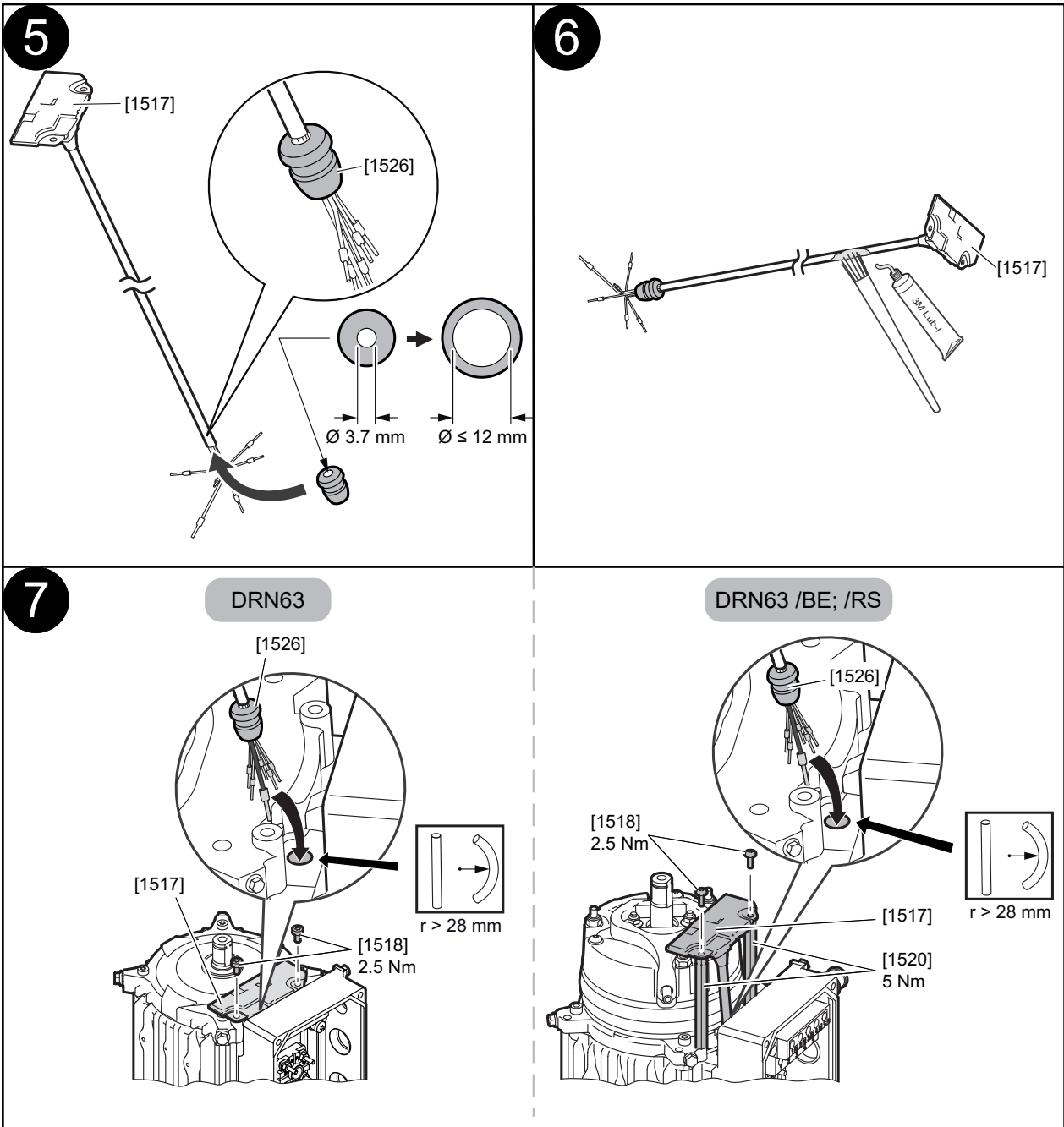


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31974473/EN – 03/2025

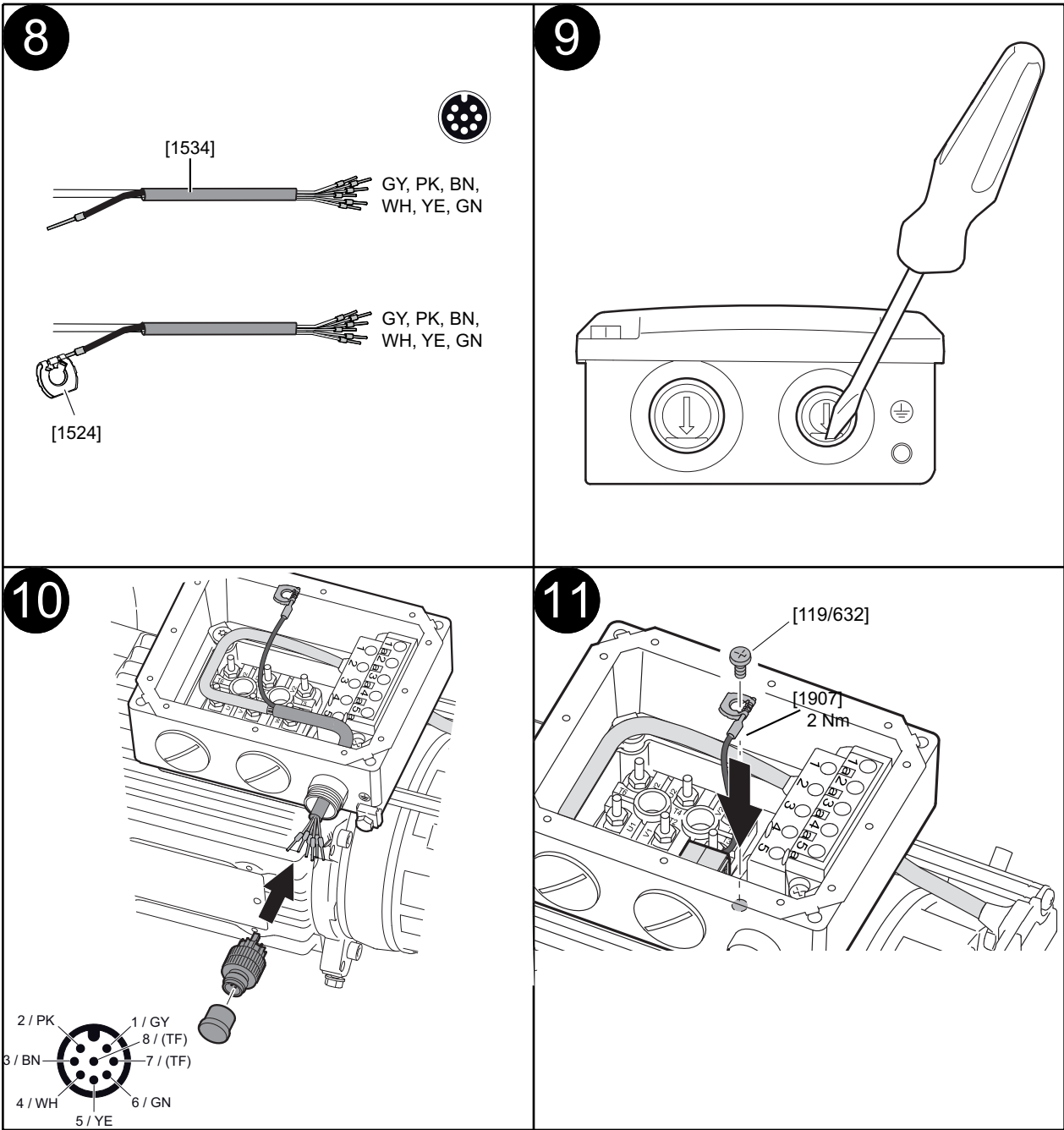
7 Mechanical installation

Removing/installing built-in encoders and encoder mounting adapters for built-in encoders



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31974473/EN – 03/2025

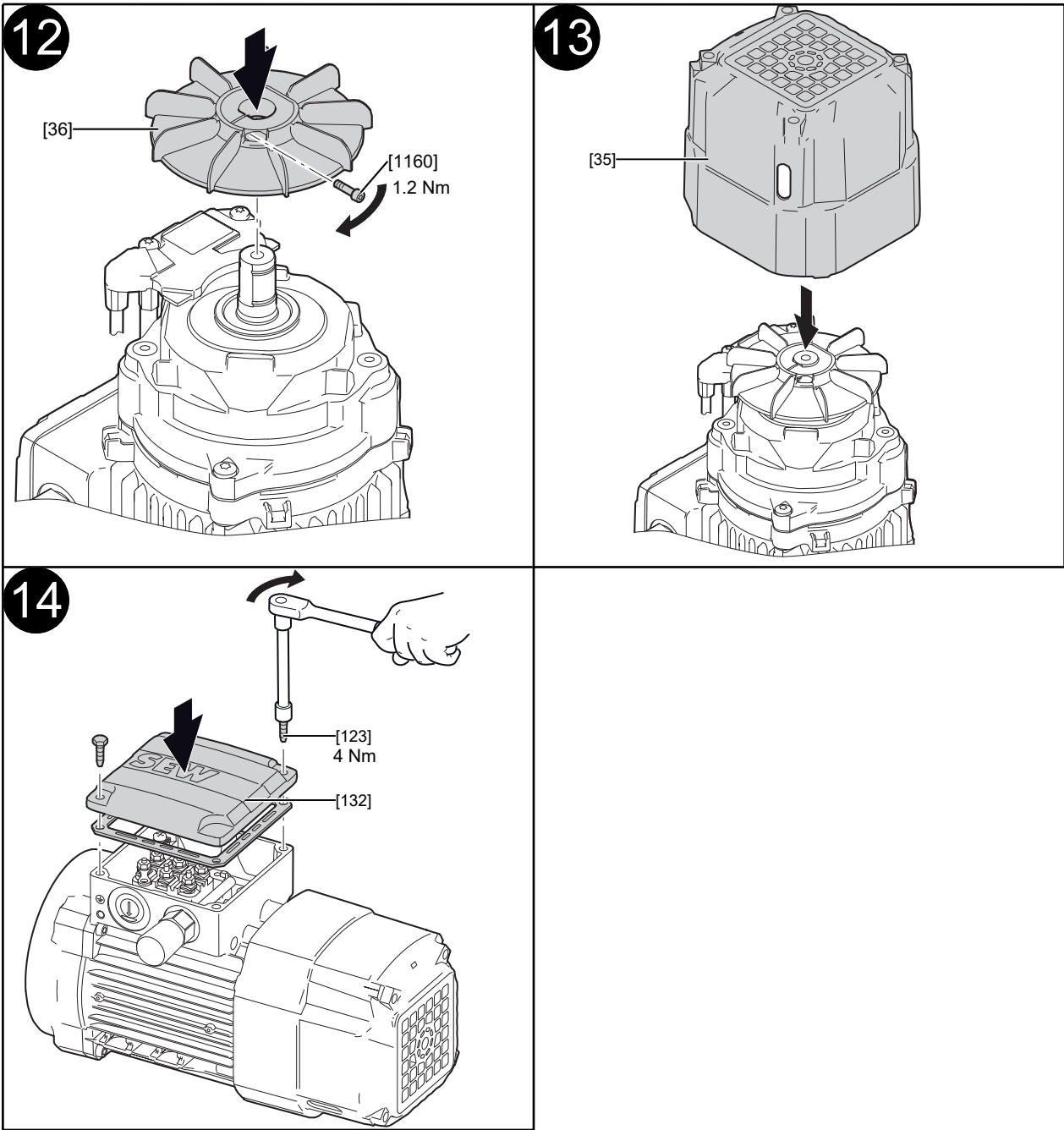


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7

Mechanical installation

Removing/installing built-in encoders and encoder mounting adapters for built-in encoders

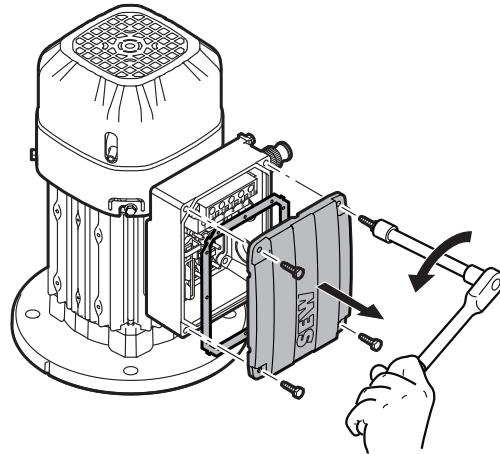


36028827140702347

31974473/EN – 03/2025

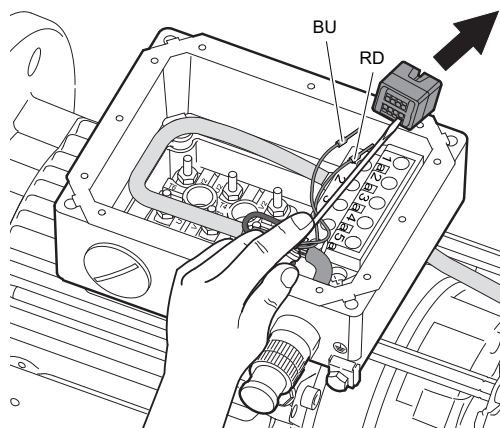
7.4.2 EI7. built-in encoders and EI7A encoder mounting adapters – DRN../DRU../DR2..71 – 132S motors

Removing EI7. – DRN../DRU../DR2..71 – 132S motors



9007208847716875

- Loosen the screws on the terminal box and remove the terminal box cover.

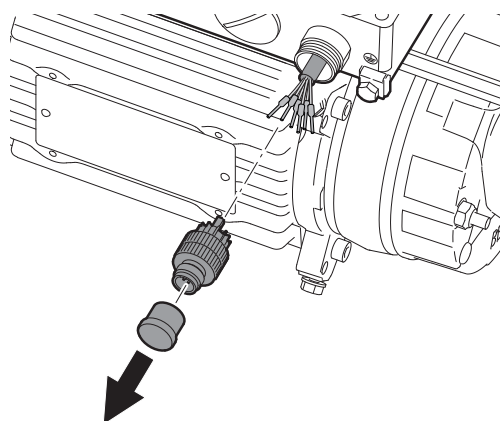


9592952843

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

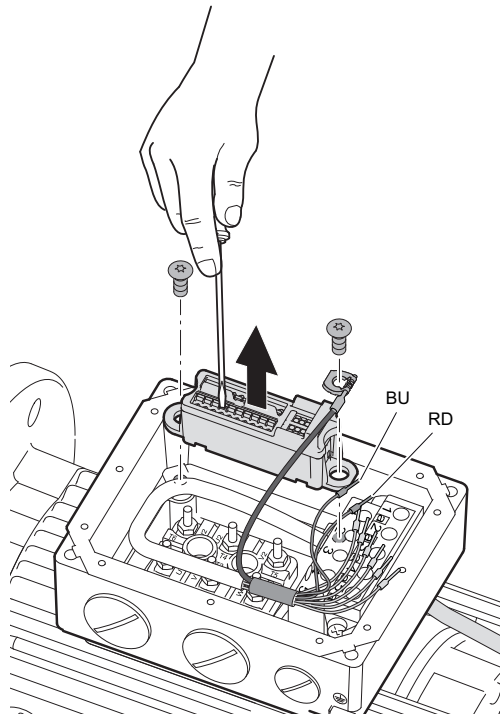


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- Unscrew the M12 connector.
- Disconnect the cores of the encoder cable from the M12 connector.

7 Mechanical installation

Removing/installing built-in encoders and encoder mounting adapters for built-in encoders

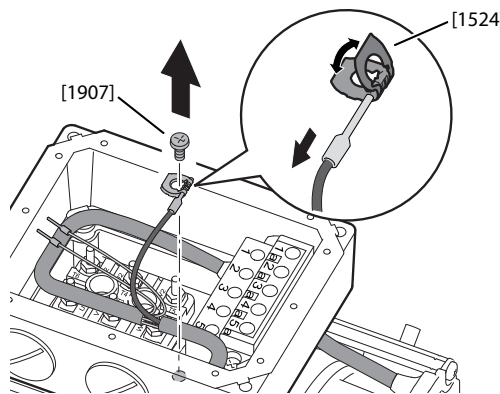


9592970123

If a connection unit without M12 connector is used:

- Disconnect the cores of the encoder cable from the connection unit.

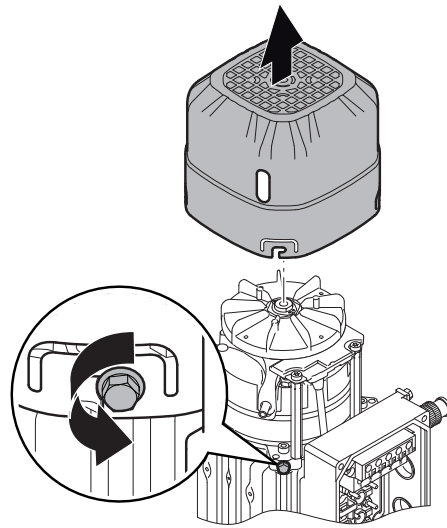
SEW-EURODRIVE recommends using the screwdriver 1205202 from Phoenix



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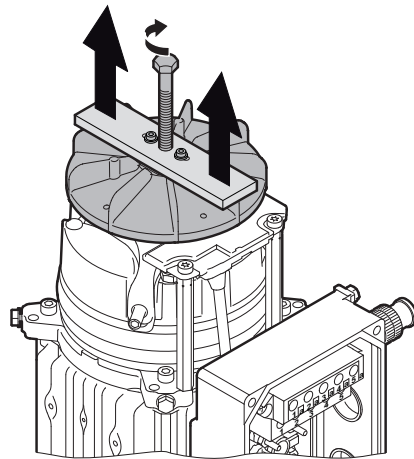
- Loosen the screw for fastening the shielding to the terminal box.
- Bend the terminal washer open and remove the encoder cable shielding together with the core end sleeve.
- Dispose of the terminal washer [1524].

- Loosen the screws on the fan guard and remove the fan guard.

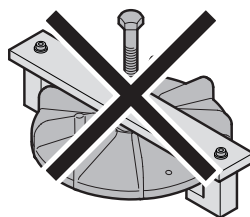


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- Apply a puller to the bushing of the plastic fan and remove the plastic fan.
Notice: Applying direct force to the plastic fan can damage it!



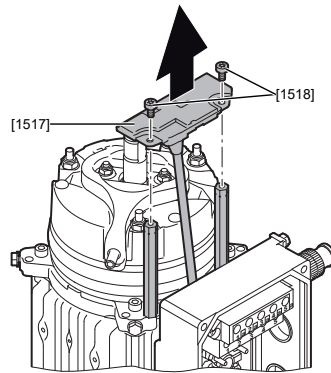
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9744815115

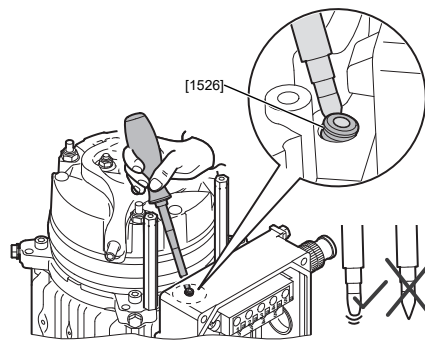
7 Mechanical installation

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.

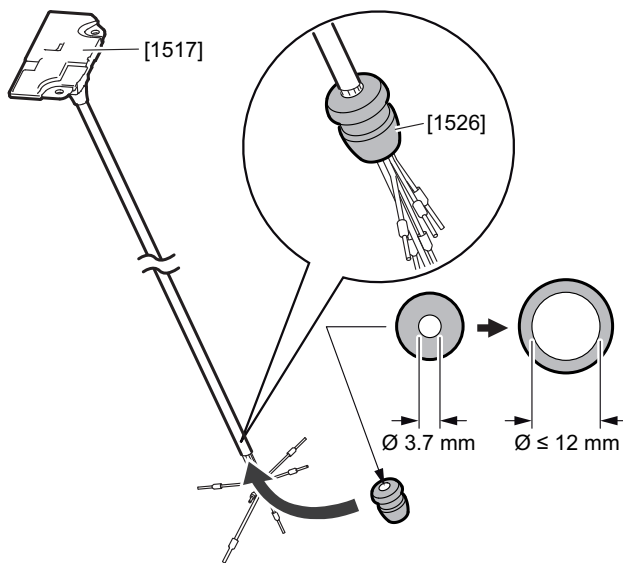
The grommet [1526] is also included in the respective retrofit sets and service kits.

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.

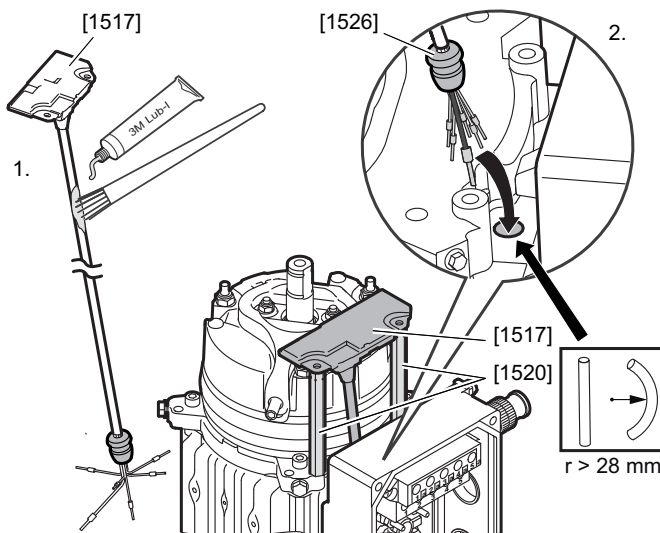
Before installation, a terminal washer [1524] with part number 13262130 must be obtained from SEW-EURODRIVE.

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.

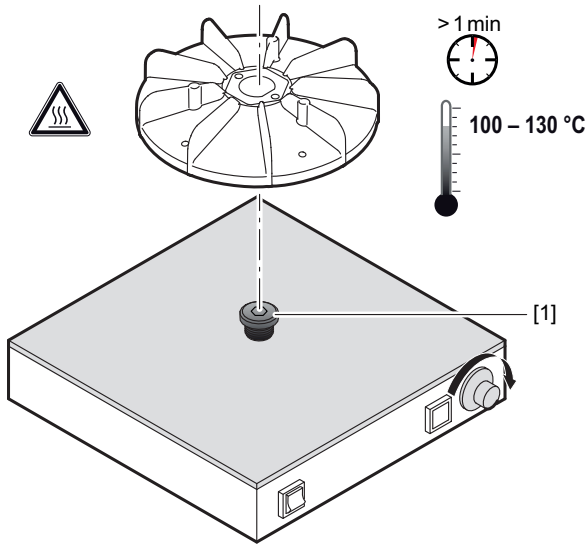
The minimum bending radius of 28 mm must be observed.

9592966283

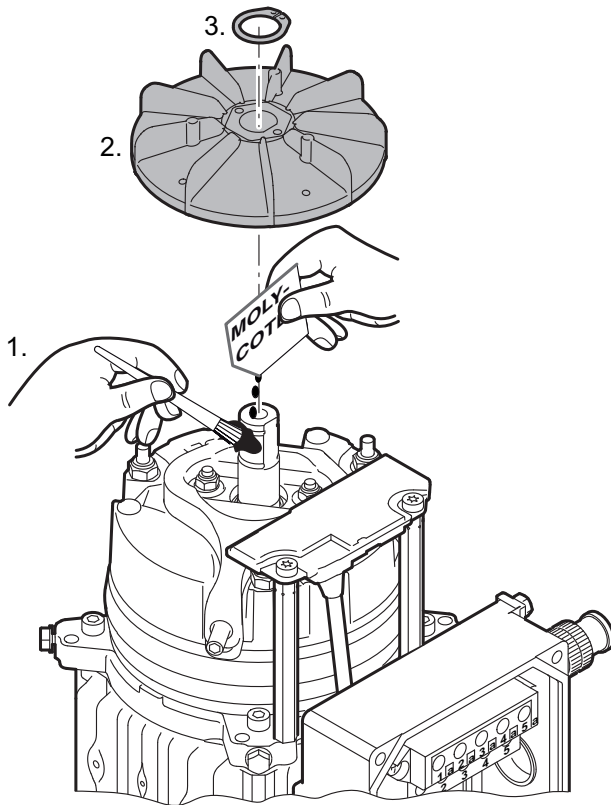
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7 Mechanical installation

Removing/installing built-in encoders and encoder mounting adapters for built-in encoders



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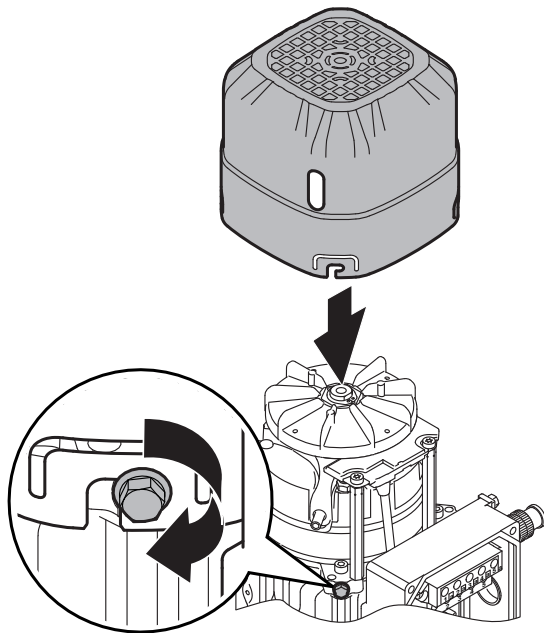
9007208910802699

- 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.

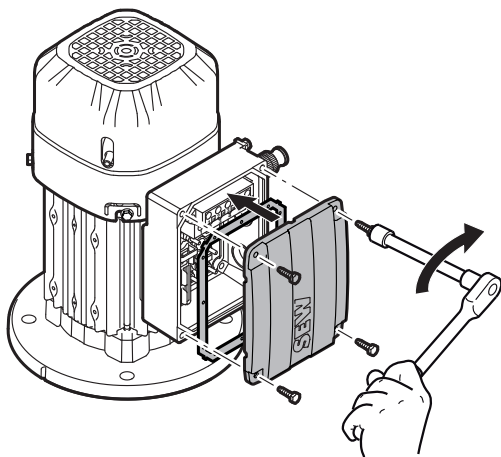
Any thermally conductive component [1] (e.g. a metal ring) can be used as a contact surface.

- Apply assembly paste to the shaft/fan seat e.g.: MOLYCOTE®.
- Install the warmed fan.
- Fasten the fan using a retaining ring.



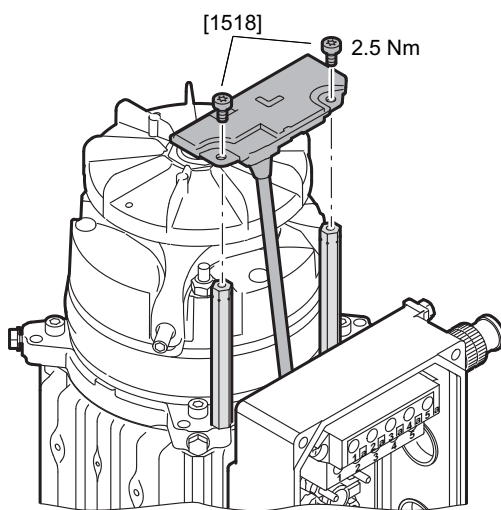
9592956683

- 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

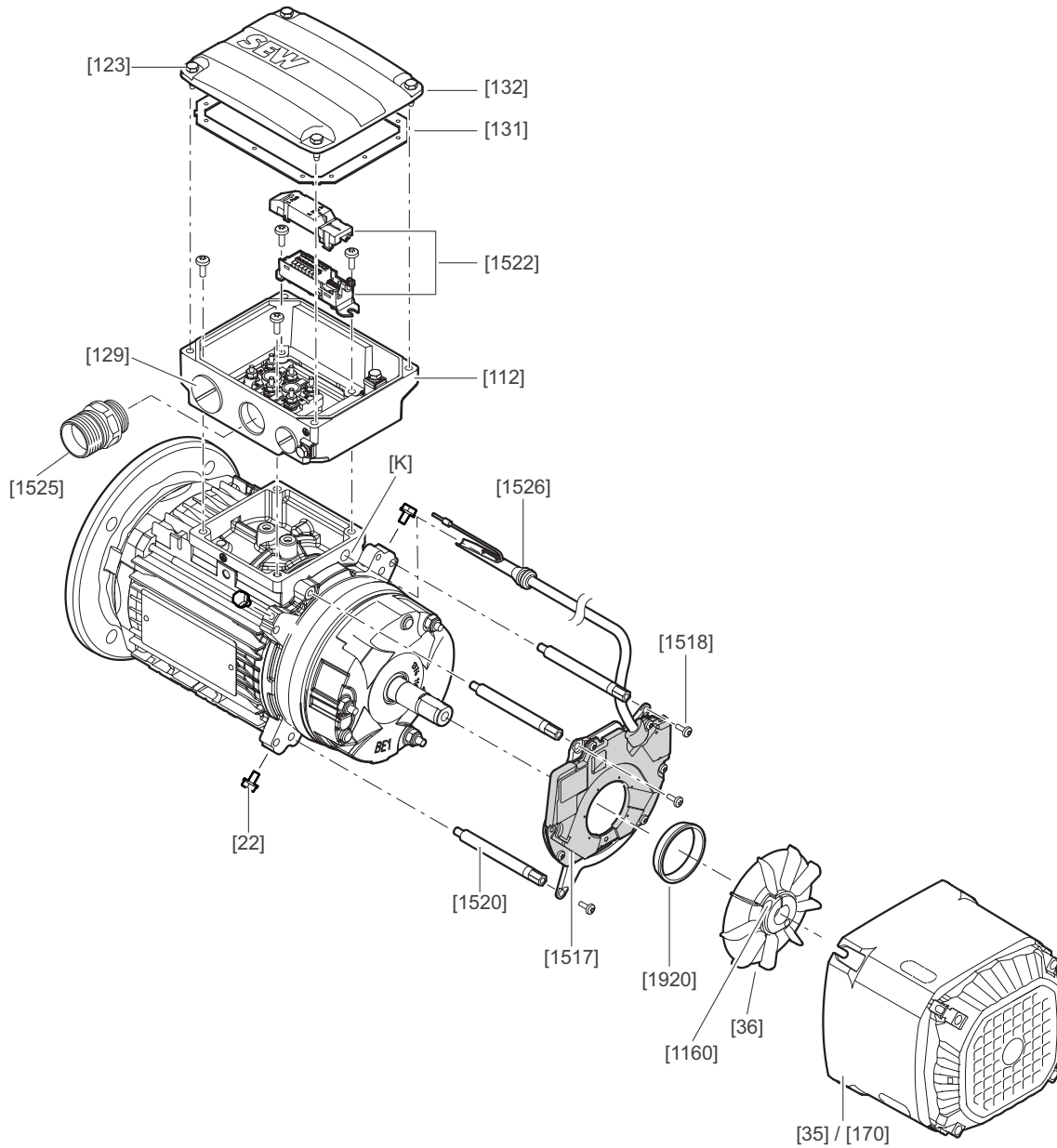


9592979723

- Fasten the encoder module to the spacers using 2 screws [1518].
 - Tightening torque: 2.5 Nm

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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

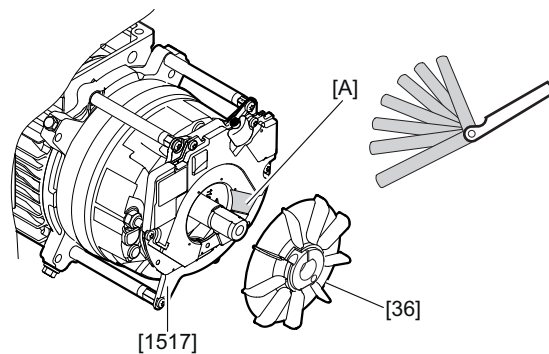
- ✓ Required resources: Screwdrivers (SW7, SW8, TX20, TX25)
- 1. Disassemble the forced cooling fan [170] if applicable.
- 2. Remove the screws [22] to disassemble the fan guard [35].
- 3. Loosen the radial clamping screw [1160]:
 - ⇒ DR..71 – 100: M3 with cylinder head
 - ⇒ DR..112/132S: M4 with cylinder 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.

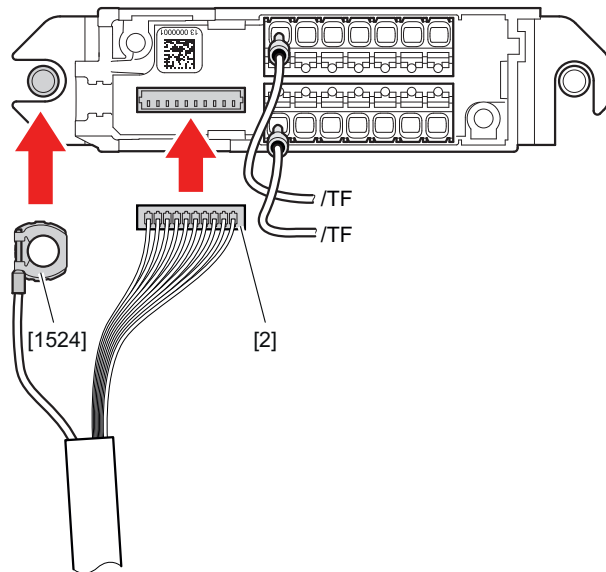
- ✓ Required resources: Feeler gauge (0.9 mm), screwdriver, centering ring [1920]
- 1. Unscrew the screws [123] to remove the terminal box cover [132].
- 2. **NOTICE!** Damage to the terminal box or fragments inside the motor. Possible damage to property. Carefully break the knockout open.
Break open 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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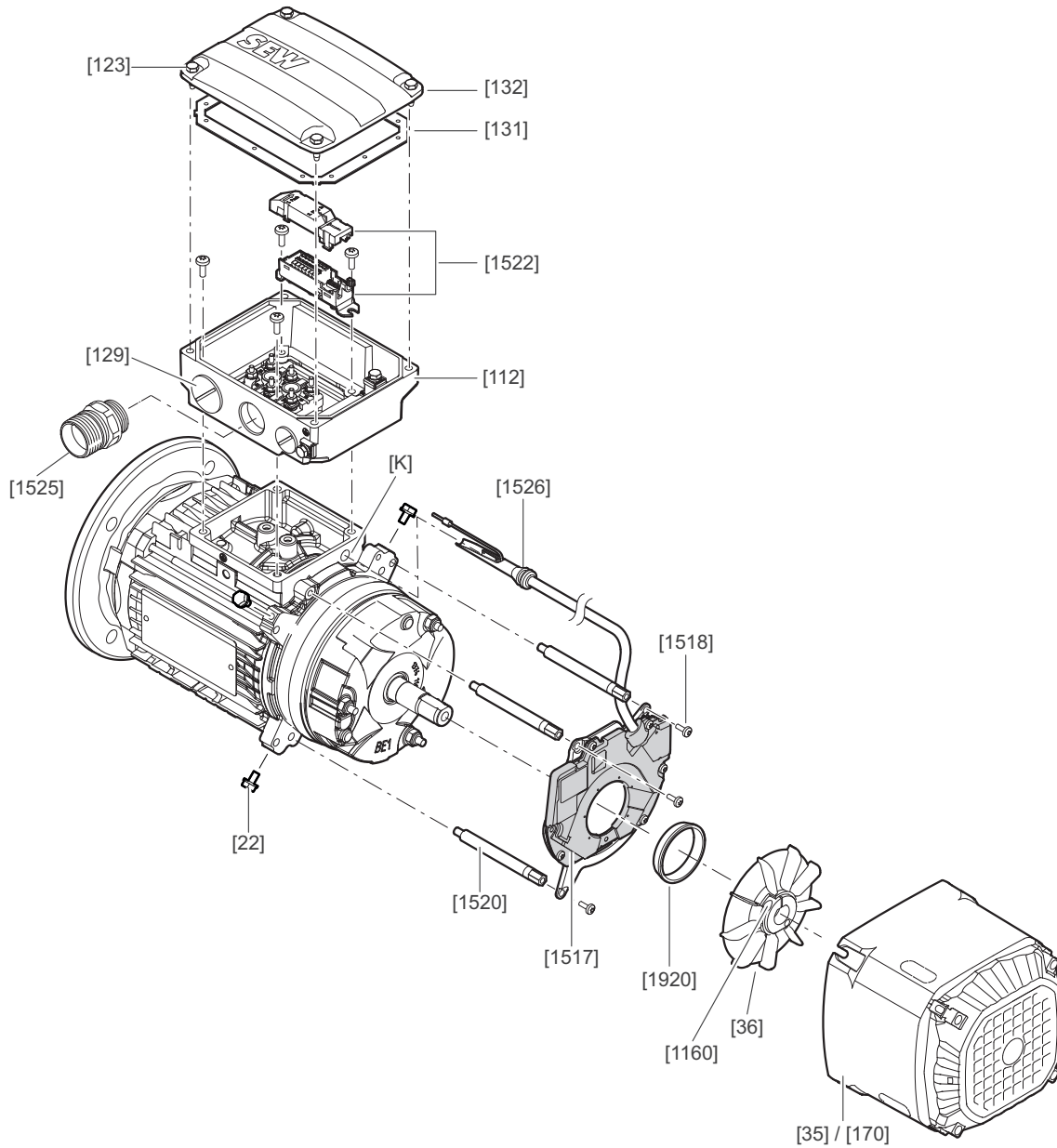
19. Insert the socket contact of the encoder cable [2] onto the connector on the board and insert the encoder cable into the hollow of the connection unit [1522], which serves as strain relief. If applicable, connect the temperature probe /TF.
20. Connect the customer's evaluation unit for the encoder 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

Mechanical installation

Removing/installing built-in encoders and encoder mounting adapters for built-in encoders

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		

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Removing EI8. – DRN../DRU../DR2..71 – 132S motors, with M23 connector

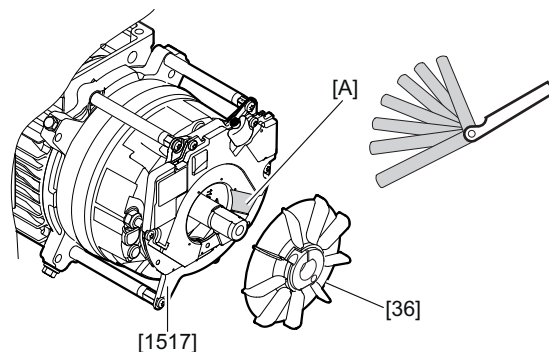
- ✓ Required resources: Screwdriver
- 1. Disassemble the forced cooling fan [170] if applicable.
- 2. Remove the screws [22] to disassemble the fan guard [35].
- 3. Loosen the radial clamping screw [1160]:
 - ⇒ DR..71 – 100: M3 with cylinder head
 - ⇒ DR..112/132S: M4 with cylinder head
- 4. Remove the 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.

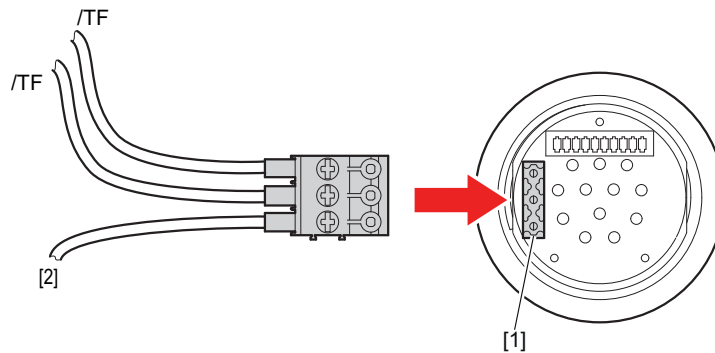
- ✓ Required resources: Feeler gauge (0.9 mm), screwdriver, centering ring [1920]
- 1. Unscrew the screws [123] to remove the terminal box cover [132].
- 2. **NOTICE!** Damage to the terminal box or fragments inside the motor. Possible damage to property. Carefully break the knockout open.
Break open 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.

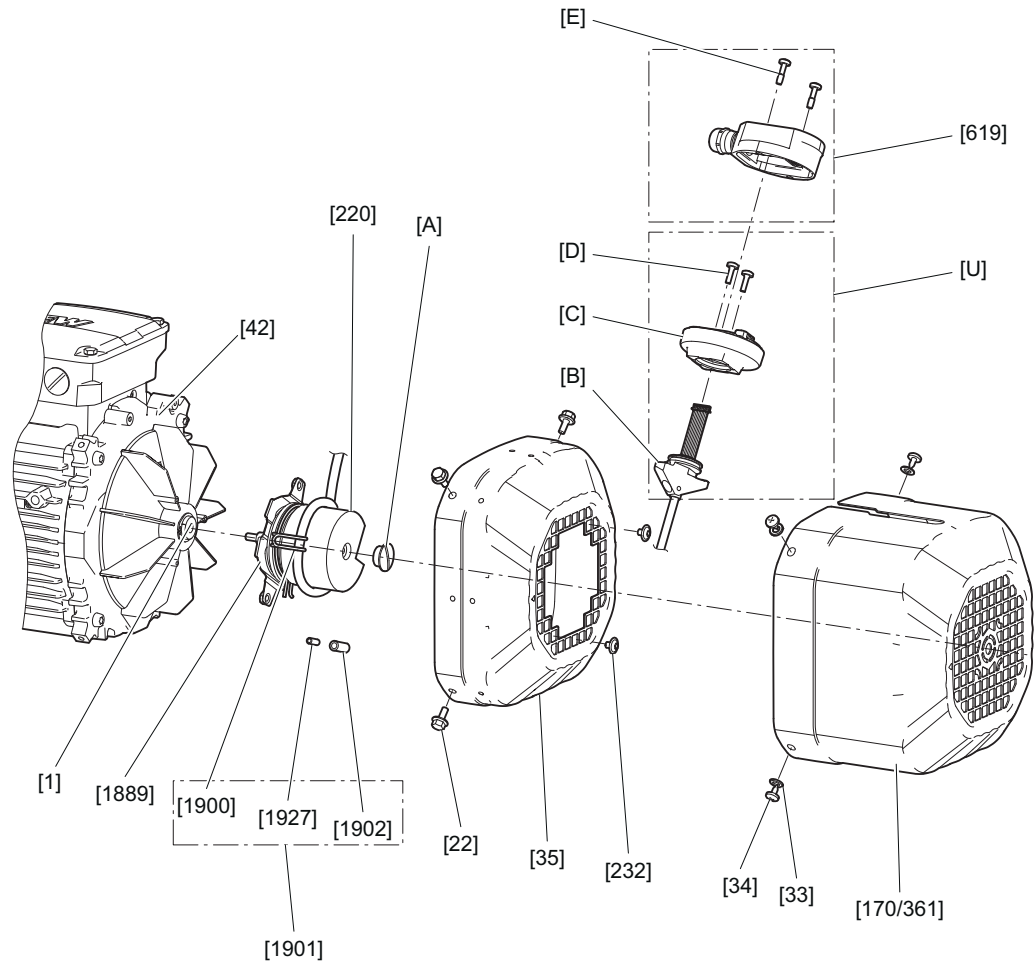
The integrated encoder connector (parts [U] and [619]) can be turned ± 180 degrees in steps of 90° to allow for a variable cable outlet of the connection cover [619]. To align, loosen the screws D in the lower part C.

In addition, the encoder cover [361] can be turned 360 degrees in steps of 90° 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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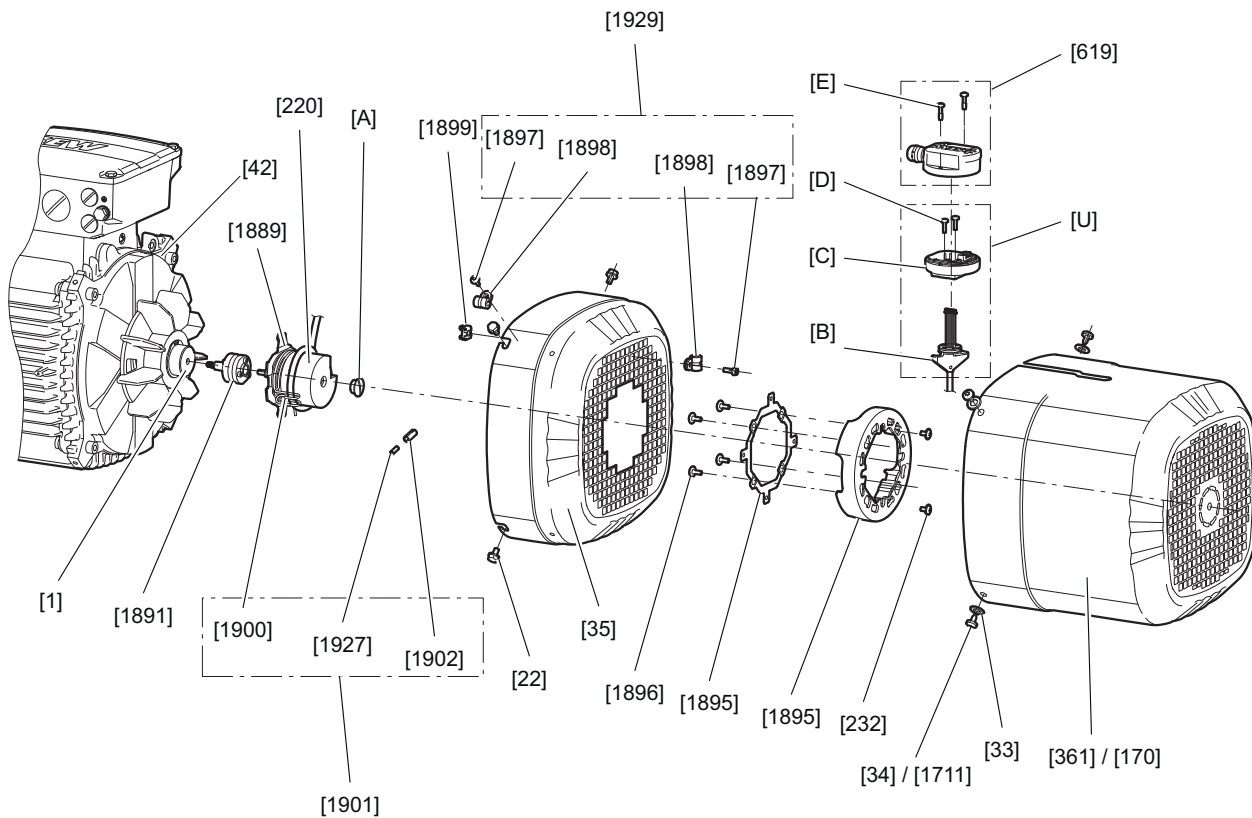
[1]	Rotor	[U]	Connection adapter
[22]	Screw (hexagonal)	[1889]	Torque bracket
[33]	Washer	[1900]	Cable retainer
[34]	Screw (cross recess)	[1901]	Accessory bag
[35]	Fan guard	[1902]	Threaded sleeve
[42]	B-side endshield	[1927]	Set screw
[170]	Forced cooling fan	[A]	Screw plug
[220]	Encoder	[B]	T-slot nut
[232]	Screw (hexalobular)	[C]	Lower part
[361]	Safety cover	[D]	Screw
[619]	Connection cover	[E]	Screw

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7 Mechanical installation

Removing/installing conical encoders and encoder mounting adapters for conical encoders

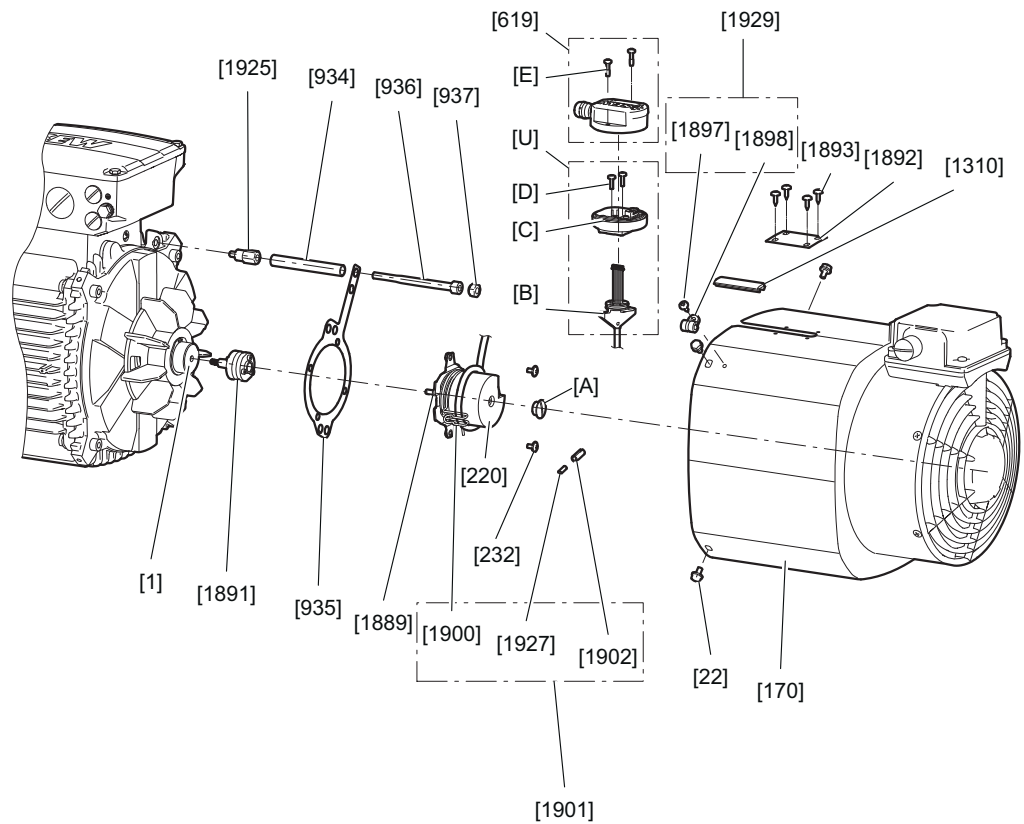
Structure of .K8./K9. conical encoder – (E)DRN../DRU../DR2..132M – 315 motors with integrated A1GA encoder connector with connection cover or A2GA without connection cover



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



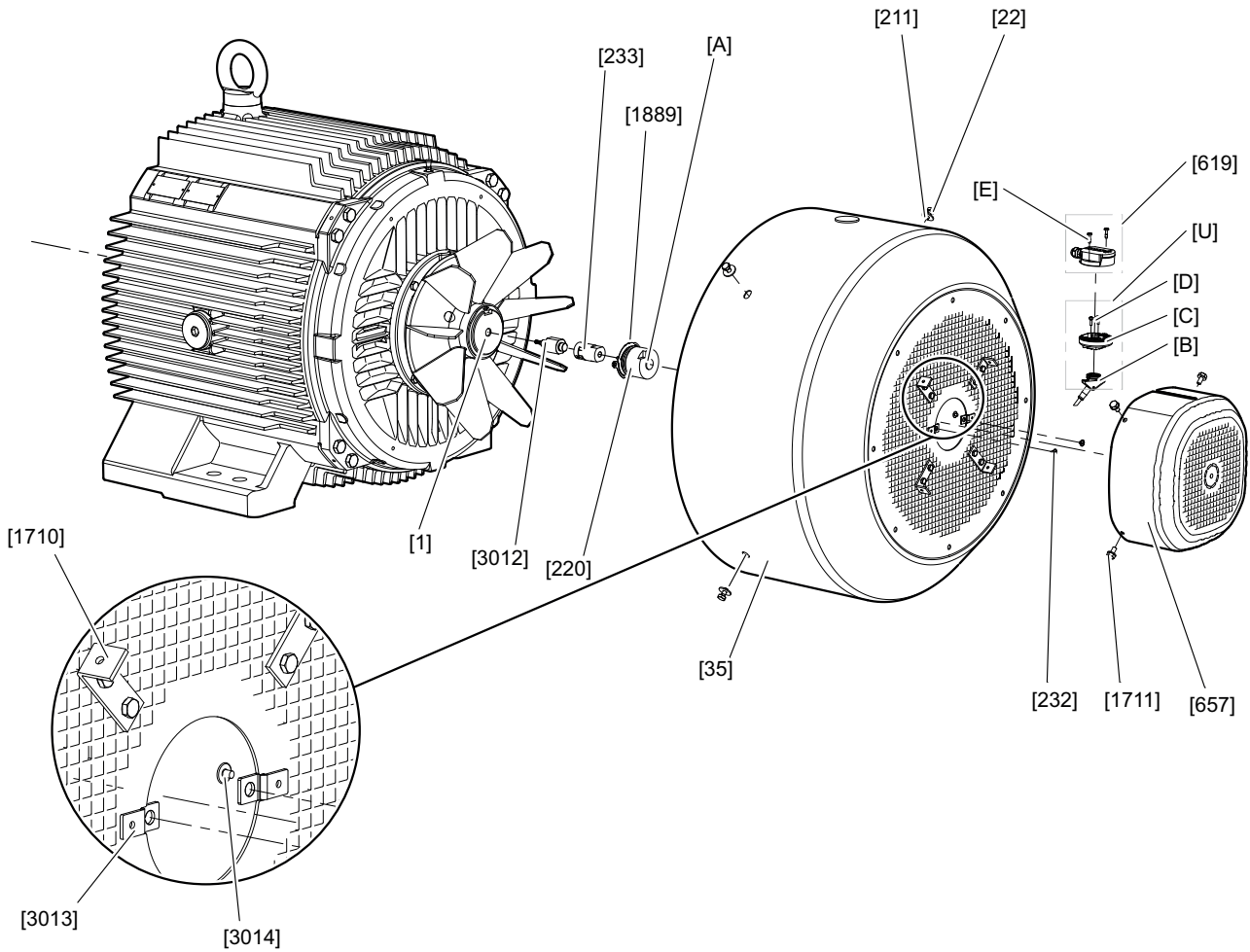
36028825563057675

[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

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

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).

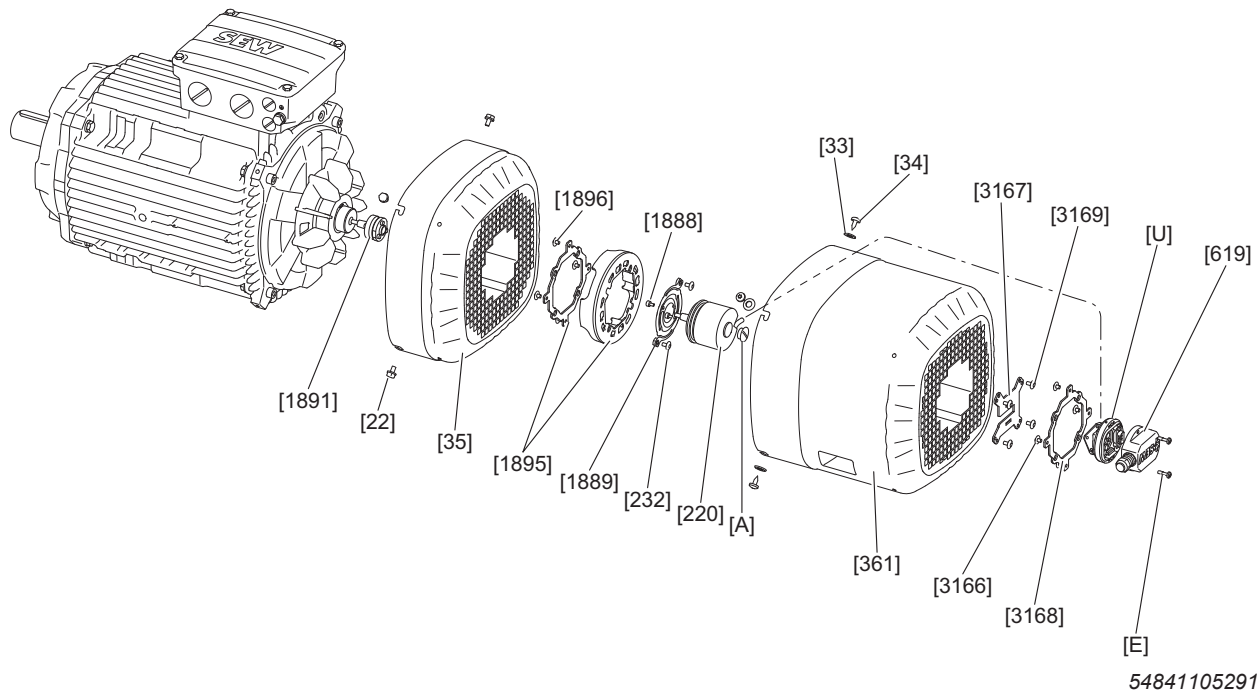
Failure to calibrate results in greater motor losses and reduced torque. In the worst-case scenario, the motor will not run.

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)



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

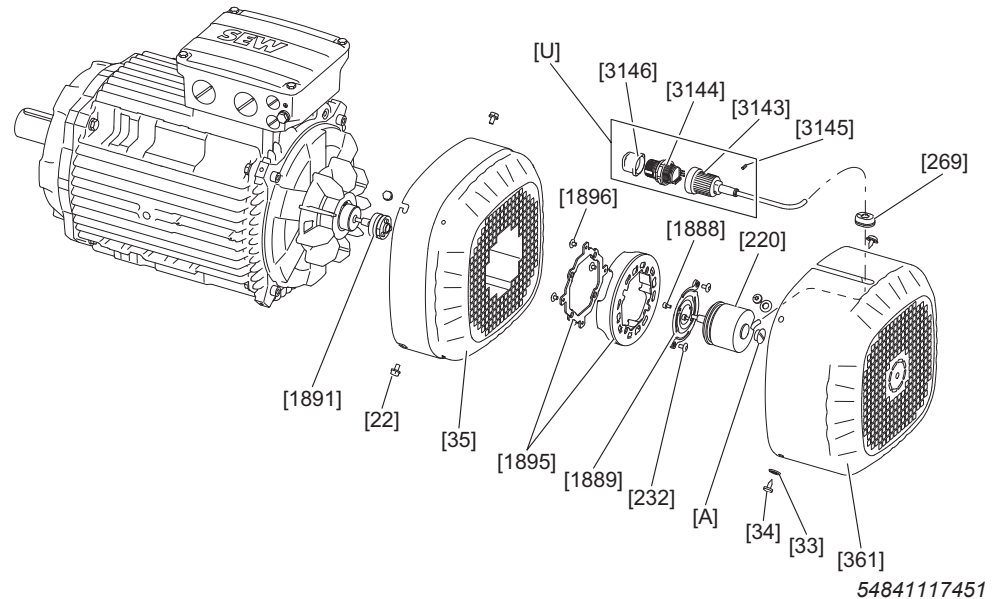
For encoders RK8M, EK8W, AK8H, AK8W, EK9Z and AK8Z on DR2C.. motors, a calibration process must be carried out for flawless operation. See "Additional work for the RK8M encoder on the DR2C.. motor" (→ 218) and "Additional work for EK8W, AK8H, AK8W, EK9Z, and AK8Z encoders on the DR2C.. motor" (→ 222).

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 ±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 ± 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).

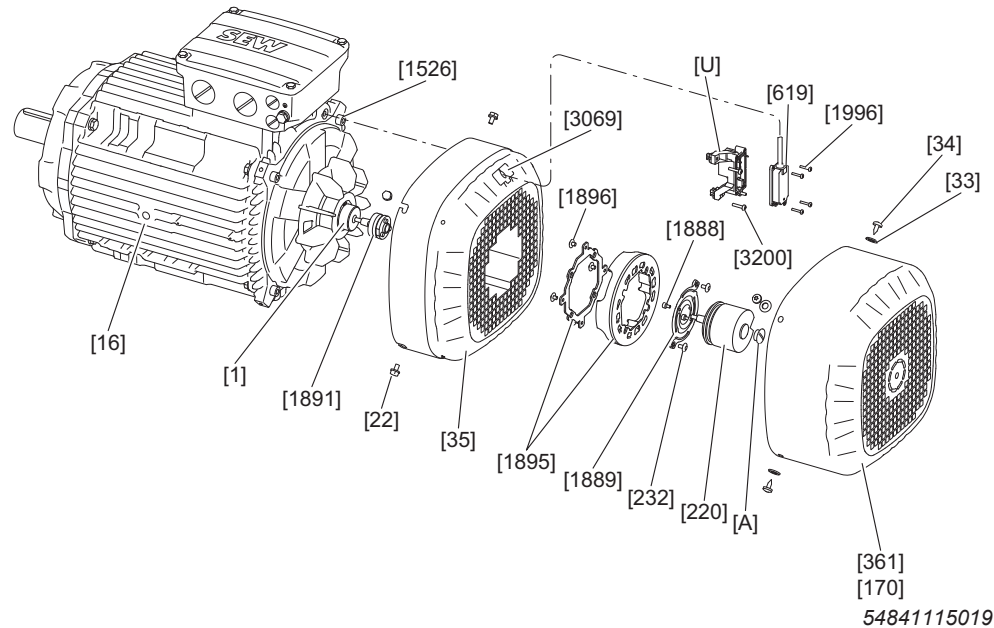
Failure to calibrate results in greater motor losses and reduced torque. In the worst-case scenario, the motor will not run.

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.

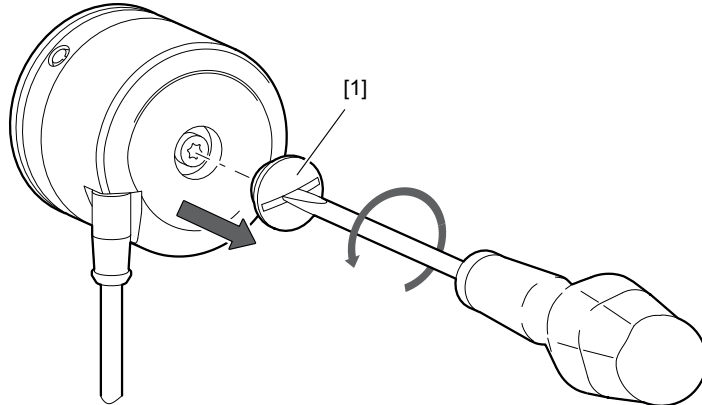
To that end, refer to the operating instructions for the frequency inverter or contact SEW-EURODRIVE Service.

7.5.3 Additional work for the RK8M encoder on the DR2C.. motor

Required tools:

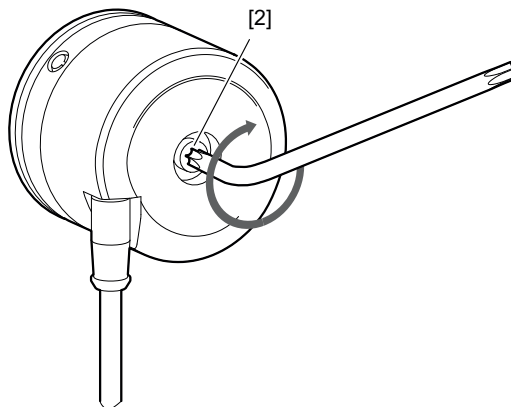
- Slotted screwdriver 1.6 × 8.0 mm
- Torx screwdriver TX20
- Allen wrench 2.5 mm

1. Remove the screw plug [1] from the resolver.



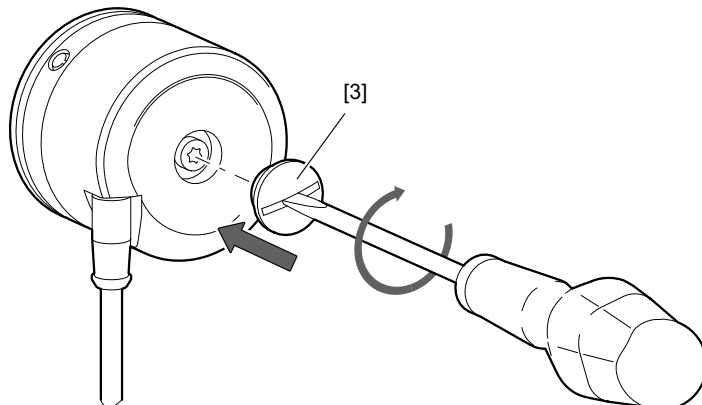
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2. Install the resolver by tightening the M5 central screw [2] with 3.3 Nm on the customer shaft.



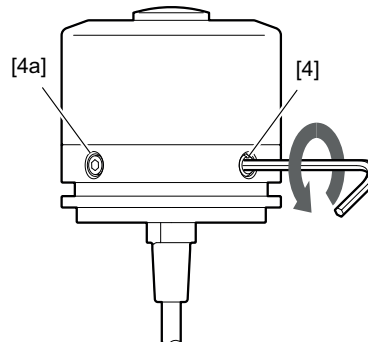
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3. Reinstall the screw plug [3] on the resolver with 1.8 Nm.



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4. When installing for the first time, loosen the set screw [4] slightly. When re-installing, the set screw [4a] must also be loosened slightly.



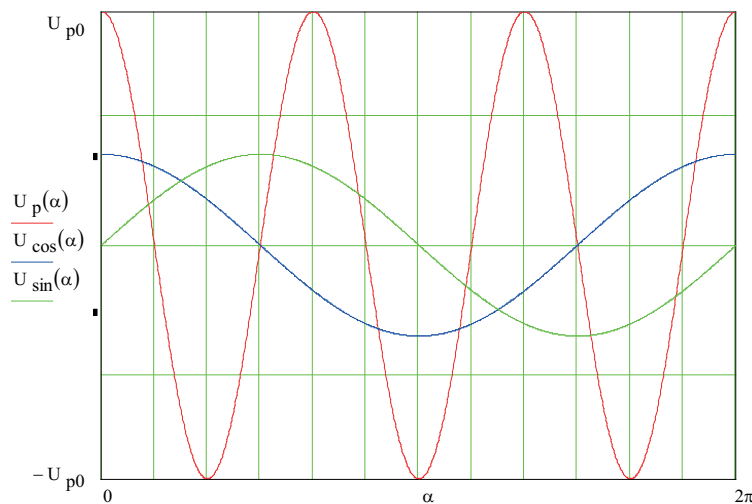
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⇒ The rear part of the resolver can now be moved.

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

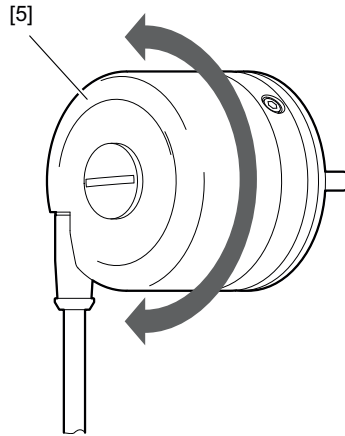
- ✓ The motor is unloaded and the brake released. The rotor can freely align itself in the stator field. Supply the motor with direct current 60 – 80% I_0 (for a maximum of 10 minutes).
 - ✓ The rotor aligns in the field.
5. Turn the movable part [5] of the resolver until:
 - ⇒ S2 – S4 (U_{\sin}) positive zero crossing
 - ⇒ S1 – S3 (U_{\cos}) positive maximum

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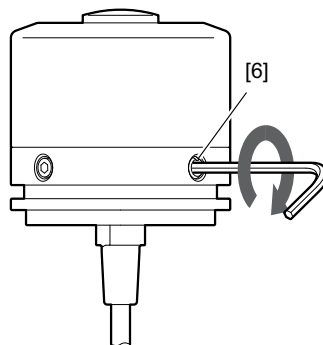
Mechanical installation

Removing/installing conical encoders and encoder mounting adapters for conical encoders



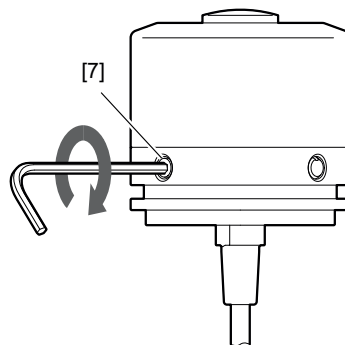
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6. Tighten the set screw [6] that was loosened at point (4) again with 1.2 Nm.



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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

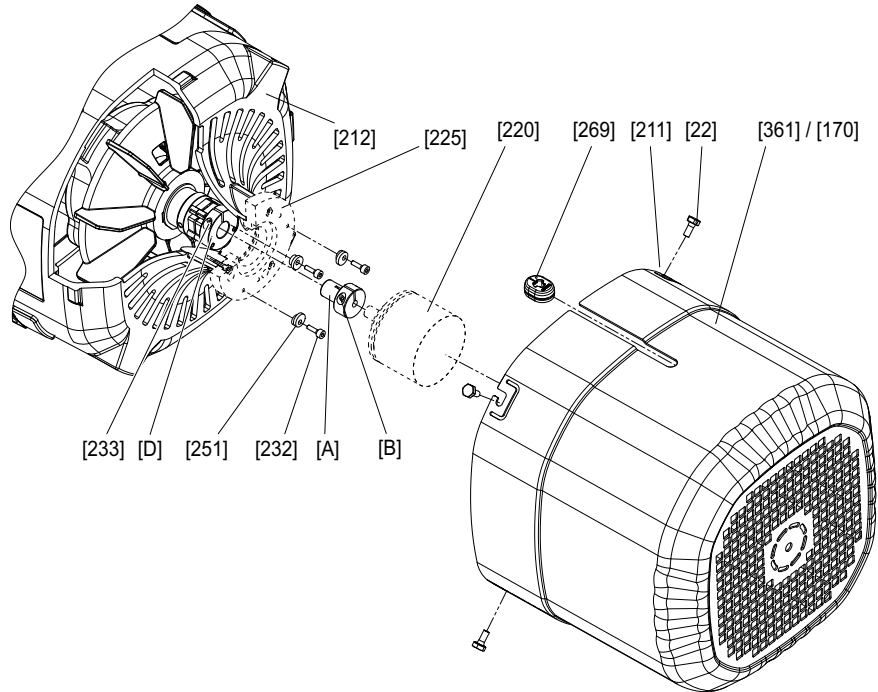
For the EK8W, AK8H, AK8W, EK9Z, and AK8Z encoders, perform the following steps after installing the encoder:

- ✓ 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].

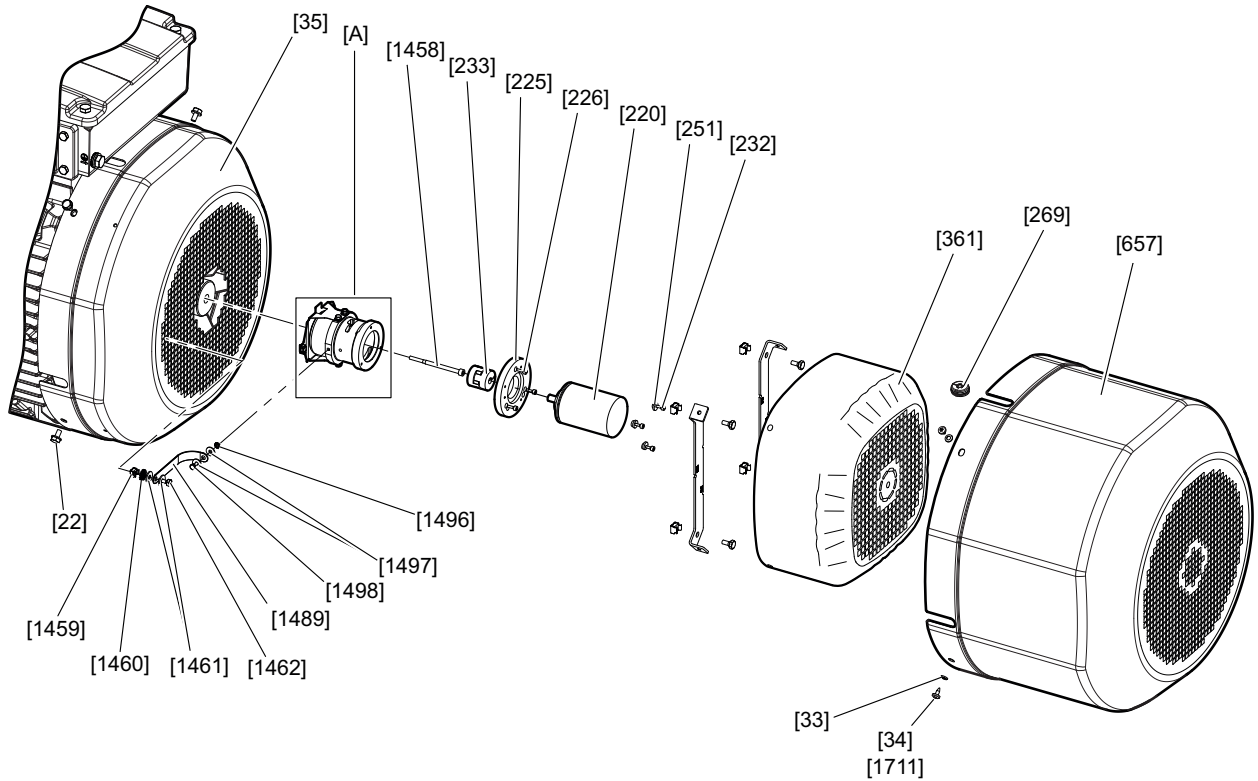
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Mechanical installation

Removing/installing an add-on encoder with encoder mounting adapter with fan guard with encoder mount

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].

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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.

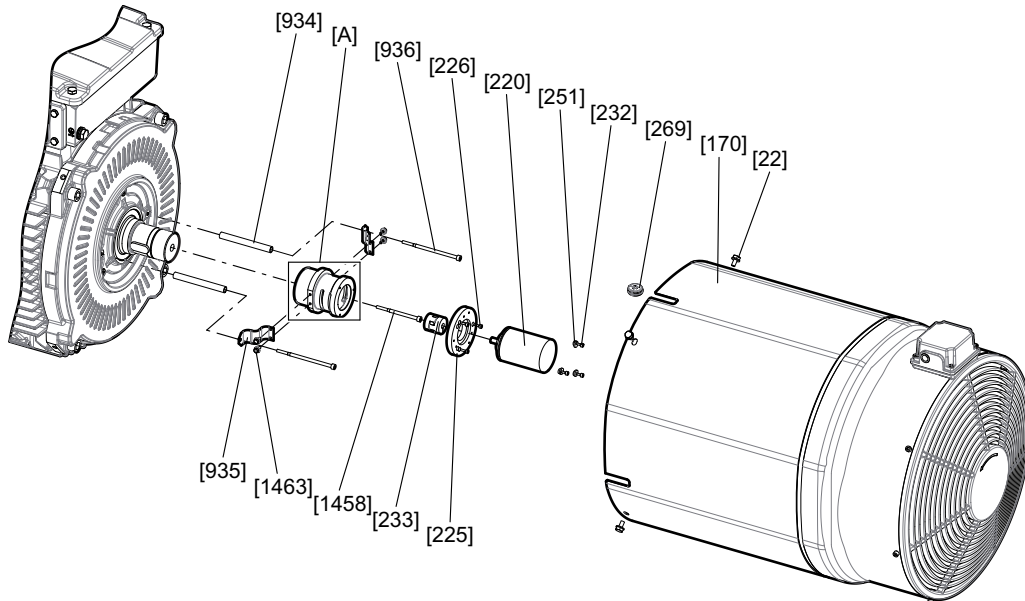
Removing EV../AV../XV..

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..

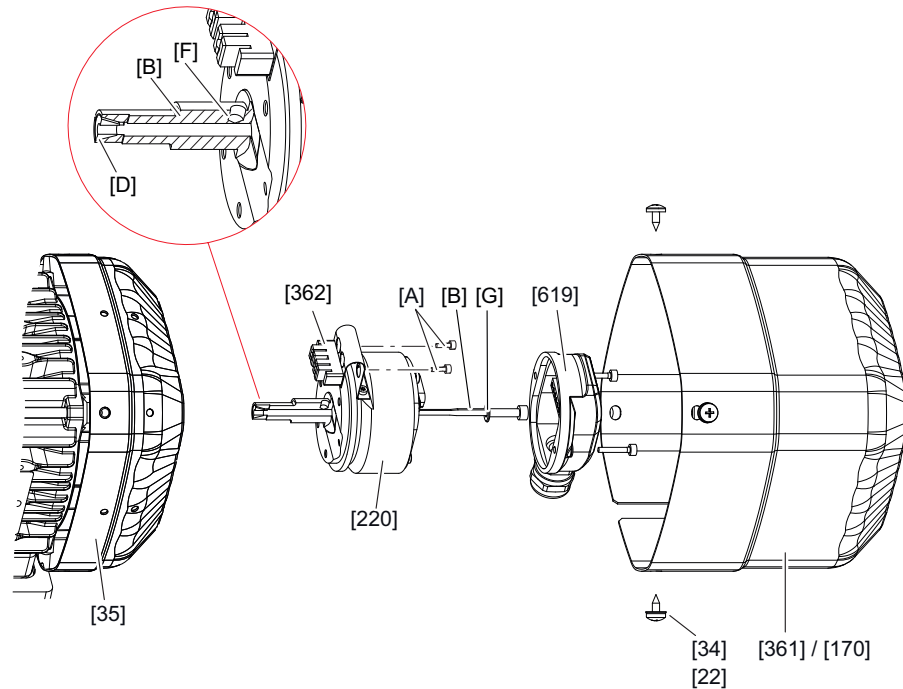
1. Remove the screws [22] to disassemble the forced cooling fan [170].
2. Remove the cable grommet [269] with the encoder cable from the forced cooling fan [170].
3. Loosen the retaining screws [232] and turn the conical spring washers [251] outwards.
4. Loosen the screw at the coupling clamping hub [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



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[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.

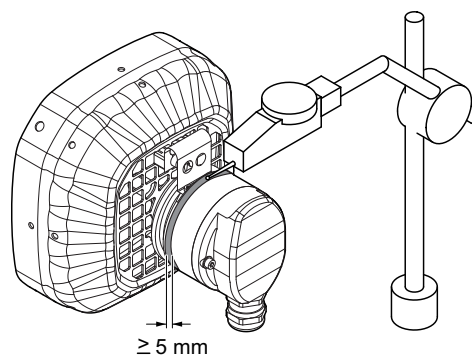
1. Apply a contact corrosion prevention compound, e.g. NOCO-Paste, to the encoder pins.
2. Attach the expansion anchor [362] to the torque bracket of the encoder.
 - ⇒ For safety encoders: Use a new expansion anchor.
3. Push the encoder to the stop of the shaft end.
4. Tighten the central retaining screw [B].
 - ⇒ Tightening torque 2.75 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 Nm \pm 10%
7. Screw on the connection cover [619].
 - ⇒ Tightening torque 2.25 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 Nm
 - ⇒ For screw [34]: Tightening torque 2 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

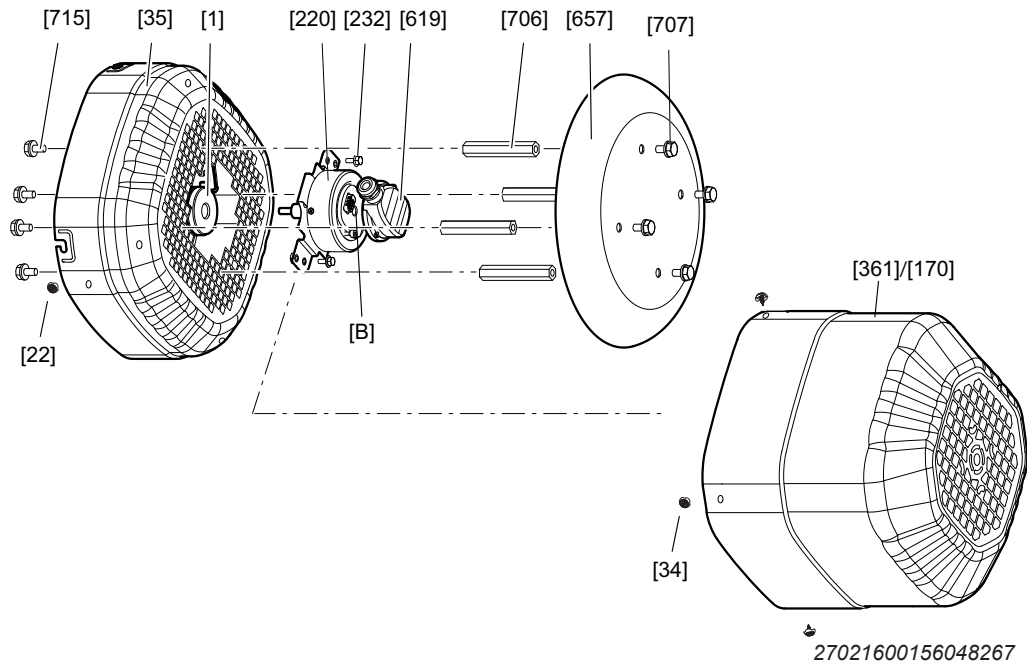
Repeat the check if the measured value is exceeded. Proceed as follows:

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.

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

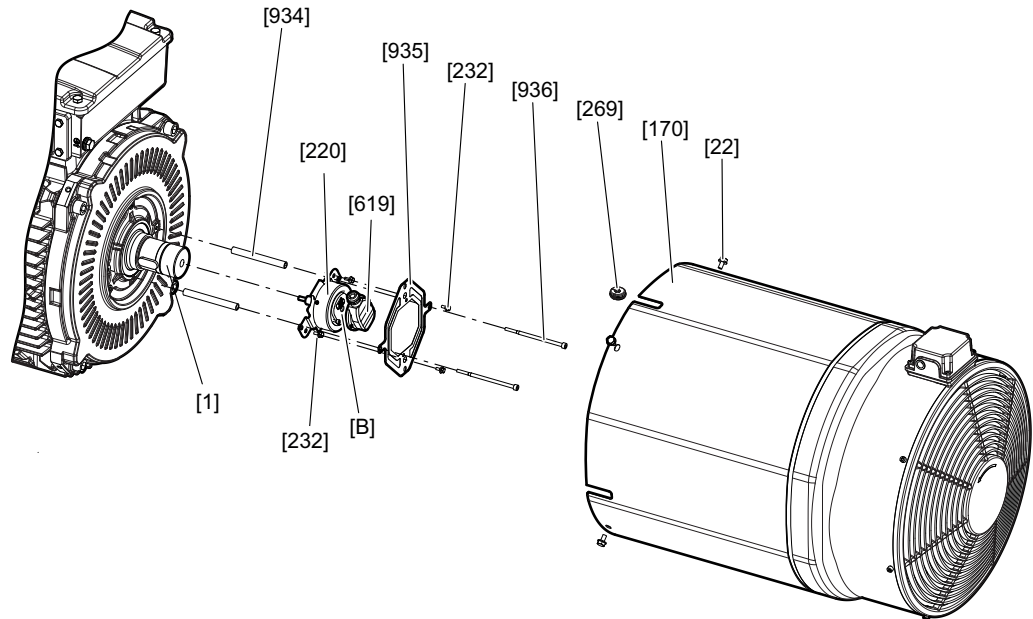
Removing EG7., AG7.

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



[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].

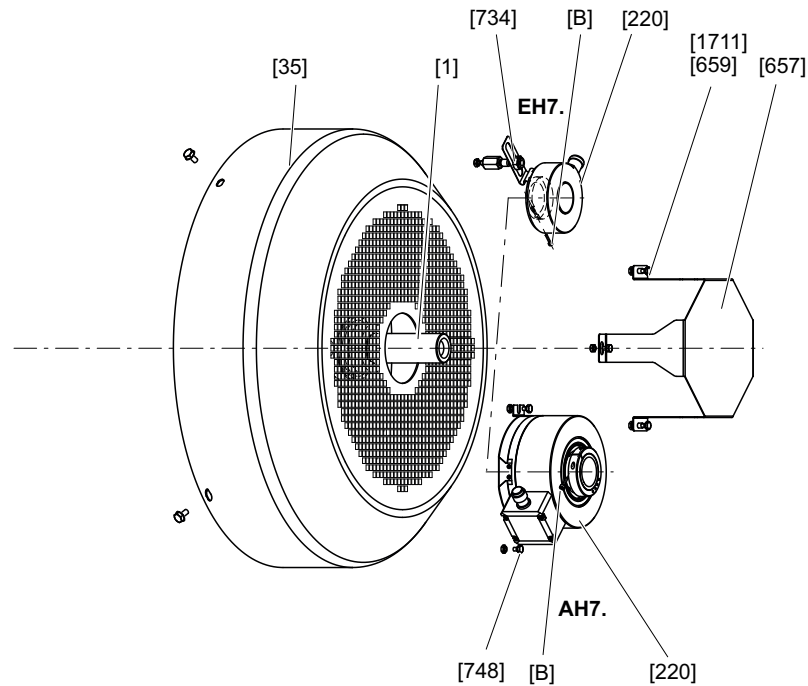
Installing EG7., AG7.

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 ± 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 ±10%, M8 = 27 Nm ±10%

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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 ± 10%
7. Screw on the connection cover [619].
 - ⇒ Tightening torque 2.25 Nm ± 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.

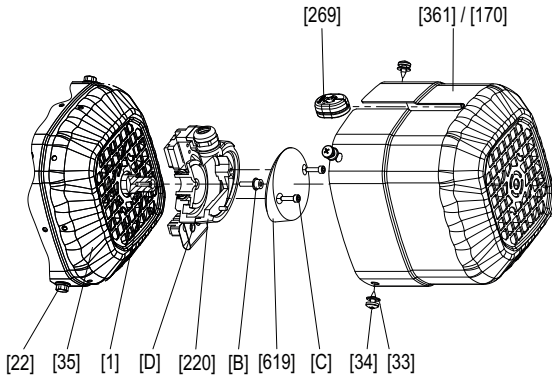
1. Push the encoder to the stop of the shaft end.
2. Tighten the screw [B].
 - ⇒ Tightening torque 3 Nm
3. Proceed as follows, depending on the encoder:
 - ⇒ **EH7.:** Install the nut [734].
 - ⇒ Tightening torque 3 Nm
 - ⇒ **AH7.:** Insert and tighten the screw [748].
 - ⇒ Tightening torque 12 Nm
4. Mount the cover plate [657] using the screws [659]/[1711].
 - ⇒ Tightening torque 11 Nm

7 Mechanical installation

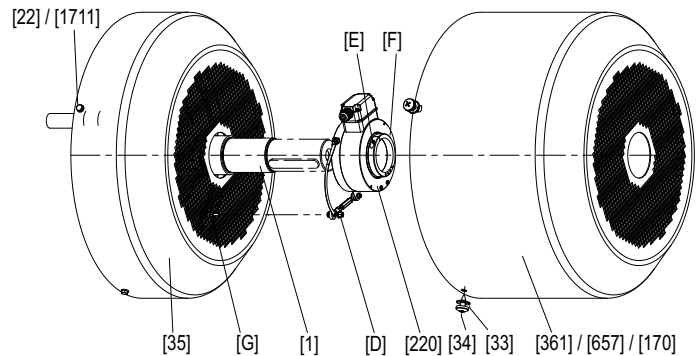
Removing/installing add-on encoders with spread shaft, plug-in shaft, and hollow shaft

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



Encoder mounting with XH7A and XH8A encoder mounting adapter



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[1]	Rotor	[619]	Connection cover
[22]	Screws	[657]	Safety cover
[33]	Washer	[1711]	Screw
[34]	Tapping screw	[B]	Central retaining screw
[35]	Fan guard	[C]	Connection cover screws
[170]	Forced cooling fan cover	[D]	Torque bracket screws
[220]	Encoder	[E]	Screw
[269]	Grommet	[F]	Clamping ring
[361]	Safety cover	[G]	Nut of the torque bracket

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

Checklist for (E)DRN../DRU../DR2..63 – 315 motors with EK8., AK8., EK9. encoders	
Performed task	Completed
For initial installation via an encoder mounting adapter with insulation coupling: <ul style="list-style-type: none"> • Insulation coupling [1891] screwed in place (tightening torque 2.25 Nm) • Screws [1896] for the spacer ring [1895] wetted with LOCTITE® 241 and secured (tightening torque 7 Nm) 	<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 (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] (For size 63 – 132S: Tightening torque 3.3 Nm) (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.

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	✓ (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	✓ (Assumption: Potential difference of GND to shielding: 0 V)

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Overvoltage protection	± 70 V (fault protected, ± 70 V (transient))
------------------------	--

- Maximum cable length (inverter to encoder):
 - 100 m with a capacitance from core to shield ≤ 110 nF/km
 - 100 m with a capacitance from core to core ≤ 70 nF/km
- Core cross section:
 - Supply cores ≥ 0.25 mm² for cable lengths up to 50 m
 - Supply cores ≥ 0.5 mm² for cable lengths up to 100 m
 - Signal cores ≥ 0.25 mm²
- 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:

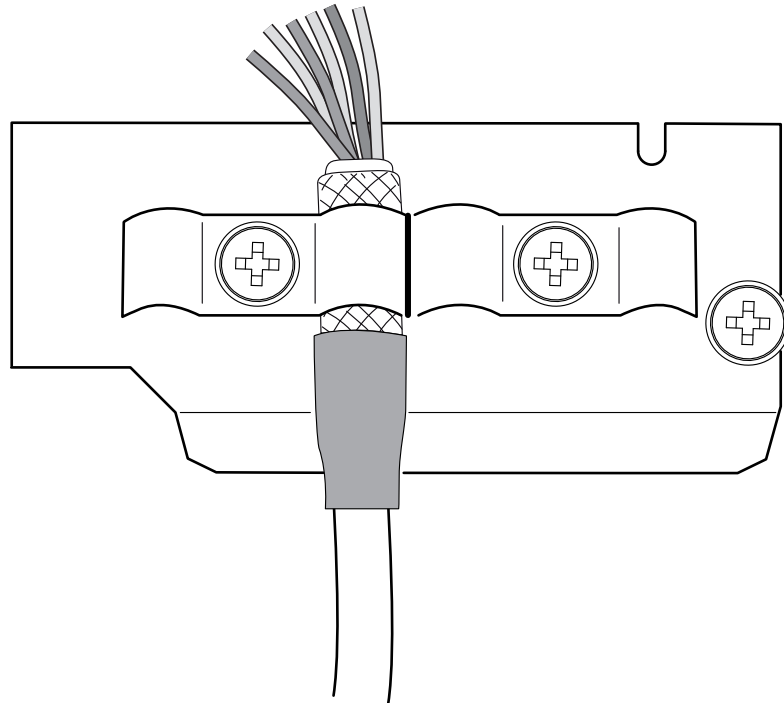
- Supply voltage
- Signal cables
- Digital signal cables, such as RS485

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.

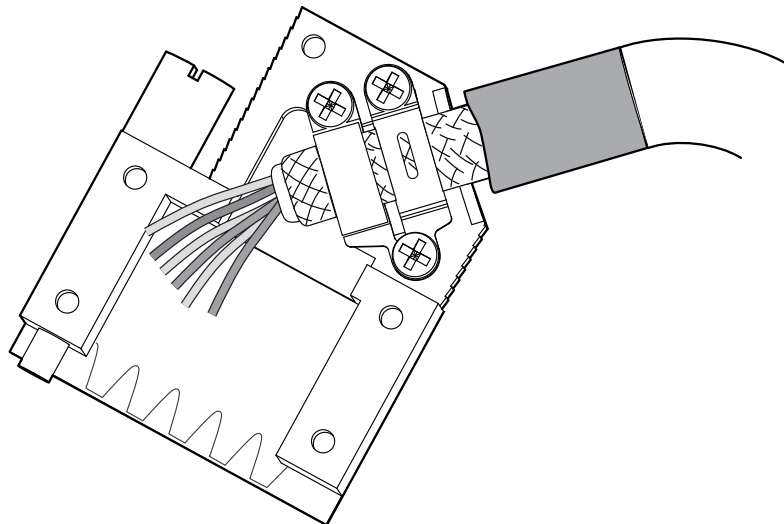
8.2.1 Installation requirements

Encoder line shield on inverter

Connect the shield of the encoder line on the inverter or the encoder evaluation unit over a wide area.



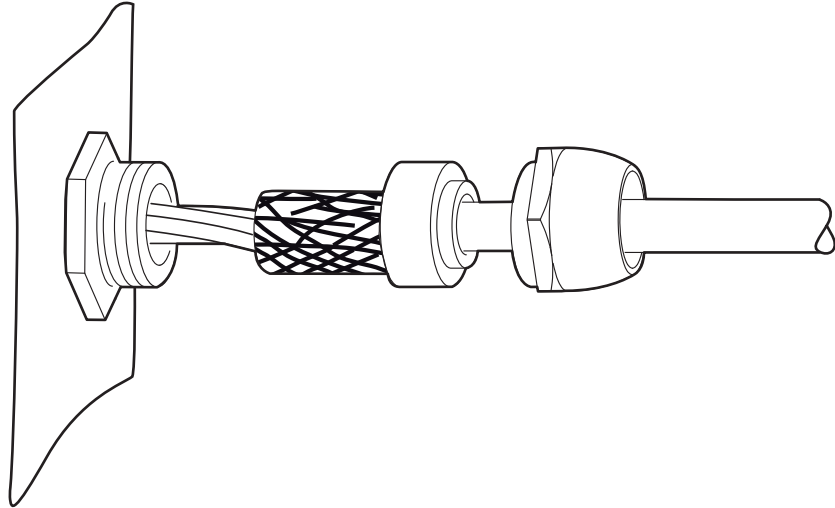
1866148491



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 ² – 4 mm ²)
KDB	=	Hybrid connector for MOVILINK® DDI: M40 (motor cable cross section 6 mm ² – 10 mm ²)
KD	=	Hybrid cable screw fitting for MOVILINK® DDI: M25/M32 (motor cable cross section 1.5 mm ² – 10 mm ²)
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	–

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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	–

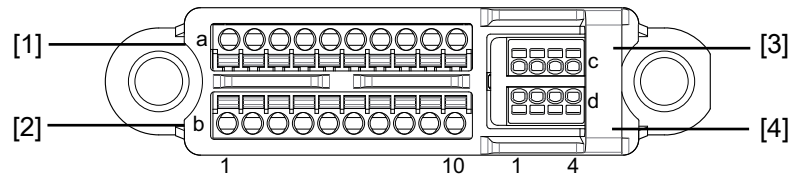
Encoder mounting adapters

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 ¹⁾	TF1 ¹⁾	TF2 ¹⁾ opt.	TF2 ¹⁾ opt.	+UB (GY)	GND (PK)	A (BN)	\bar{A} (WH)	\bar{B} (YE)	B (GN)
b	TF1 ¹⁾	TF1 ¹⁾	TF2 ¹⁾ opt.	TF2 ¹⁾ 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_ Config (BU)	n. c.	n. c.	n. c.
d	EI7C (RD)	n. c.	n. c.	n. c.

Pin assignment EI76				
	1	2	3	4
c	GND_ Config (BU)	n. c.	n. c.	n. c.
d	n. c.	EI76 (RD)	n. c.	n. c.


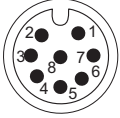
Pin assignment EI72				
	1	2	3	4
c	GND_ Config (BU)	n. c.	n. c.	n. c.
d	n. c.	n. c.	EI72 (RD)	n. c.

Pin assignment EI71				
	1	2	3	4
c	GND_ Config (BU)	n. c.	n. c.	n. c.
d	n. c.	n. c.	n. c.	EI71 (RD)

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Connection via M12 connector on the terminal box

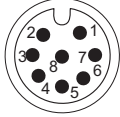
An 8-pin or a 4-pin M12 connector is available for the connection.

4-pin M12 connector AVSE		8-pin M12 connector AVRE	
<ul style="list-style-type: none"> • A-coded • male 	Pin 1: $+U_B$ Pin 2: B Pin 3: GND Pin 4: A	<ul style="list-style-type: none"> • A-coded • male 	Pin 1: $+U_B$ Pin 2: GND Pin 3: 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 	Pin 1:	+U _B	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



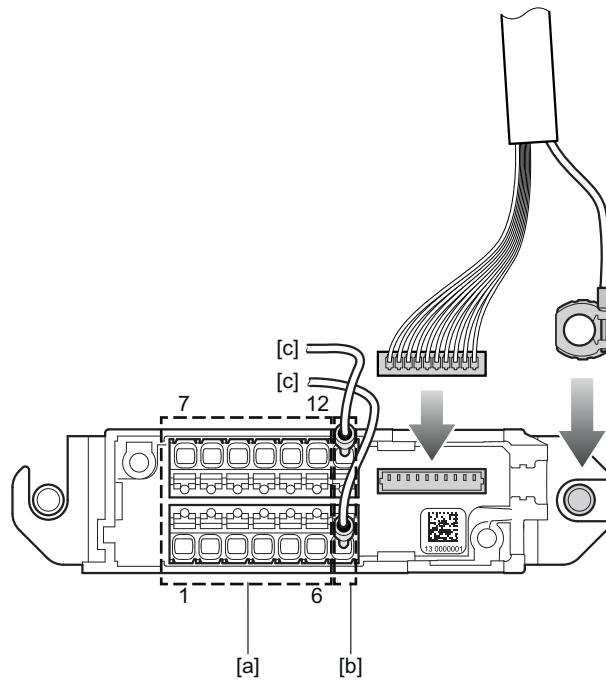
Pins 7 and 8 must **not** be used.

The following guidelines apply for the encoder cable:

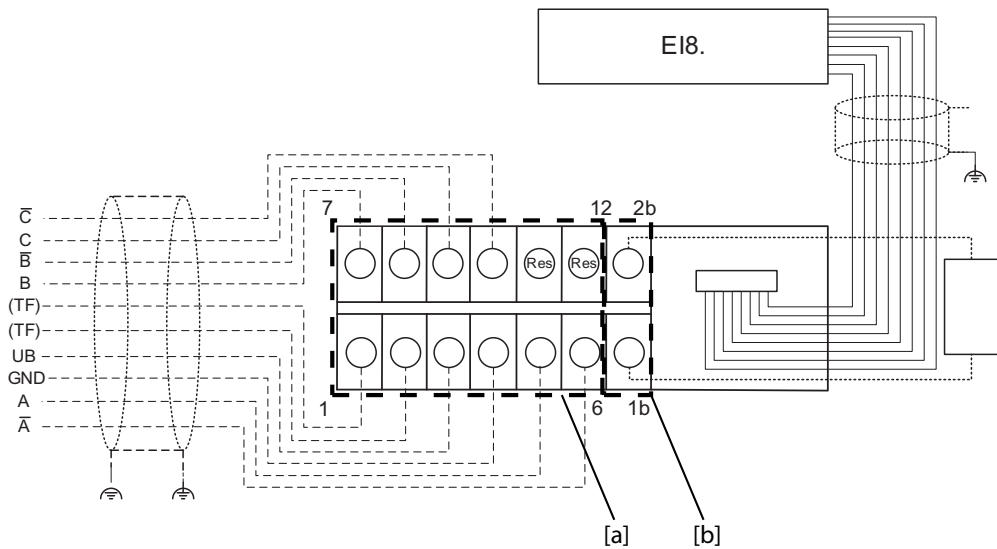
- Max. length of the cable: 100 m. The cable length may be limited by the encoder evaluation unit.
- The minimum core cross section must meet the specifications of the encoder evaluation unit. If this value is not specified, the core cross section must be at least 0.25 mm².
- The cable must be shielded. 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)

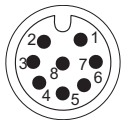
Basic connection:

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 _B
male	Pin 2: GND
	Pin 3: A
	Pin 4: n.c.
	Pin 5: B
	Pin 6: C
	Pin 7: TF
	Pin 8: TF

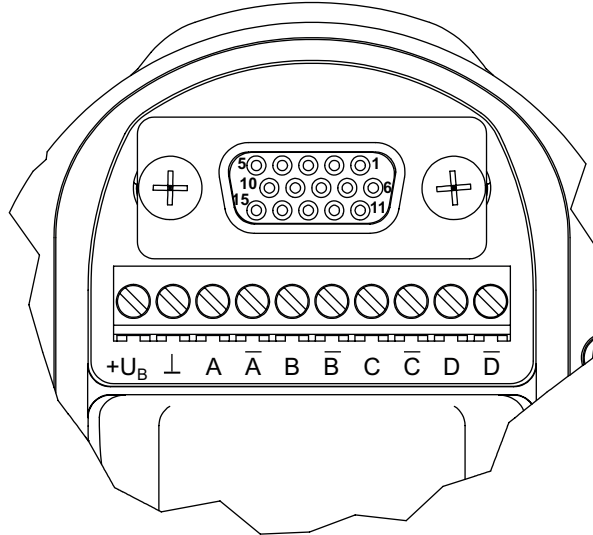
The following guidelines apply for the encoder cable:

- 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 mm².
- 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

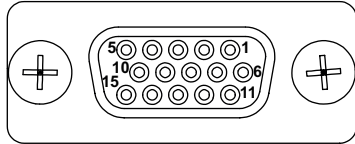
Connection via integrated encoder connector

Observe the notes in the respective chapters about connecting your encoder when connecting the encoder.



		EK8W AK8W AS7W AG7W AV8W	AK8Y AS7Y AG7Y AV8Y	AK8H AV8H	EK8C EK8R ES7C EG7C ES7R EG7R EV8C EV8R	EK8S ES7S EG7S EV8S	RK8M
	+U _B	+U _B	+U _B	+U _B	+U _B	+U _B	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_B

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-

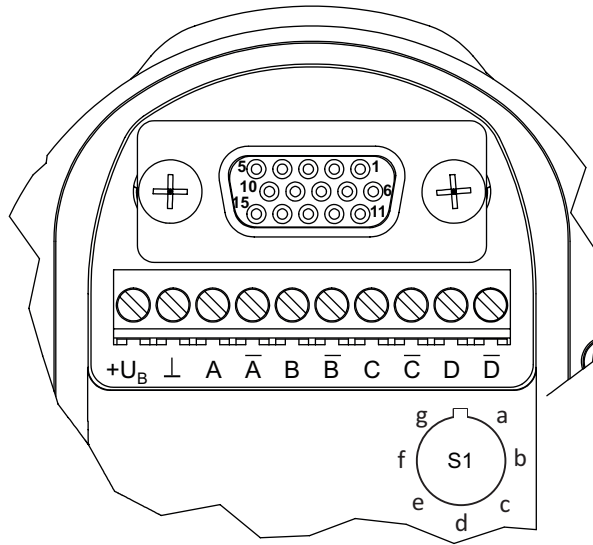
Pin 13: B+, sin+

Pin 14: A-, cos-

Pin 15: A+, cos+

8.3.6 Structure of wiring diagram of EK8X add-on encoder – with adjustable resolution

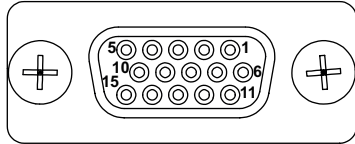
Connection via integrated encoder connector



		EK8X
	+U _B	+U _B
	⊥	DGND
	A	A
	Ā	Ā
	B	B
	B̄	B̄
	C	C
	C̄	C̄
	D	–
	D̄	–

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_B

Pin 6: C-, clock-

Pin 7: n.c.

Pin 8: n.c.

Pin 9: GND

Pin 10: GND

Pin 11: C+, clock+

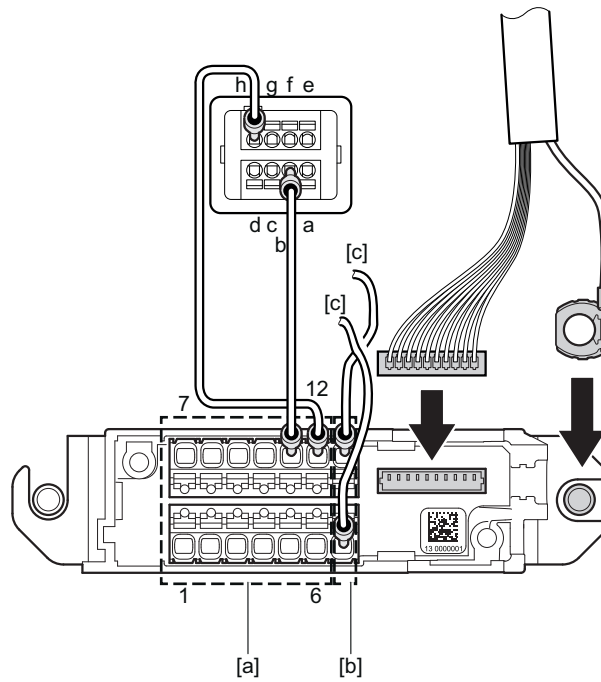
Pin 12: B-, sin-

Pin 13: B+, sin+

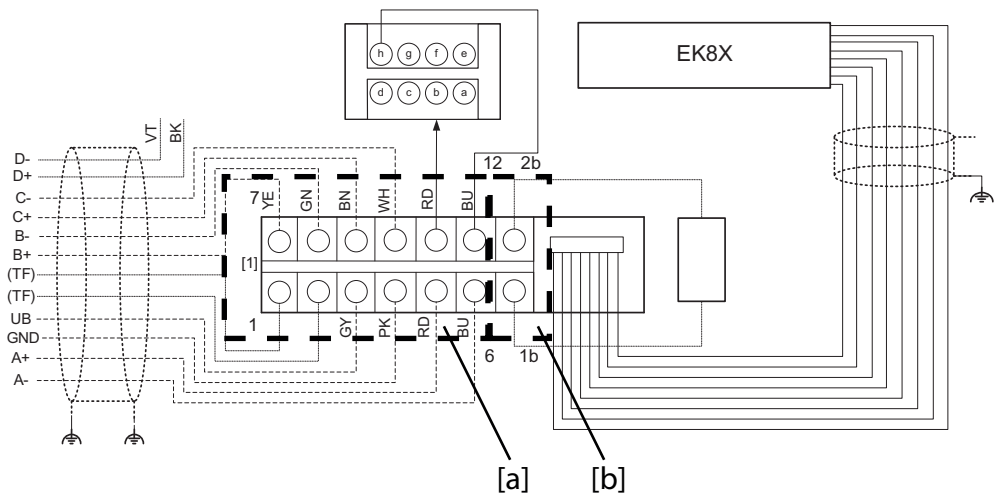
Pin 14: A-, cos-

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 _B	U _B
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

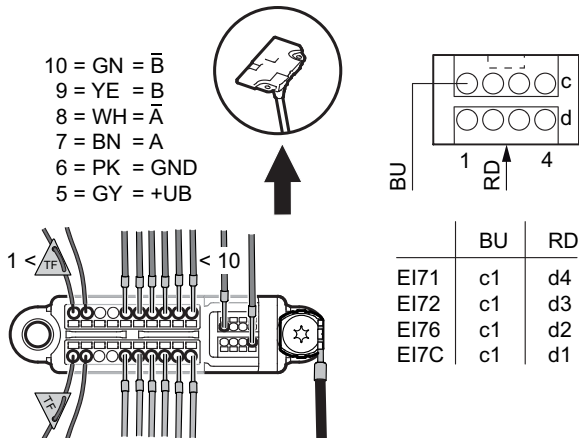
8.4 Connecting EI7. built-in encoders

INFORMATION

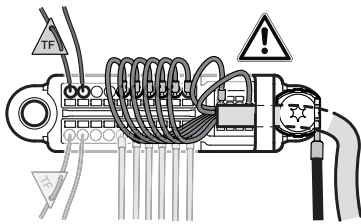


Observe the wiring diagrams in chapter "Overview of wiring diagrams"

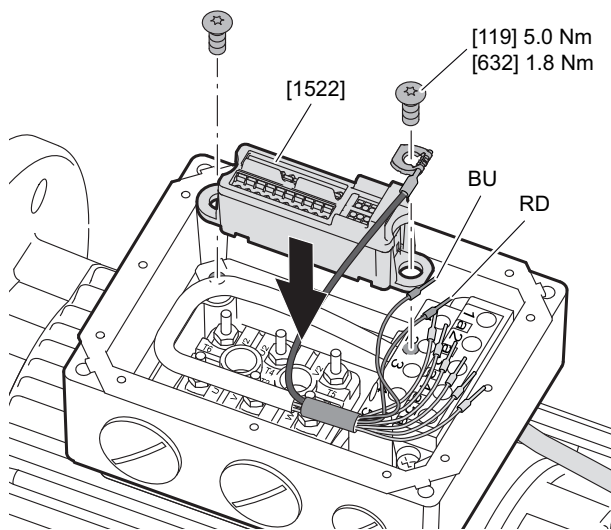
8.4.1 Wiring EI7. - with M12 connector and connection box



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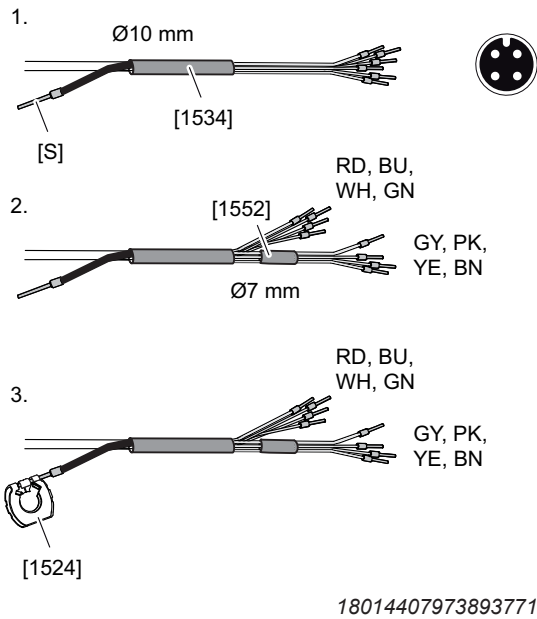
1. Wire the connection unit [1522] in accordance with the installed encoder type and the wiring diagrams (see "Overview of wiring diagrams").

1. Secure the connection unit with the M8 screws [119] or M4 screws [632].

⇒ For M8 screws: Tightening torque 5 Nm

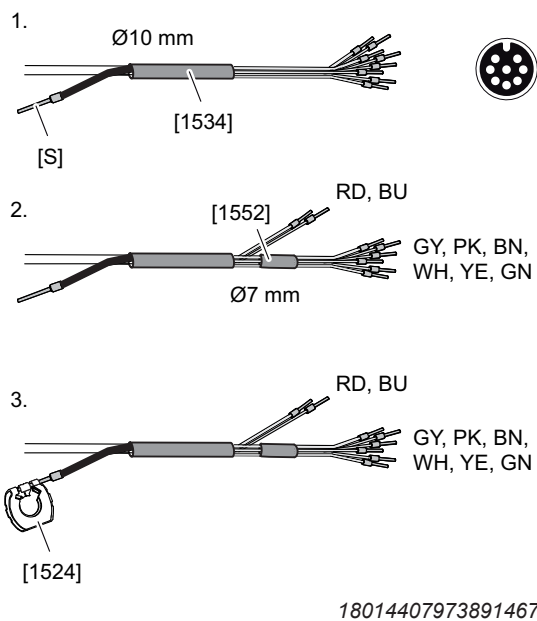
⇒ For M4 screws: Tightening torque 1.8 Nm

8.4.2 Wiring EI7. – with connection unit



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].



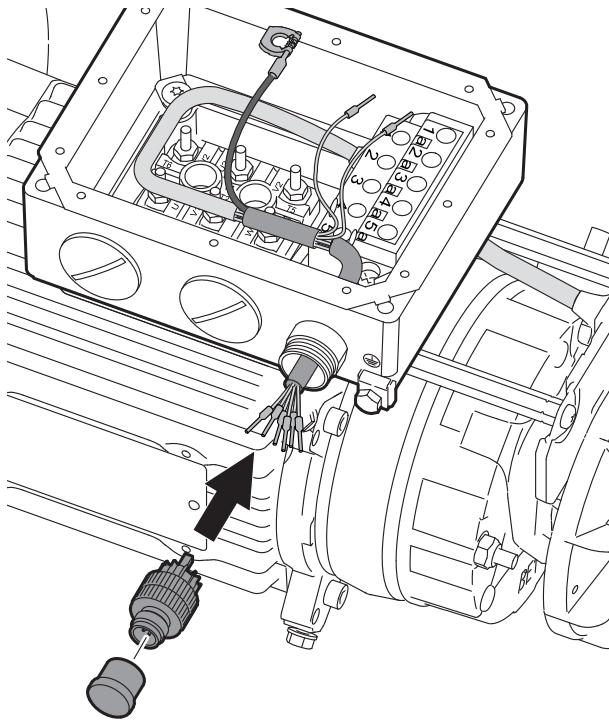
8-pin:

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].

8

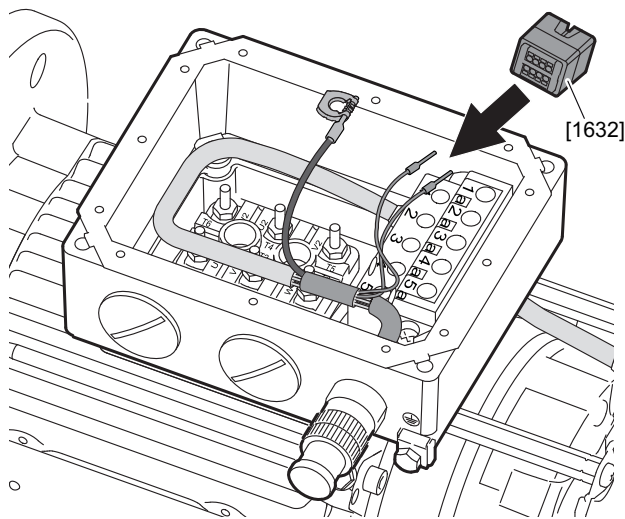
Electrical installation

Connecting EI7. built-in encoders



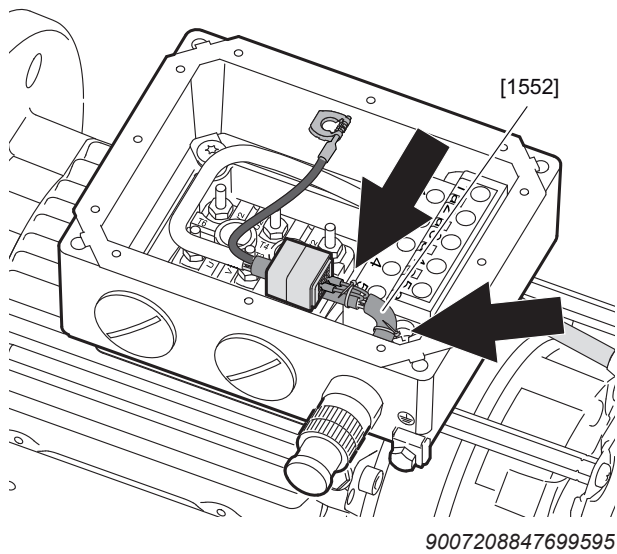
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1. Route the cores through the thread reduction out of the terminal box to the outside.
2. Connect the M12 connector as shown in the wiring diagram (see "Overview of wiring diagrams").
3. Screw the cores to the M12 connector.
⇒ Tightening torque $0.8 \text{ Nm} \pm 10\%$
4. Fasten the connector.

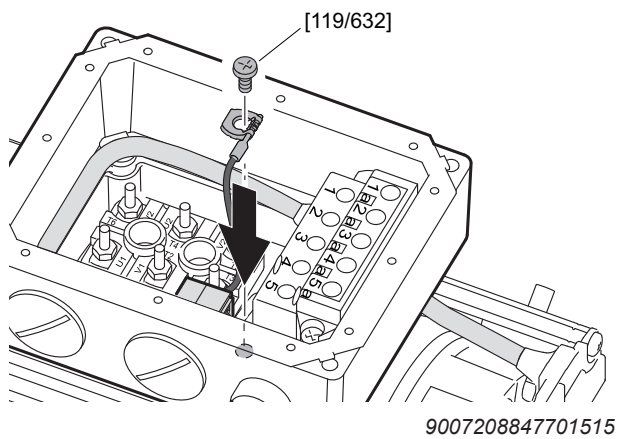


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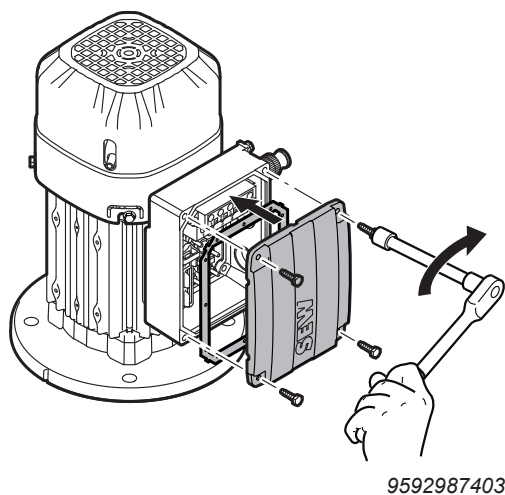
1. Wire the connection unit [1632] in accordance with the previously installed encoder type (see "Overview of wiring diagrams").



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].

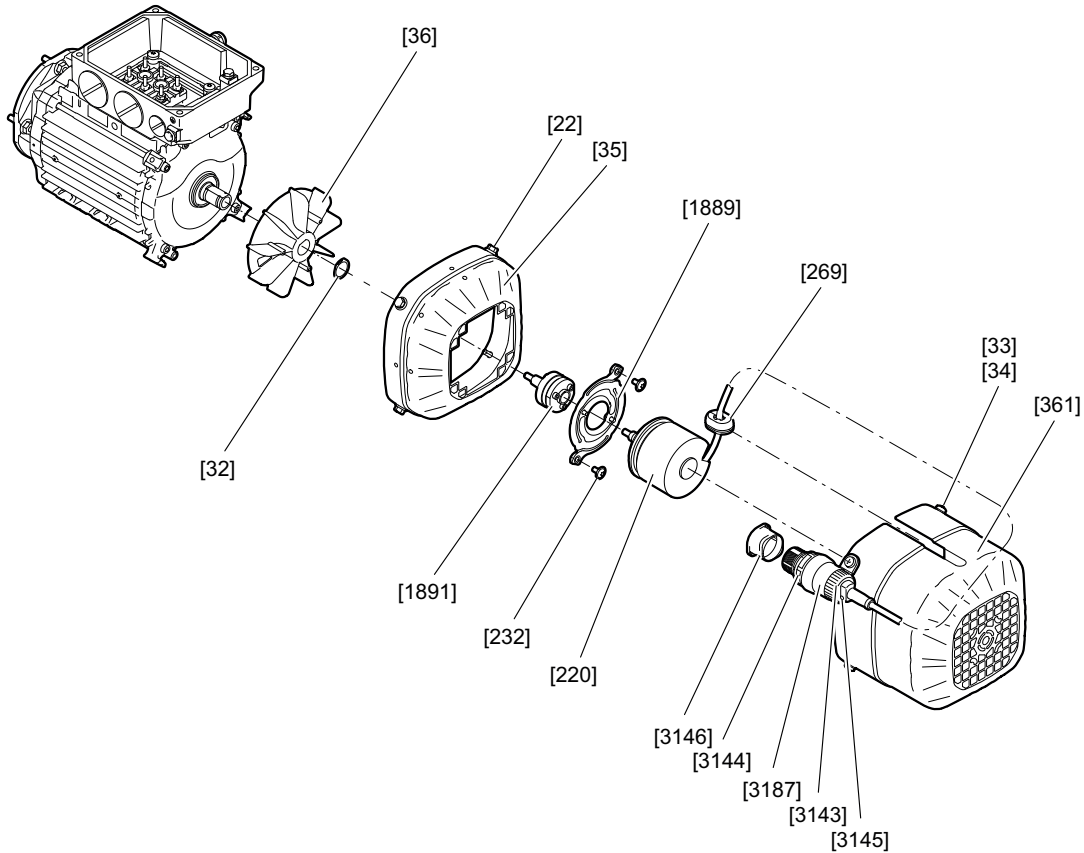
INFORMATION



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

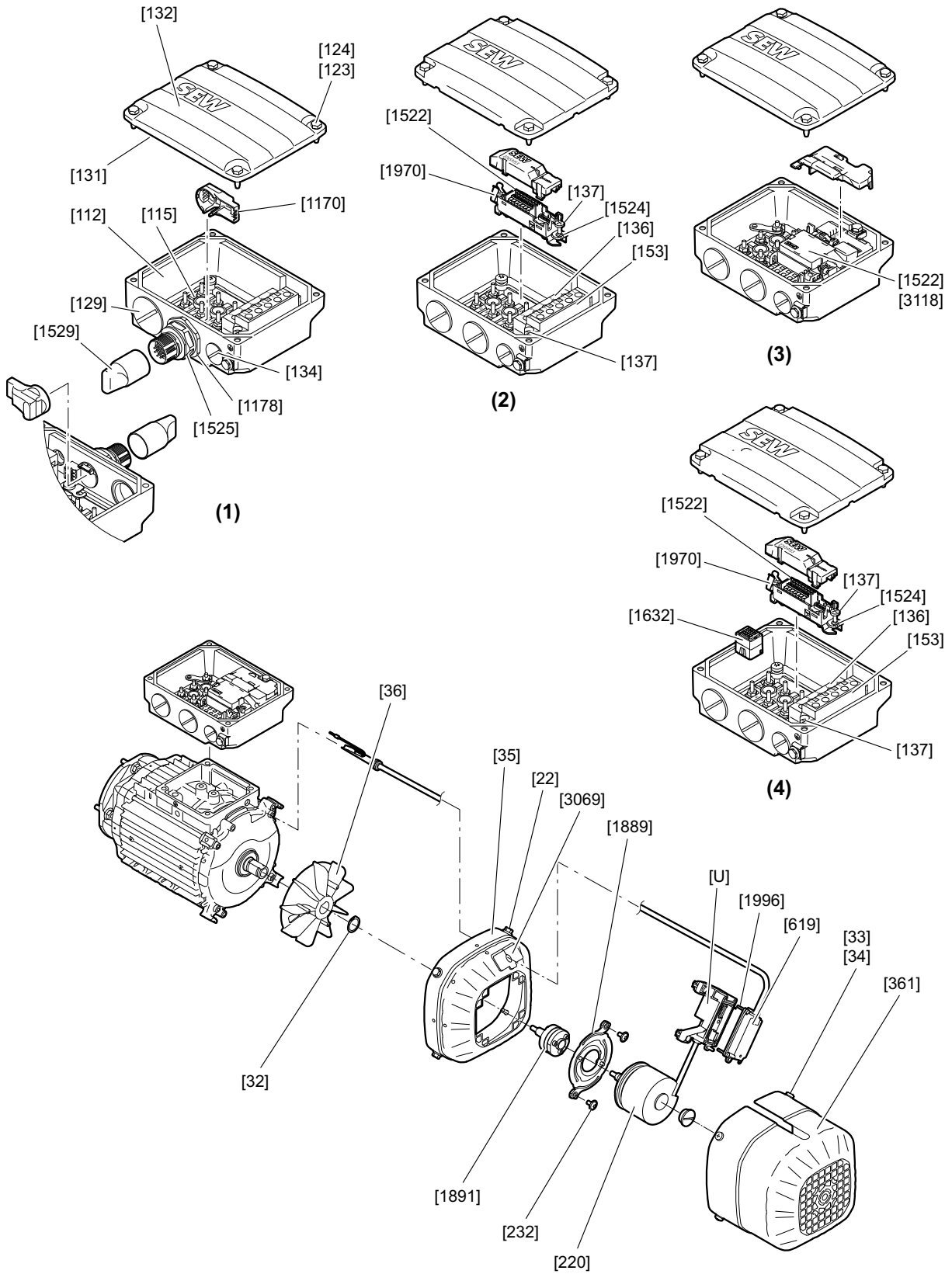


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✓ Required resources: Screwdriver

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

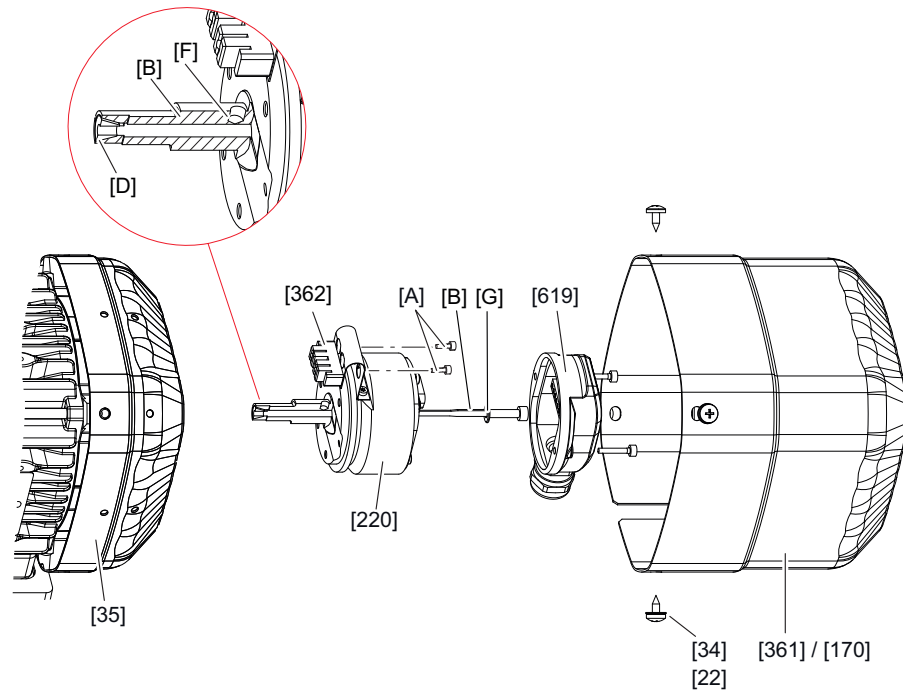
(3) – Connecting the .K8./V8. conical encoder with DDI KD1, KDB, KD, or KDD

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

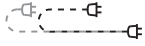



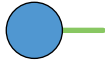


8.8 Connecting third-party encoders

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

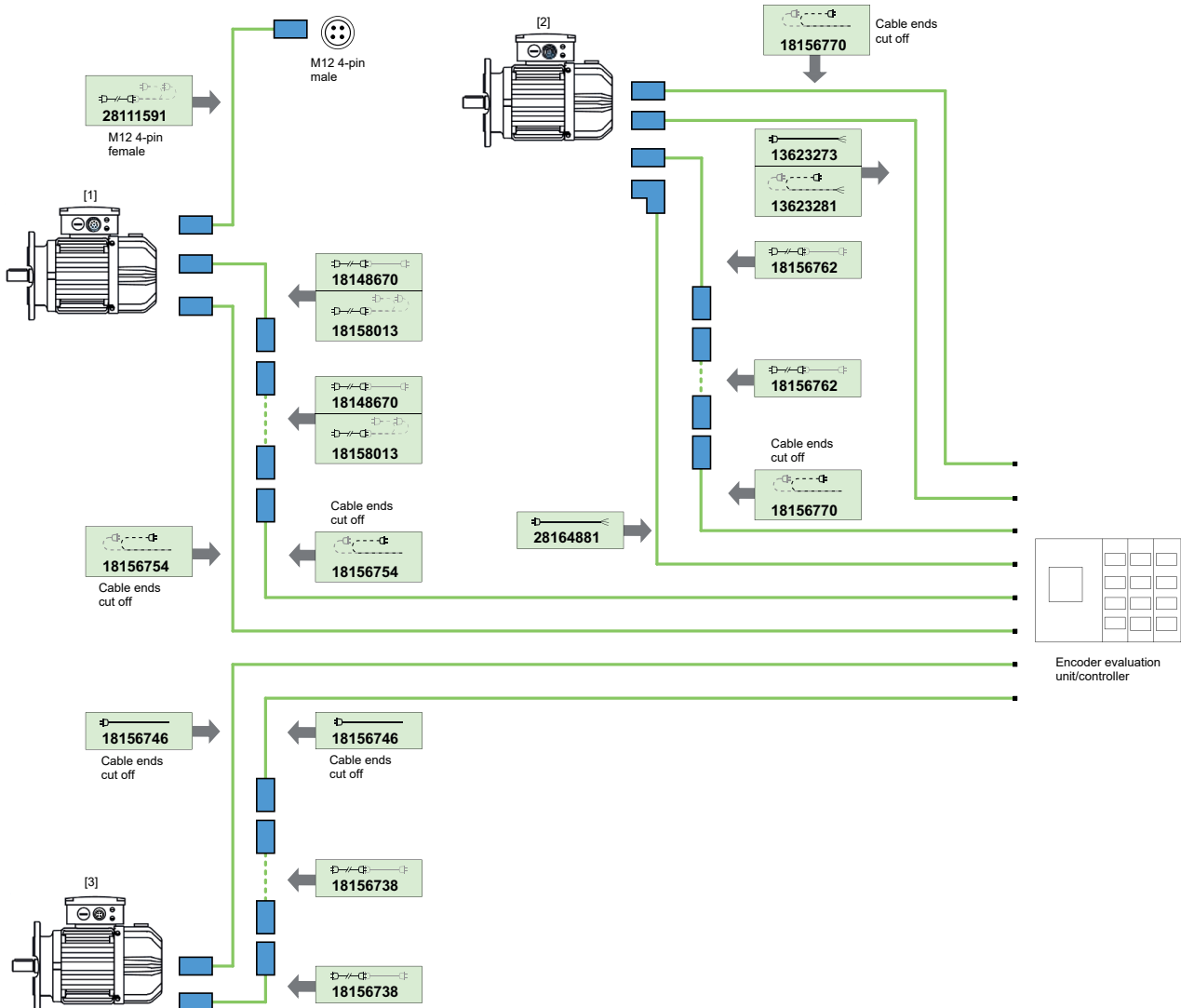
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9

Connection technology

Overview of encoder cables for DR.. motors – MOVI-C® inverters

9.1.3 EI7. encoder – Terminal strip or M12 on the terminal box – AVRE, AVSE – Encoder evaluation unit/controller

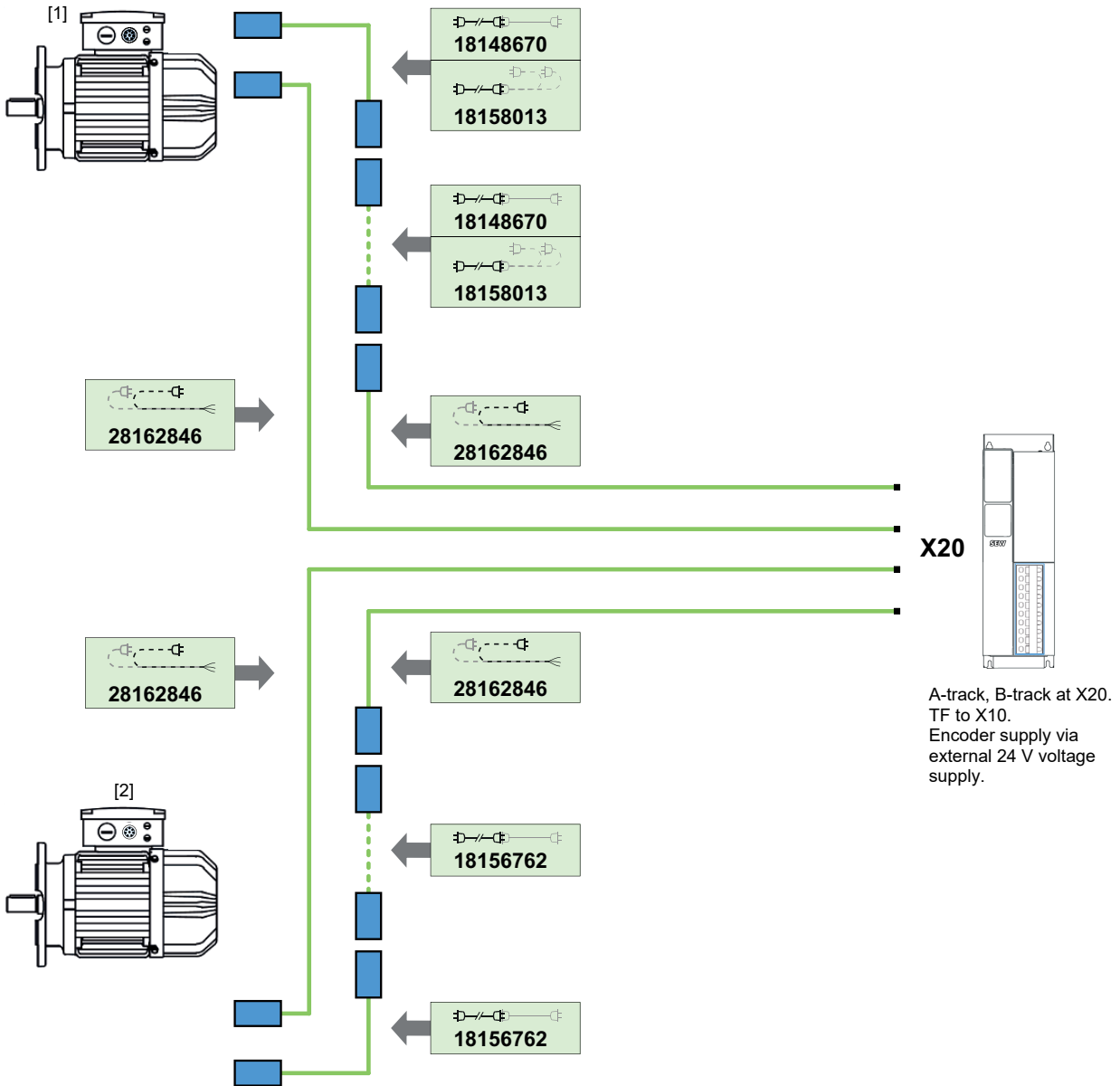


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[1]	DR.. motors with 8-pin M12 connector for encoder signals on the terminal box, without TF. Connection type: AVSE Encoder: EI7. The signals for thermal monitoring of the motor are not transmitted in the encoder cable.
[2]	DR.. motors with 8-pin M12 connector for encoder signals and TF thermal monitoring on the terminal box. Connection type: AVRE Encoder: EI7. 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. Connection type: AVSE Encoder: EI7. The signals for thermal monitoring of the motor are not transmitted in the encoder cable.

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9.1.4 EI7. encoder – M12 on the terminal box – AVRE, AVSE – MOVITRAC® advanced



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[1]	DR.. motors with 8-pin M12 connector for encoder signals on the terminal box, without TF. Connection type: AVSE Encoder: EI7. 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. Connection type: AVRE Encoder: EI7. The signals for thermal monitoring of the motor are transmitted in the encoder cable.

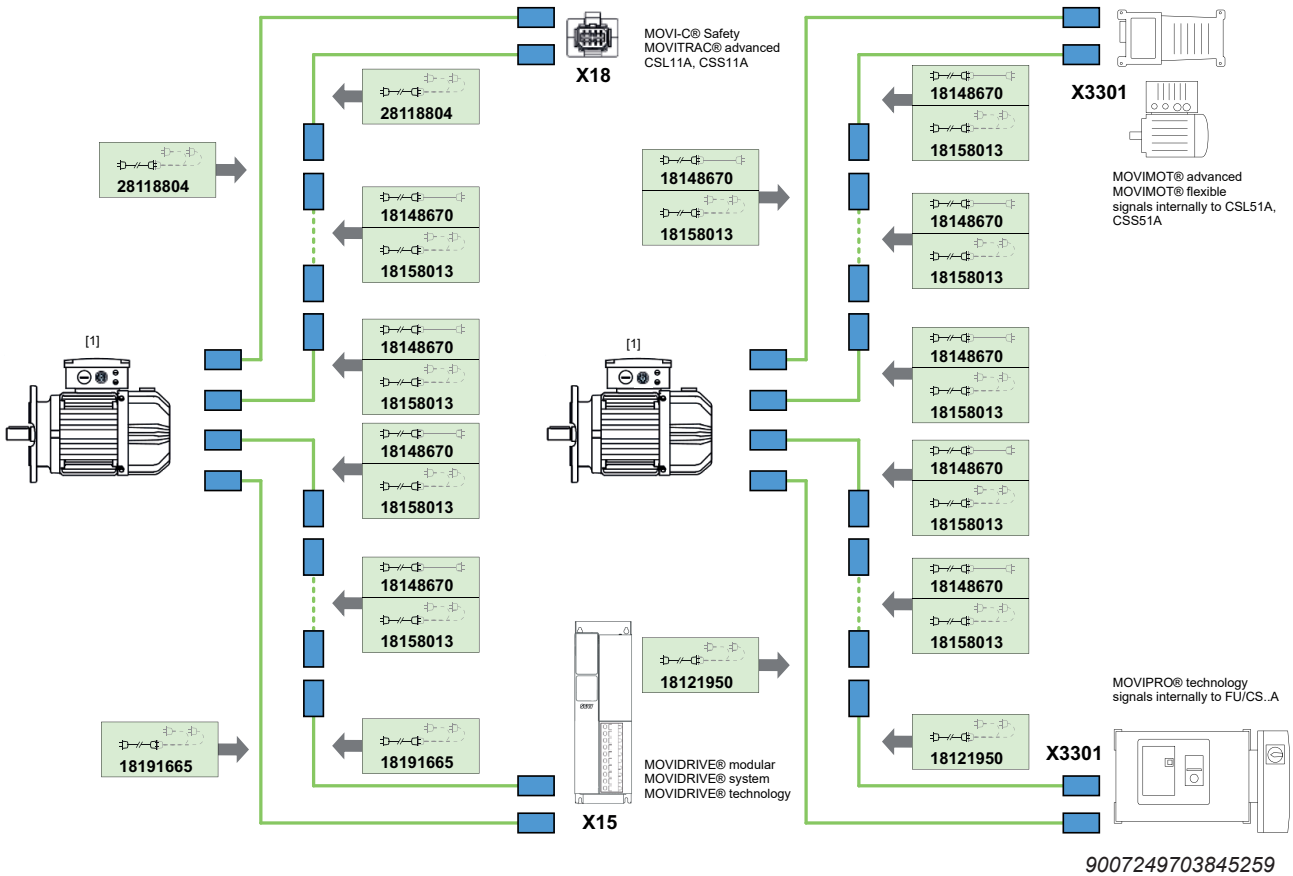
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Connection technology

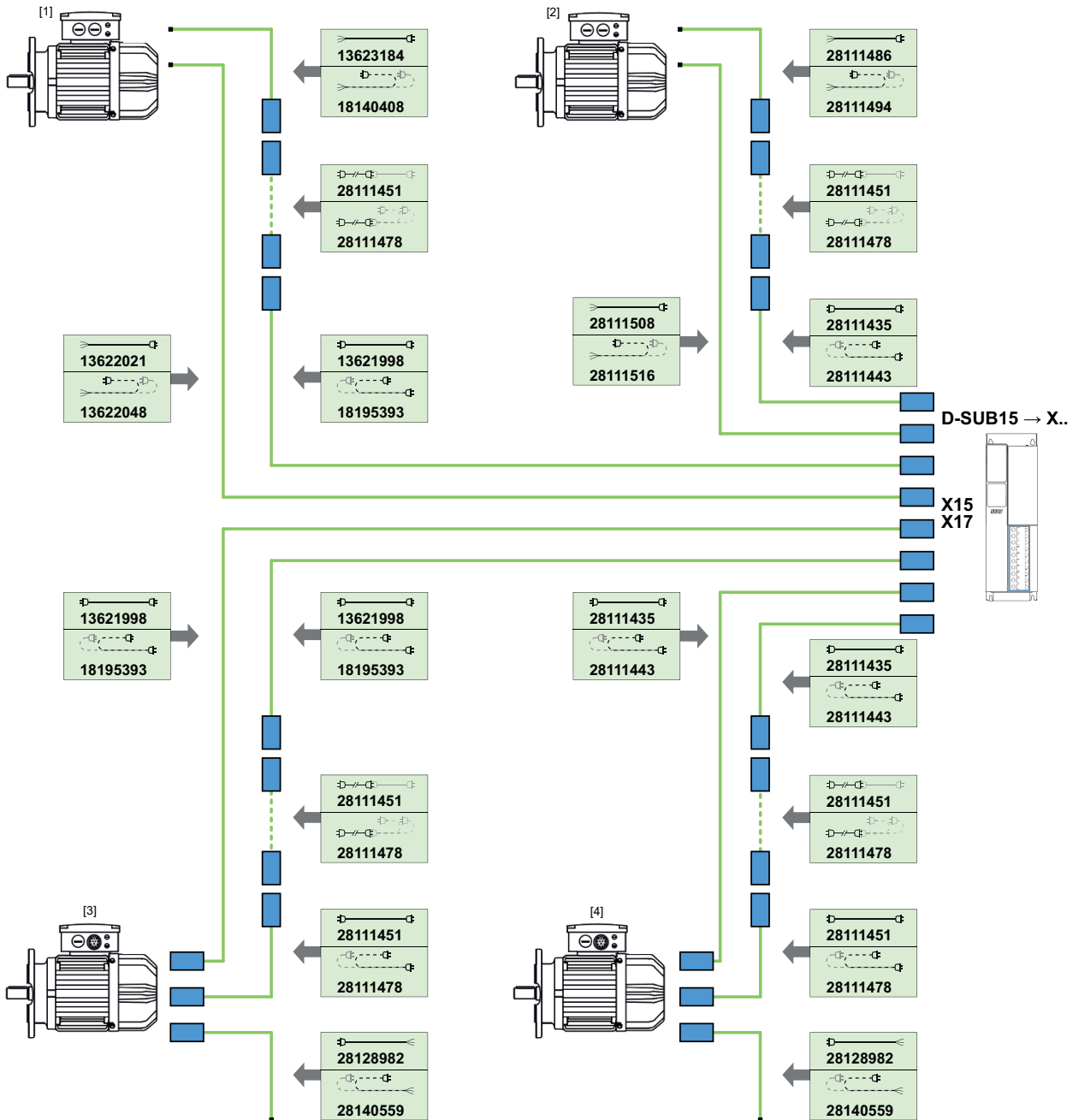
Overview of encoder cables for DR.. motors – MOVI-C® inverters

9.1.5 E17C FS safety encoder – M12 on the terminal box – AVRE – MOVIDRIVE®/MOVITRAC® advanced/MOVIMOT® advanced/MOVIMOT® flexible/MOVIPRO® technology



[1]	<p>DR.. motors with 8-pin M12 connector for encoder signals on the terminal box, without TF. Connection type: AVRE Encoder: E17C FS The signals for thermal monitoring of the motor are not transmitted in the encoder cable.</p>
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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 X17: CES11A multi-encoder card
[1]	DR.. motors with terminal strip in the terminal box for encoder signals, without TF. Encoder: EI8R, EI8C 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. Encoder: EI8R, EI8C 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. Connection type: AIGA Encoder: EI8R, EI8C The signals for thermal monitoring of the motor are not transmitted in the encoder cable.

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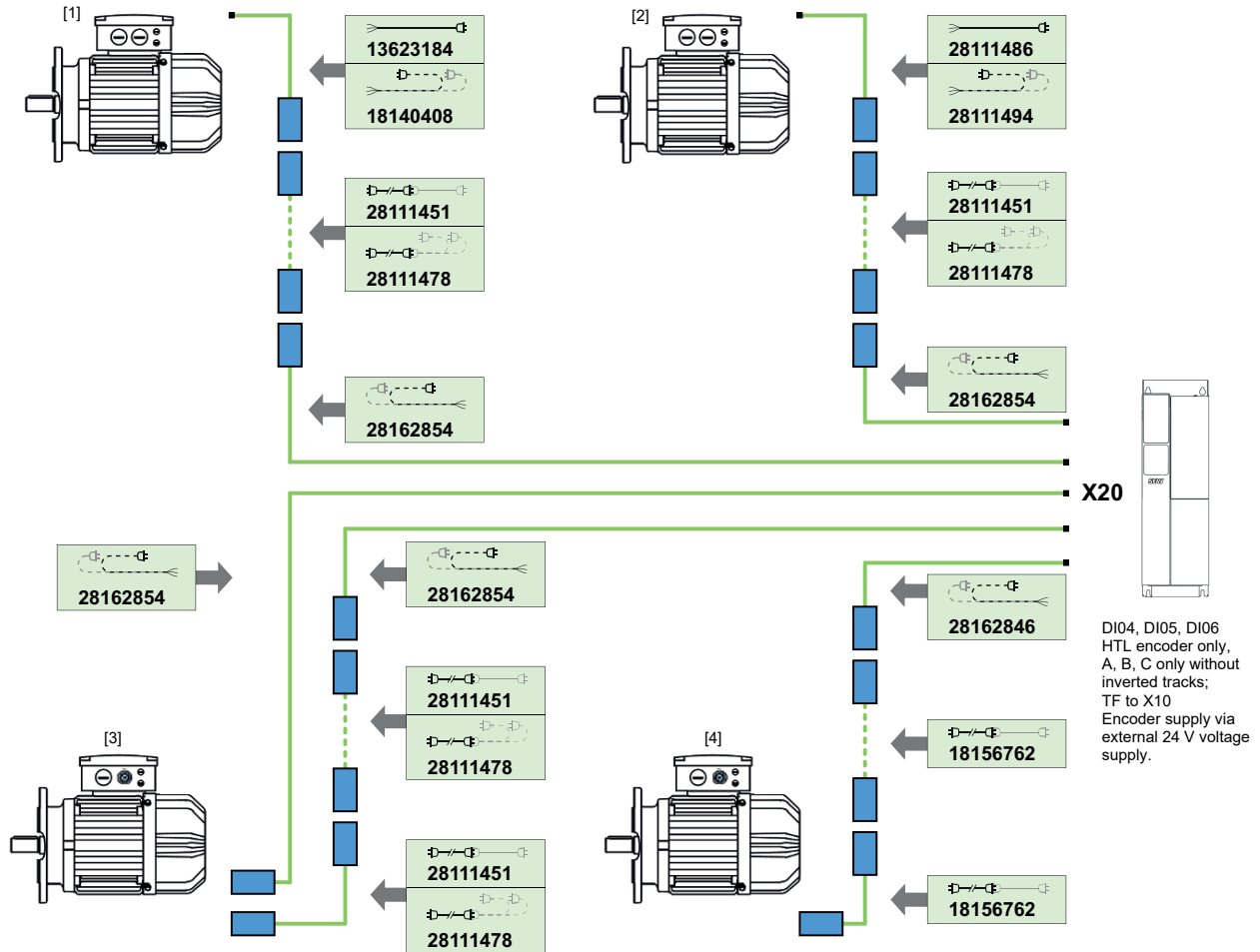
9

Connection technology

Overview of encoder cables for DR.. motors – MOVI-C® inverters

[4]	DR.. motors with M23 connector on the terminal box for encoder signals and TF thermal monitoring. Connection type: AIGB Encoder: EI8R, EI8C The signals for thermal monitoring of the motor are transmitted in the encoder cable.
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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. Encoder: EI8C 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. Encoder: EI8C 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. Connection type: AIGA/AIGB Encoder: EI8C 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. Connection type: AVRE Encoder: EI8C The signals for thermal monitoring of the motor are transmitted in the encoder cable.

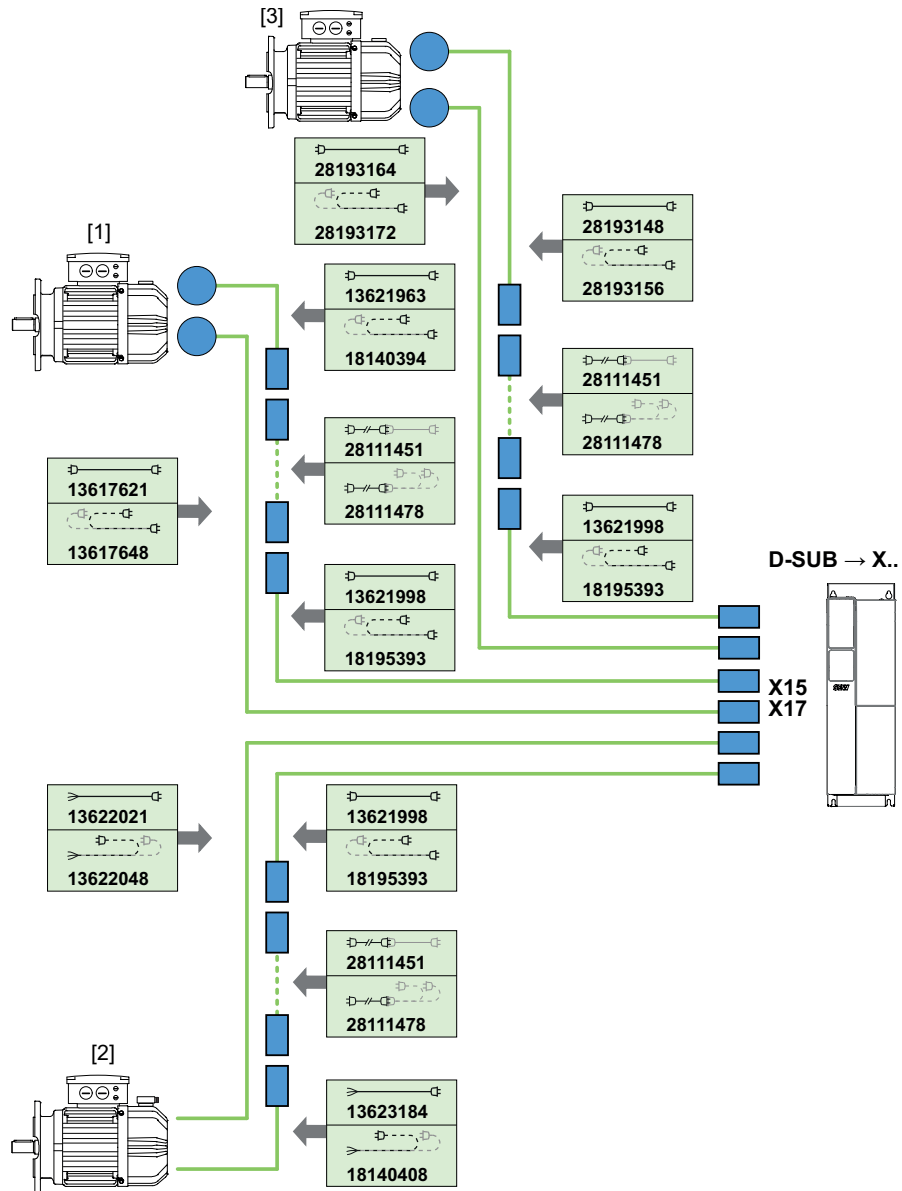
9.1.8 Encoder .K8./V8. - Integrated encoder connector - A1GA, A2GA - MOVIDRIVE®

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.

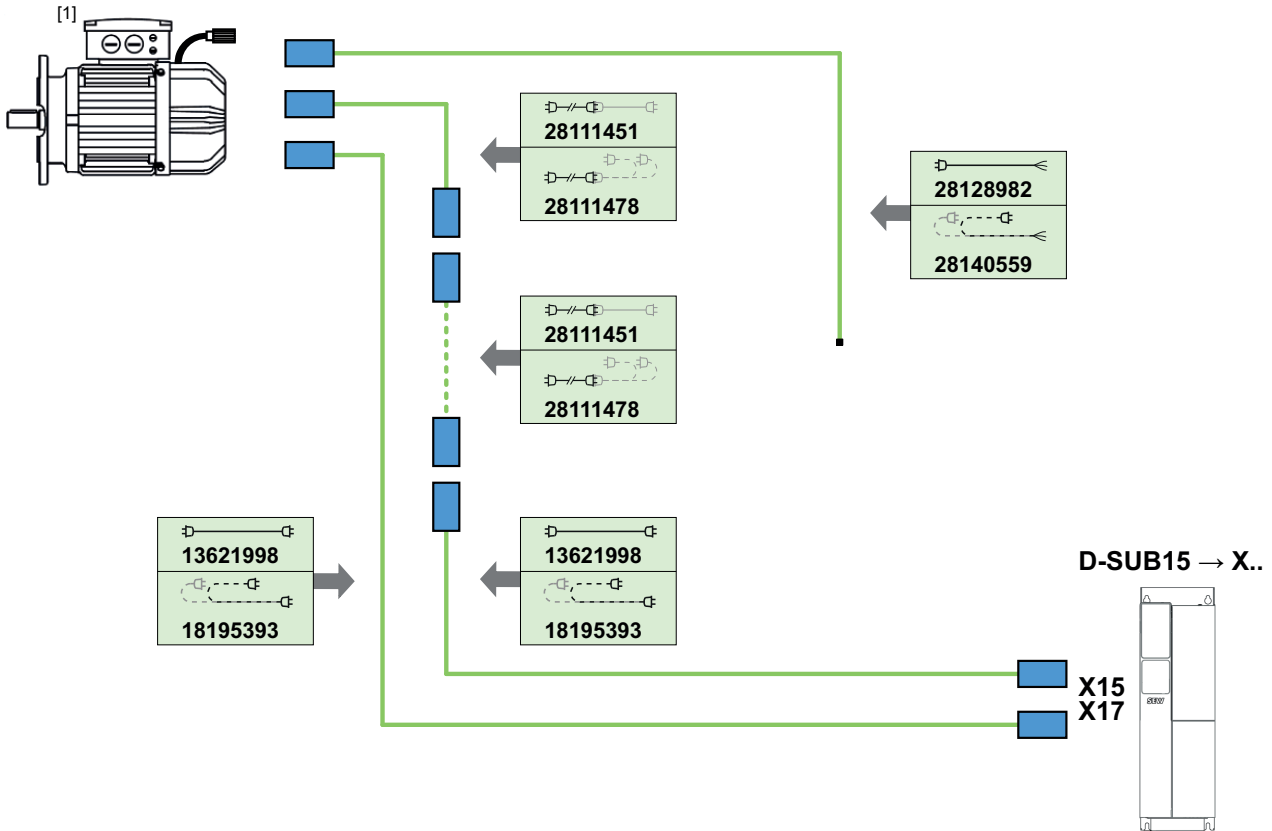


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D-sub → X..	X15: Connection of encoder/resolver to a MOVIDRIVE® modular/system/technology basic unit X17: CES11A multi-encoder card A..Y encoders can be connected only to the CES11A multi-encoder card.
-------------	---

[1]	<p>DR.. motors with integrated connector for encoder signals without connection cover on the motor, with connection cover on the cable. Connection type: A2GA Encoder: E.8S, E.8R, E.8C, A.8W, A.8Y, A.8H, EK8W 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. Connection type: A1GA Encoder: E.8S, E.8R, E.8C, A.8W, A.8Y, A.8H, EK8W, EK8X 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. Connection type: A2GA Encoder: EK8X 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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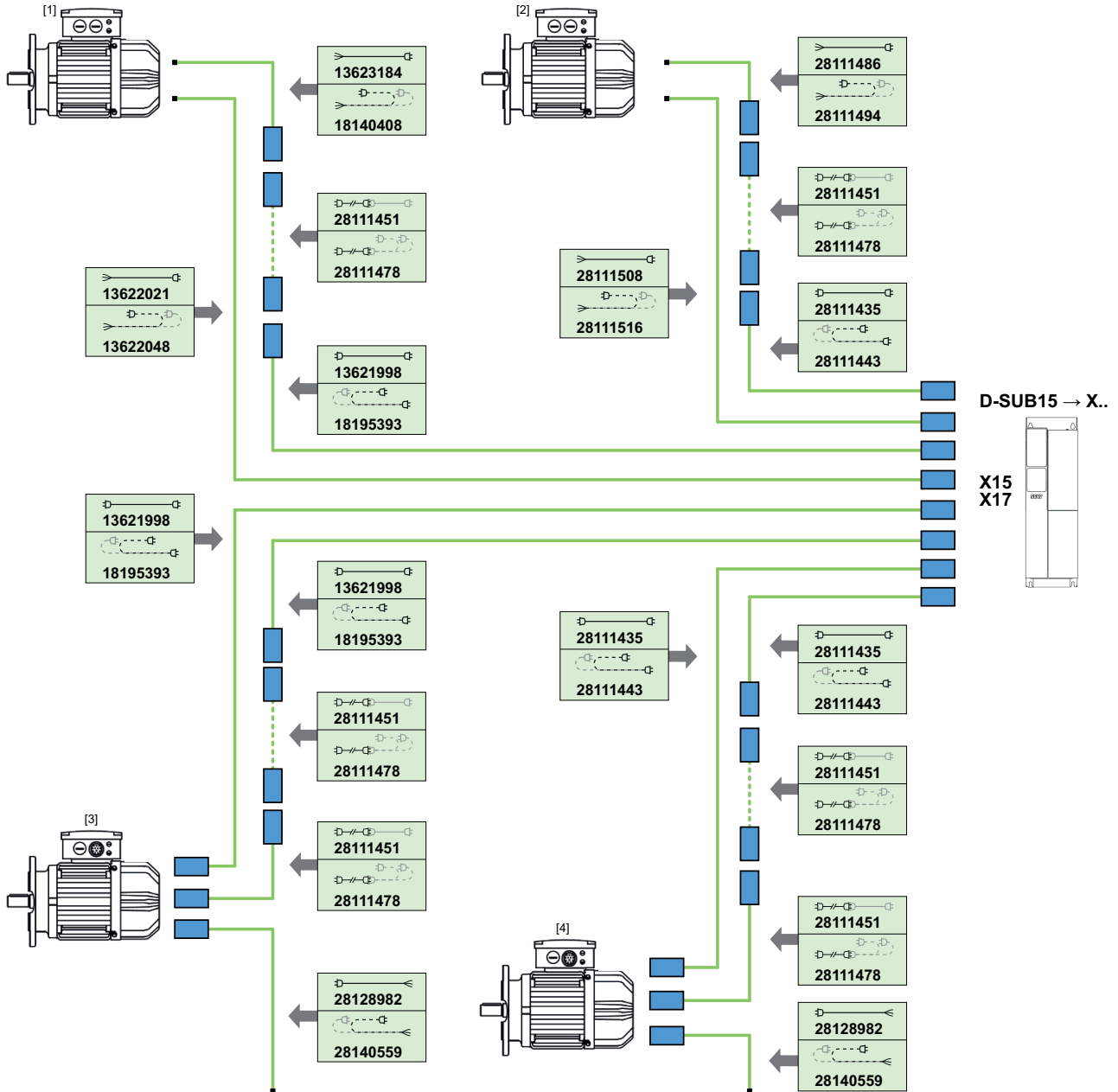
D-sub → X..	X15: Connection of encoder/resolver to a MOVIDRIVE® modular/system/technology basic unit X17: CES11A multi-encoder card A..Y encoders can be connected only to the CES11A multi-encoder card.
[1]	DR.. motors with M23 connector on the encoder for encoder signals. Connection type: KIGA Encoder: .K8./K9./V8. 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®



9007249706050571

D-sub → X..	X15: Connection of encoder/resolver to a MOVIDRIVE® modular/system/technology basic unit X17: CES11A multi-encoder card 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. Encoder: .K8. 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. Encoder: .K8. 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. Connection type: AIGA Encoder: .K8. The signals for thermal monitoring of the motor are not transmitted in the encoder cable.

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Connection technology

Overview of encoder cables for DR.. motors – MOVI-C® inverters

[4]	DR.. motors with M23 connector on the terminal box for encoder signals and TF thermal monitoring. Connection type: AIGB Encoder: .K8. The signals for thermal monitoring of the motor are transmitted in the encoder cable.
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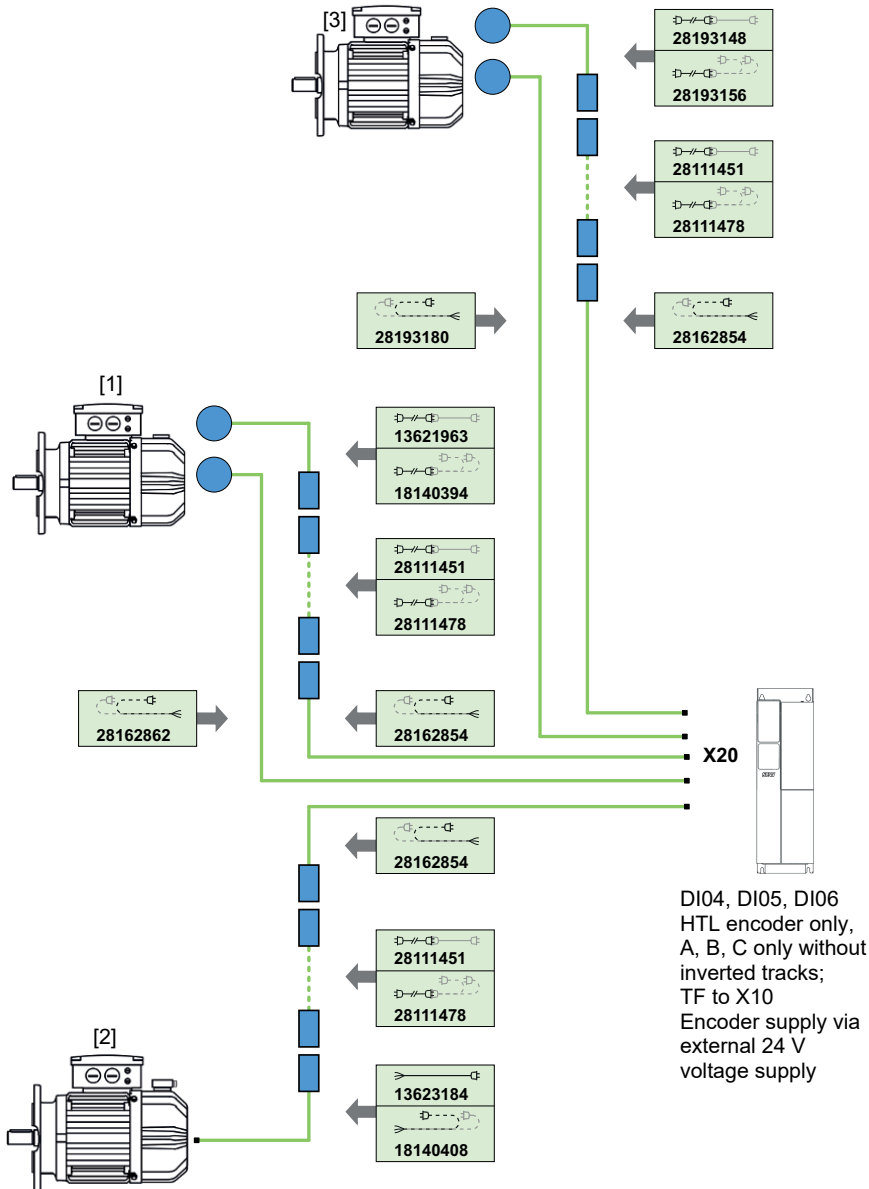
9.1.11 EK8C/EV8C/EK8X encoder – Integrated encoder connector – A1GA, A2GA – MOVITRAC® advanced

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.



9007249705376267

[1]	DR.. motors with integrated connector for encoder signals without connection cover on the motor, with connection cover on the cable. Connection type: A2GA. Encoder: EK8C, EV8C The signals for thermal monitoring of the motor are not transmitted in the encoder cable.
-----	--

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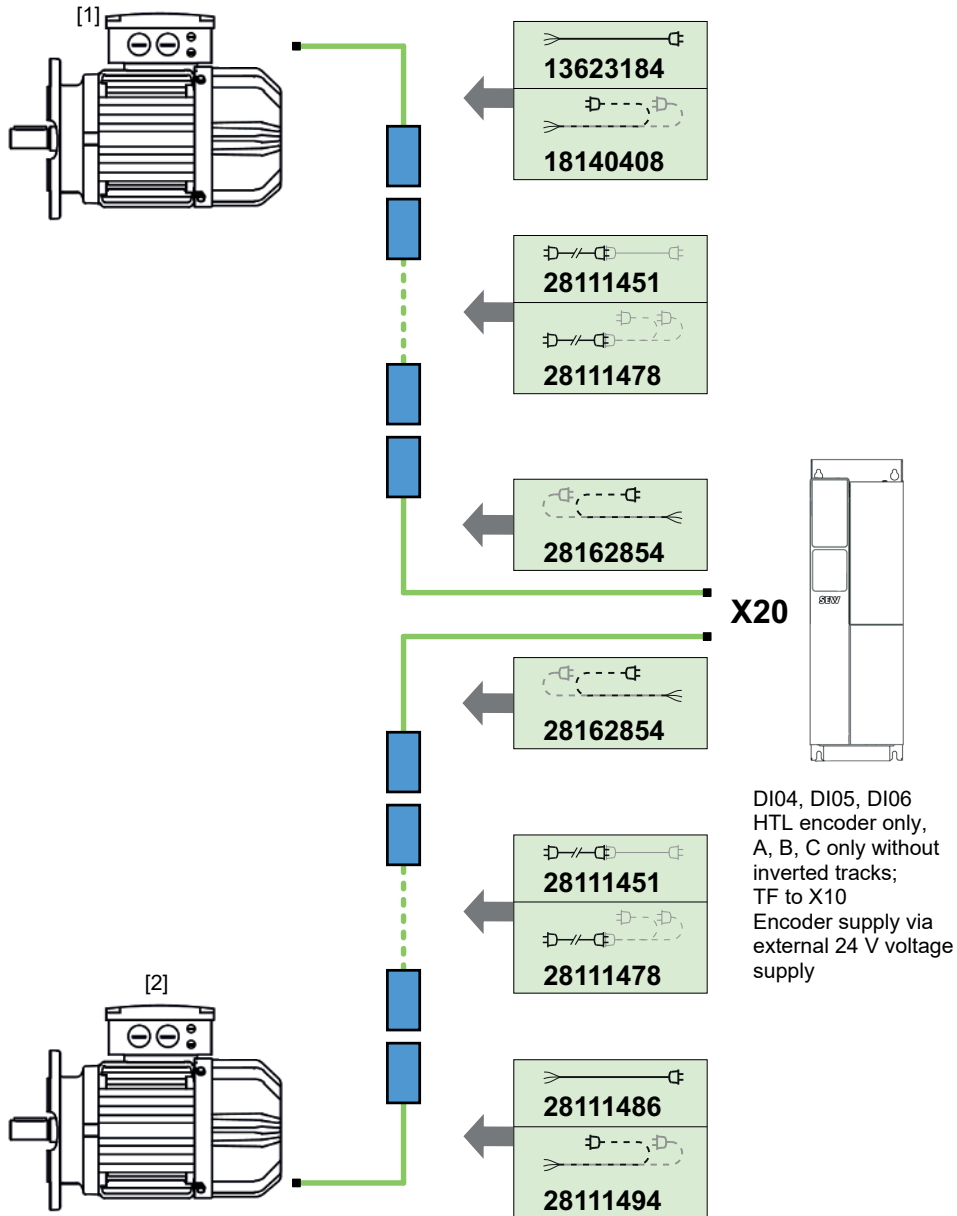
9

Connection technology

Overview of encoder cables for DR.. motors – MOVI-C® inverters

[2]	DR.. motors with integrated connector for encoder signals with connection cover on the motor and open ends on the cable. Connection type: A1GA. Encoder: EK8C, EV8C The signals for thermal monitoring of the motor are not transmitted in the encoder cable.
[3]	DR.. motors with integrated connector for encoder signals without connection cover on the motor, with connection cover on the cable. Connection type: A2GA. Encoder: EK8X The signals for thermal monitoring of the motor are not transmitted in the encoder cable.

9.1.12 EK8C/EK8X encoder – Terminal strip in the terminal box – MOVITRAC® advanced

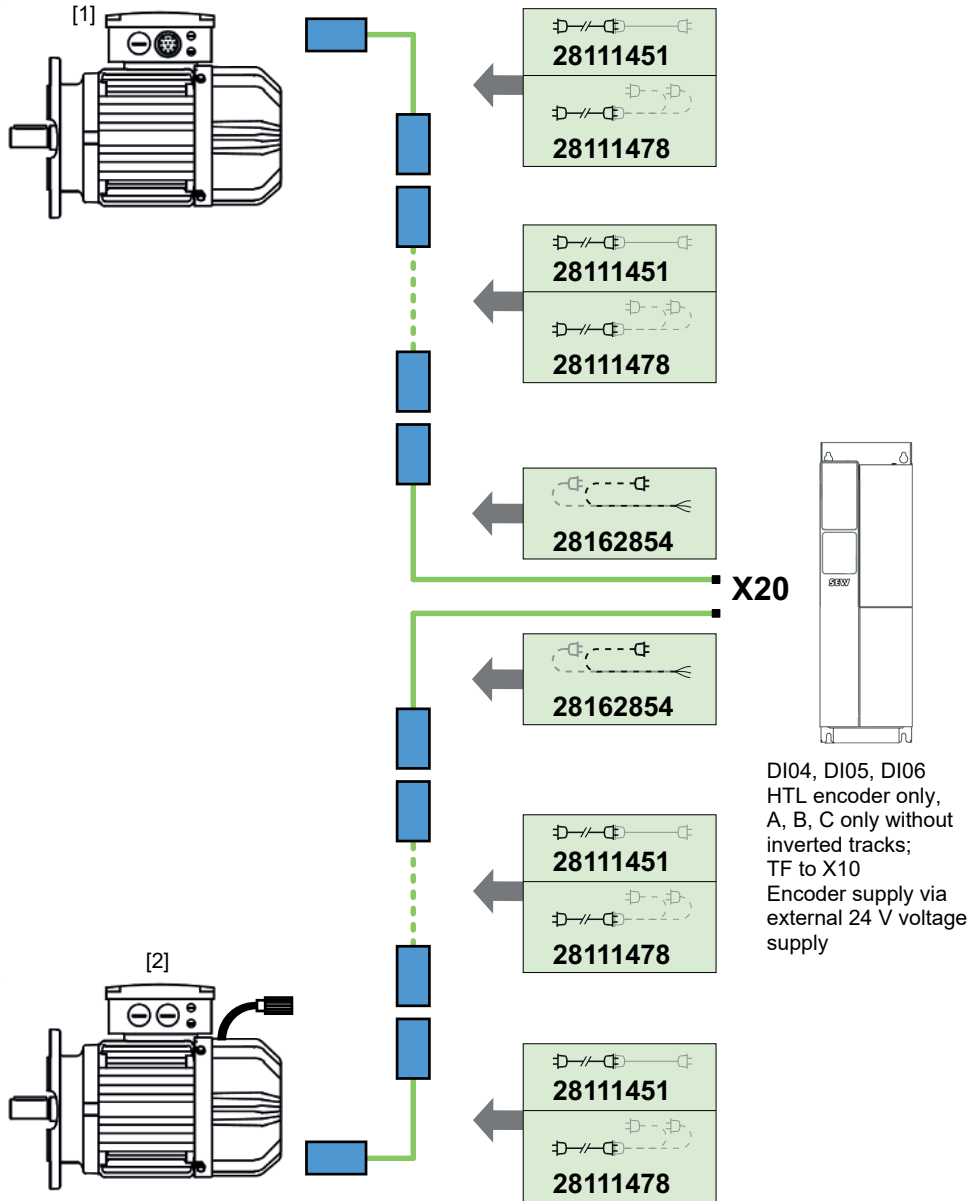


9007249707055115

[1]	DR.. motors with terminal strip in the terminal box for encoder signals without TF thermal monitoring. Encoder: EK8C, EK8X 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. Encoder: EK8C, EK8X The signals for thermal monitoring of the motor are transmitted in the encoder cable.

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9.1.13 EK8C/EV8C encoder – M23 on the encoder or terminal box – AIGA, AIGB, KIGA – MOVITRAC® advanced



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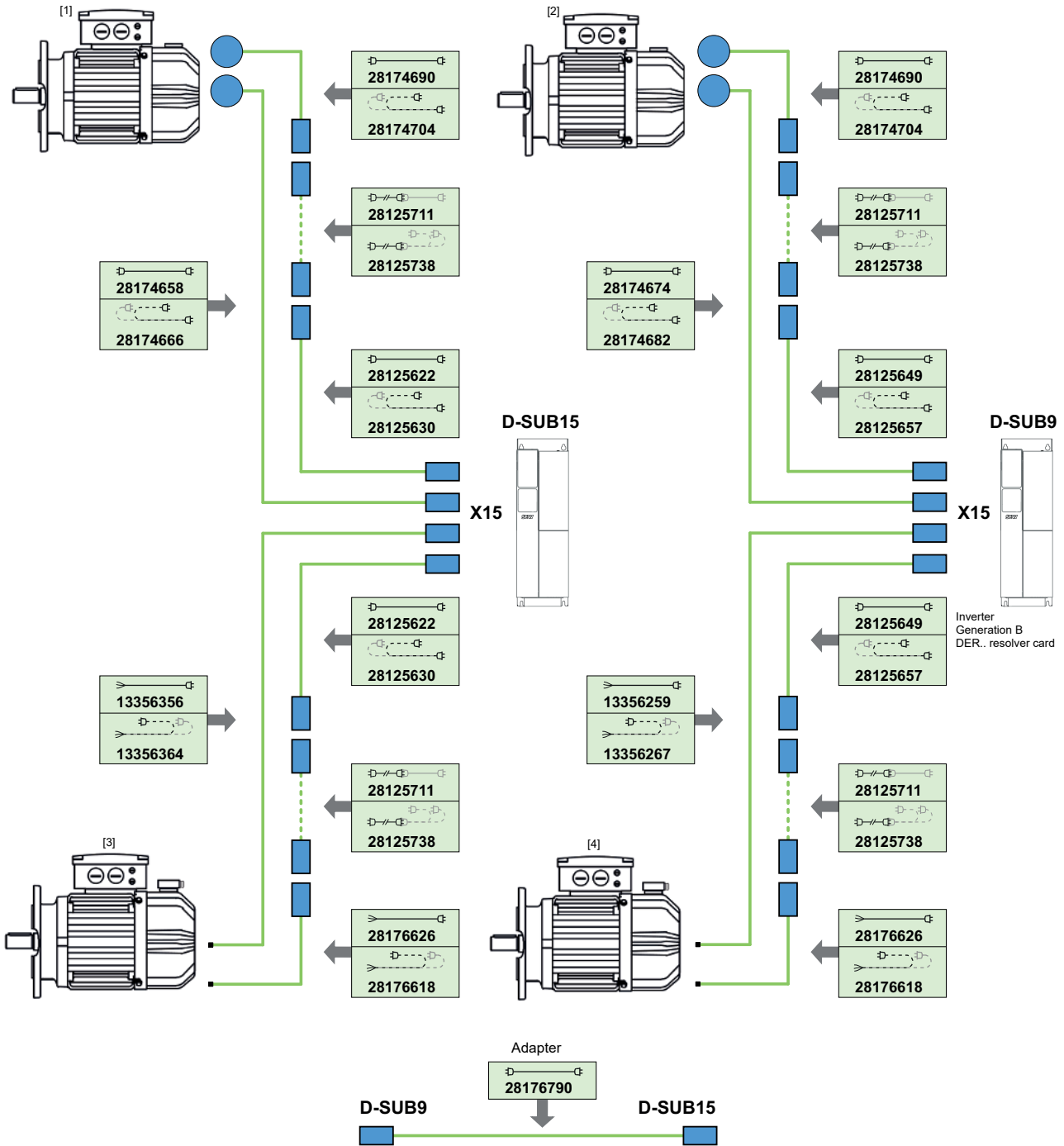
[1]	DR.. motors with M23 on the terminal box for encoder signals with or without TF thermal monitoring. Connection type: AIGA/AIGB Encoder: EK8C The signals for thermal monitoring of the motor are transmitted in the encoder cable.
[2]	DR.. motors with M23 connector on the encoder for encoder signals. Connection type: KIGA Encoder: EK8C, EV8C 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. Connection type: A2GA Encoder: RK8M Connector on the inverter: D-Sub15. 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. Connection type: A2GA Encoder: RK8M Connector on the inverter: D-Sub9. The signals for thermal monitoring of the motor are not transmitted in the encoder cable.

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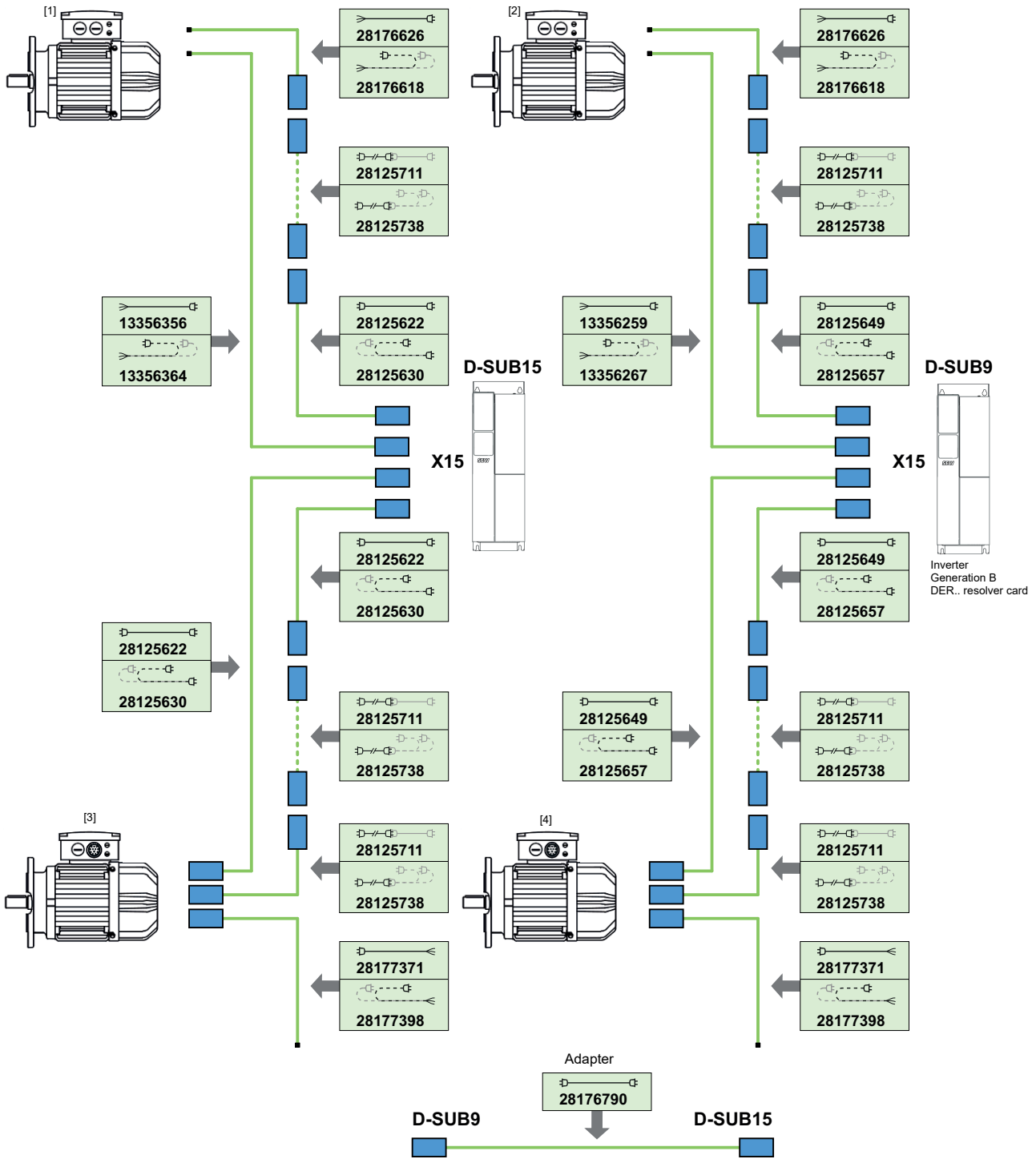
9

Connection technology

Overview of encoder cables for DR.. motors – MOVI-C® inverters

[3]	DR.. motors with integrated connector for encoder signals with connection cover on the motor and open ends on the cable. Connection type: A1GA Encoder: RK8M Connector on the inverter: D-Sub15. 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. Connection type: A1GA Encoder: RK8M Connector on the inverter: D-Sub9. 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®



9007249709846923

[1]	DR.. motors with terminal strip in the terminal box for encoder signals without/with TF thermal monitoring. Encoder: RK8M Connector on the inverter: D-Sub15. 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. Encoder: RK8M Connector on the inverter: D-Sub9. The signals for thermal monitoring of the motor are transmitted in the encoder cable.

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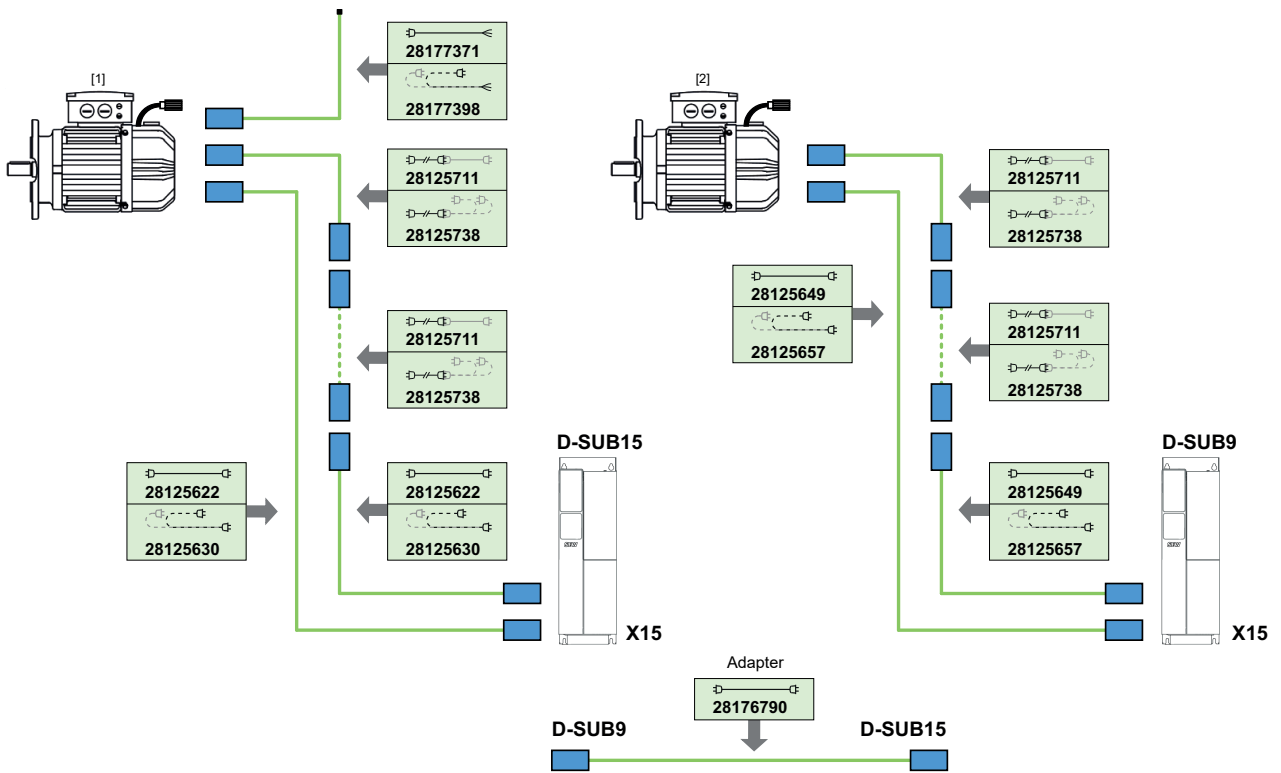
9

Connection technology

Overview of encoder cables for DR.. motors – MOVI-C® inverters

[3]	DR.. motors with M23 connector on the terminal box for encoder signals without/with TF thermal monitoring. Connection type: AIGA/AIGB Encoder: RK8M Connector on the inverter: D-Sub15. 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. Connection type: AIGA/AIGB Encoder: RK8M Connector on the inverter: D-Sub9. 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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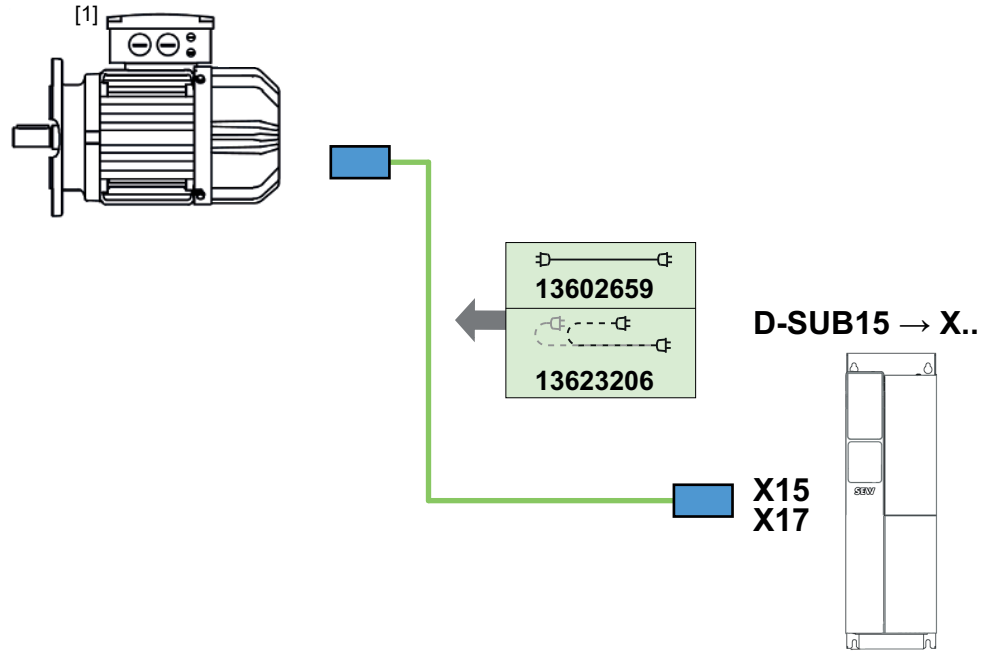
[1]	DR.. motors with M23 connector on the encoder for encoder signals. Connection type: KIGA Encoder: RK8M Connector on the inverter: D-Sub15 The signals for thermal monitoring of the motor are not transmitted in the encoder cable.
[2]	DR.. motors with M23 connector on the encoder for encoder signals. Connection type: KIGA Encoder: RK8M Connector on the inverter: D-Sub9 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.

9.1.17 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 X17: CES11A multi-encoder card
[1]	DR.. motors with M23 connector on the encoder for encoder signals. Connection type: KIGA Encoder: EH7. The signals for thermal monitoring of the motor are not transmitted in the encoder cable.

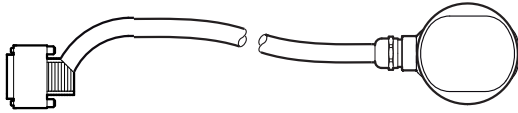

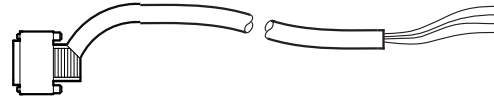

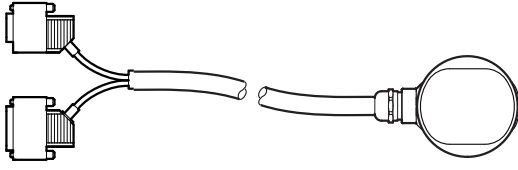
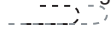
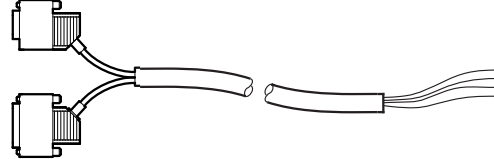


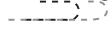
9.2 Information regarding functional safety and encoder connection options

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

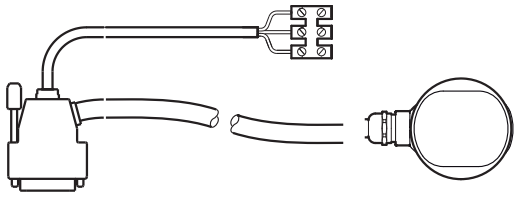
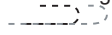
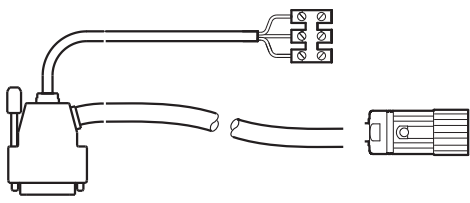
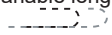
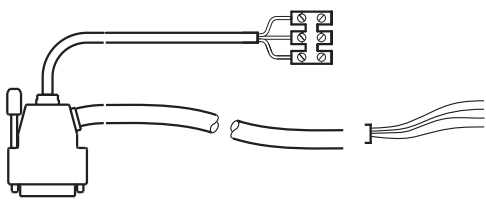
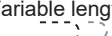
Connection cable			Length/installation type	Specification
Motor side				
			Set length Variable length 	If the encoder on the motor is ordered and delivered without an encoder connection cover, the prefabricated cable can be fitted with an encoder connection cover on the encoder end.
D-sub (15-pin)		Encoder connection cover		
			Set length 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 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 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 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 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. Connection to MOVIAxis®: A 15-pin connector is available that matches the interface on the inverter.
D-sub (15-pin)	Encoder connection cover		
		Set length Variable length 	Connection to MOVIAxis®: A 15-pin connector is available that matches the interface on the inverter. The motor protection is routed from the D-sub connector.
D-sub (15-pin)	M23 connector		
		Set length 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 MOVIAxis®: A 15-pin connector is available that matches the interface on the inverter. The motor protection is routed from the D-sub connector.
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

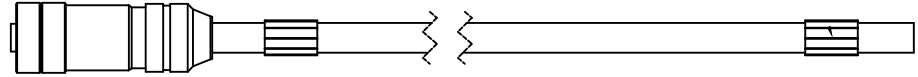
Signal designation	Alternative signal designation	Definition
A+, cos+	A, cos	A-track, TTL/HTL signal, cosine
A-, cos-	/A, RefCos, \bar{A}	Inverted A-track, inverted TTL/HTL signal, inverted cosine
B+, sin+	B, sin	B-track, TTL/HTL signal, sine
B-, sin-	/B, RefSin, \bar{B}	Inverted B-track, inverted TTL/HTL 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 _B	+U _B , V _{CC}	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

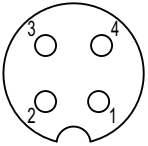



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Types

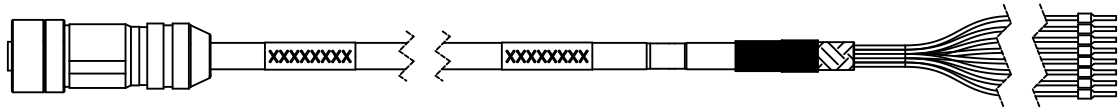
Design and cable cross section	Part number	Installation type	Encoder
5 × 2 × 0.25 mm ²	18156746	Fixed installation	EI7.

Pin assignment for EI71, EI72, EI76, EI7C

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
M12, female, 4-pin 	1	U _B	Gray (GY)	U _B	–	Open end 
	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



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Types

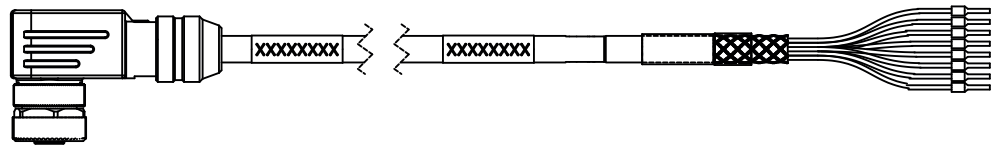
Design and cable cross section	Part number	Installation type	Encoder
$5 \times 2 \times 0.25 \text{ mm}^2$	13623273	Fixed installation	EI7.
$4 \times 2 \times 0.25 \text{ mm}^2$	13623281	Cable carrier installation	EI7.

Pin assignment for EI71, EI72, EI76, EI7C

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
M12, female, 8-pin 	3	A+, cos+	Brown (BN)	A+, cos+	–	Open end
	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_B	Gray (GY)	U_B	–	
	2	GND	Pink (PK)	GND	–	

9.5.3 EI7. encoder - M12, 8-pin angled to open end

Figure



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Types

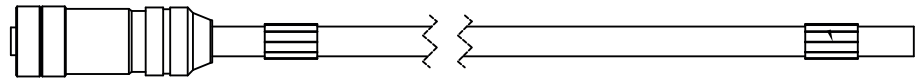
Design and cable cross section	Part number	Installation type	Encoder
5 × 2 × 0.25 mm ²	28164881	Fixed installation	EI7.

Pin assignment for EI71, EI72, EI76, EI7C

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
M12, female, 8-pin 	3	A+, cos+	Brown (BN)	A+, cos+	–	Open end
	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 _B	Gray (GY)	U _B	–	
	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 × 2 × 0.25 mm ²	18156754	Cable carrier installation, without TF	EI7. EI7C FS
4 × 2 × 0.25 mm ²	18156770	Cable carrier installation, with TF	EI7.

Pin assignment for EI71, EI72, EI76, EI7C

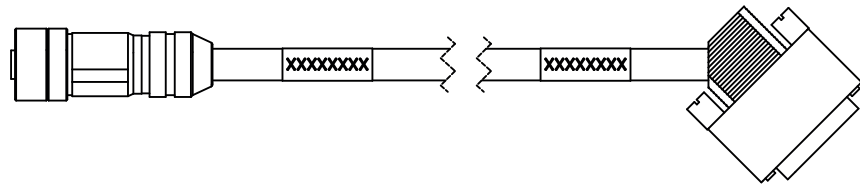
Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
M12, female, 8-pin 	3	A+, cos+	Brown (BN)	A+, cos+	–	Open end
	4	A-, cos-	White (WH)	A-, cos-	–	
	5	B+, sin+	Yellow (YE)	B+, sin+	–	
	6	B-, sin-	Green (GN)	B-, sin-	–	
	7	TF+	Red (RD)	TF+	–	
	8	TF-	Blue (BU)	TF-	–	
	1	U _B	Gray (GY)	U _B	–	
	2	GND	Pink (PK)	GND	–	

Pin assignment for EI7C FS safety encoder

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
M12, female, 8-pin 	3	A+, cos+	Brown (BN)	A+, cos+	–	Open end
	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 _B	Gray (GY)	U _B	–	
	2	GND	Pink (PK)	GND	–	

9.5.5 EI7C FS safety encoder - M12, 8-pin to D-Sub15

Figure

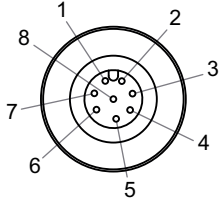
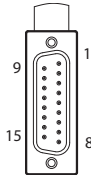


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Types

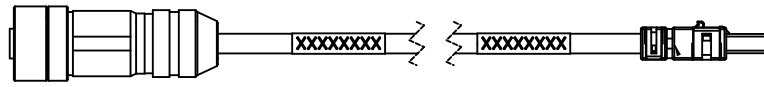
Design and cable cross section	Part number	Installation type	Encoder
4 × 2 × 0.25 mm ²	18191665	Cable carrier installation	EI7C FS

Pin assignment for EI7C FS safety encoder

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
M12, female, 8-pin 	1	U _B	Gray (GY) Blue (BU)	U _B	13	D-sub, male, 15-pin 
	2	GND	Pink (PK) Red (RD)	GND	8	
	3	A+, cos+	Brown (BN)	A+, cos+	1	
	4	A-, cos-	White (WH)	A-, cos-	9	
	5	B+, sin+	Yellow (YE)	B+, sin+	2	
	6	B-, sin-	Green (GN)	B-, sin-	10	

9.5.6 EI7C FS safety encoder - M12, 8-pin to mini I/O

Figure

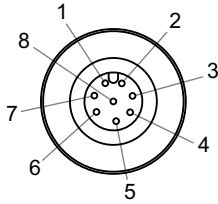
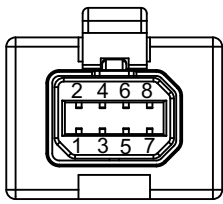


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Types

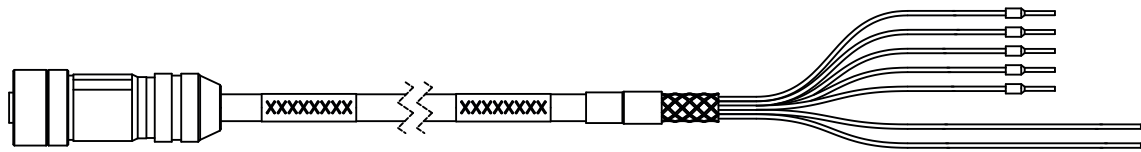
Design and cable cross section	Part number	Installation type	Encoder
4 × 2 × 0.14 mm ²	28118804	Cable carrier installation	EI7C FS

Pin assignment for EI7C FS safety encoder

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
M12, female, 8-pin 	1	U _B	Pink (PK) Red (RD)	U _B	1 4	Mini I/O, male, 8-pin 
	2	GND	Gray (GY) Blue (BU)	GND	2 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



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Types

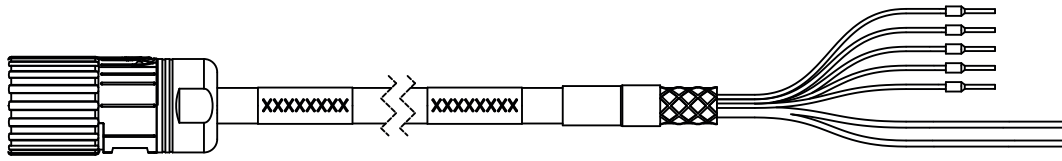
Design and cable cross section	Part number	Installation type	Encoder
4 × 2 × 0.25 mm ²	28162846	Cable carrier installation	EI7., EI8C

Pin assignment for EI71, EI72, EI76, EI7C, EI8C

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
	3	A+, cos+	Brown (BN)	A+, cos+	—	Open end
	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 _B	Gray (GY)	U _B	—	
	2	GND	Pink (PK)	GND	—	

9.5.8 E.8C encoder - M23 to open end

Figure

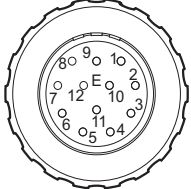



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Types

Design and cable cross section	Part number	Installation type	Encoder
$5 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	28162854	Cable carrier installation	E.8C

Pin assignment for EK8C, EV8C, EI8C

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
M23, female, 12-pin 	3	A+, cos+	Red (RD)	A+, cos+	–	Open end 
	5	B+, sin+	Yellow (YE)	B+, sin+	–	
	1	C+, clock+	Brown (BN)	C+, clock+	–	
	12	U_B	Gray (GY)	U_B	–	
	11	GND	Pink (PK)	GND	–	
	9	TF+	Gray-pink (GYPK)	TF+	–	
	10	TF-	Red-blue (RDBU)	TF-	–	

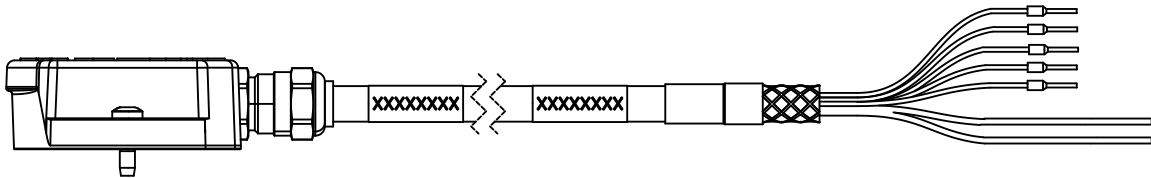
9.5.9 E.8C encoder – Connection cover to open end

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 × 2 × 0.25 mm ² + 2 × 0.5 mm ²	28162862	Cable carrier installation	E.8C

Pin assignment for EK8C, EV8C

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
	A	A+, cos+	Red (RD)	A+, cos+	–	Open end
	B	B+, sin+	Yellow (YE)	B+, sin+	–	
	C	C+, clock+	Brown (BN)	C+, clock+	–	
	+U _B	U _B	Gray (GY)	U _B	–	
	GND	GND	Pink (PK)	GND	–	

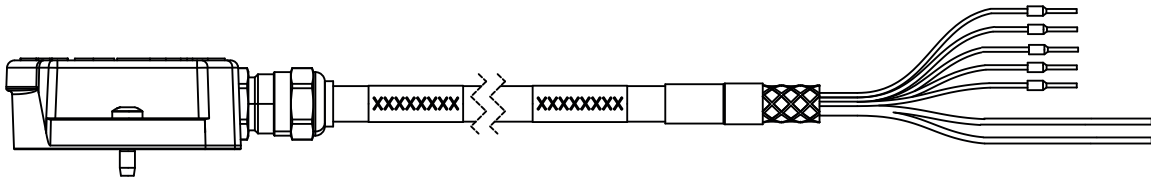
9.5.10 EK8X encoder – Connection cover with alignment to open end

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/ Core color	Signal	Contact	Connector view
	A	A+, cos+	Red (RD)	A+, cos+	–	Open end
	B	B+, sin+	Yellow (YE)	B+, sin+	–	
	C	C+, clock+	Brown (BN)	C+, clock+	–	
	+U _B	U _B	Gray (GY)	U _B	–	
	GND	GND	Pink (PK)	GND	–	

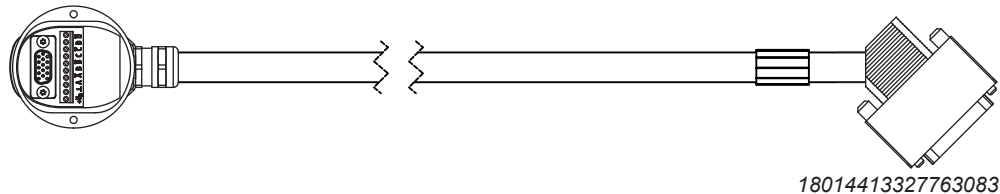
9.5.11 E.7./A.7./E.8./A.8. encoder - Connection cover to D-Sub15

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 × 2 × 0.25 mm ² + 2 × 0.5 mm ²	13617621	Fixed installation	E.7., A.7. E.8., A.8.
4 × 2 × 0.25 mm ² + 2 × 0.5 mm ²	13617648	Cable carrier installation	E.7., A.7. 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/ Core color	Signal	Contact	Connector view
	A	A+, cos+	Red (RD)	A+, cos+	1	D-sub, male, 15-pin
	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 _B	U _B	Gray (GY) Red-blue + gray (RD- BU+GY)	U _B	15	
	GND	GND	Pink (PK) Gray-pink + pink (GYP- K+PK)	GND	8	

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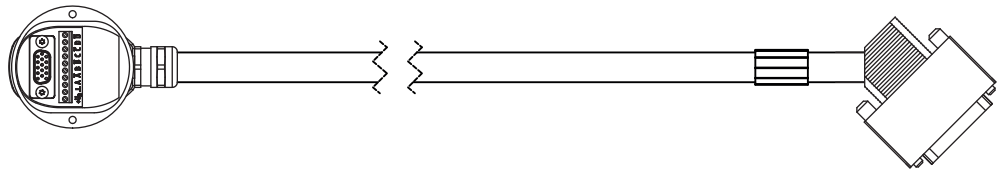
9.5.12 EK8X encoder – Connection cover with alignment to D-Sub15

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



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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/ Core color	Signal	Contact	Connector view	
	A	A+, cos+	Red (RD)	A+, cos+	1	D-sub, male, 15-pin 	
	\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)	Red-blue + gray (RD-BU+GY)	U_B		15
	GND	GND	Pink (PK)				

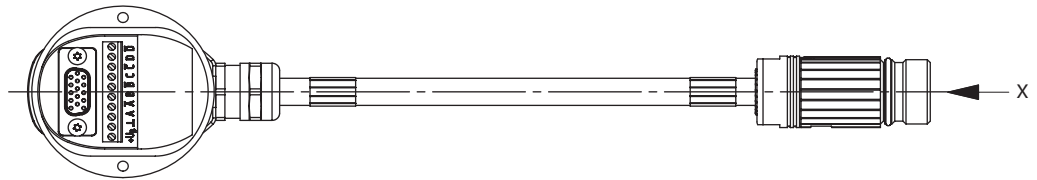
9.5.13 E.7./A.7./E.8./A.8. encoders – Connection cover to M23

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



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Types

Design and cable cross section	Part number	Installation type	Encoder
4 × 2 × 0.25 mm ² + 2 × 0.5 mm ²	13621963	Fixed installation	E.7., A.7. E.8., A.8.
4 × 2 × 0.25 mm ² + 2 × 0.5 mm ²	18140394	Cable carrier installation	E.7., A.7. 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/ Core color	Signal	Contact	Connector view	
	A	A+, cos+	Red (RD)	A+, cos+	3	M23, male, 12-pin 	
	Ā	A-, cos-	Blue (BU)	A-, cos-	4		
	B	B+, sin+	Yellow (YE)	B+, sin+	5		
	B̄	B-, sin-	Green (GN)	B-, sin-	6		
	C	C+, clock+	Brown (BN)	C+, clock+	1		
	C̄	C-, clock-	White (WH)	C-, clock-	2		
	D	D+, data+	Black (BK)	D+, data+	8		
	D̄	D-, data-	Violet (VT)	D-, data-	7		
	+U _B	U _B	Gray (GY)				12
	GND	GND	Red-blue + gray (RD-BU+GY)	U _B			
		Pink (PK)	GND		11		

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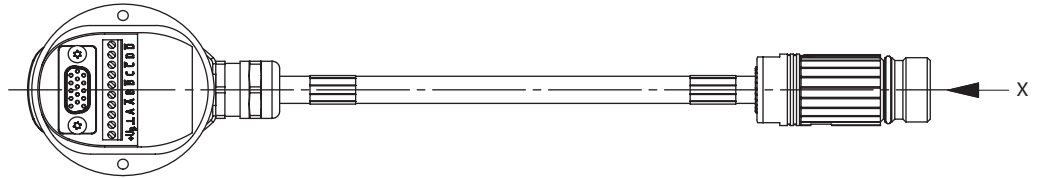
9.5.14 EK8X encoder – Connection cover with alignment to M23

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



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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/ Core color	Signal	Contact	Connector view	
	A	A+, cos+	Red (RD)	A+, cos+	3	M23, male, 12-pin 	
	\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)				
			Red-blue + gray (RD- BU+GY)		U_B		12
GND	GND	Pink (PK)		GND	11		

9.5.15 E.7./A.7./E.8./A.8. encoder - M23 to D-Sub15

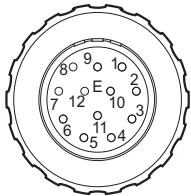
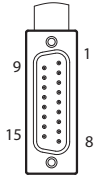
Figure



Types

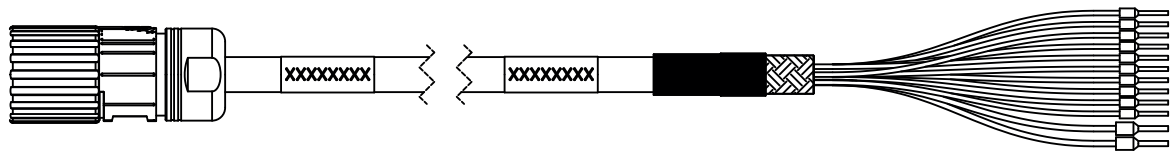
Design and cable cross section	Part number	Installation type	Encoder
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	13621998	Fixed installation, without TF	E.7., A.7. E.8., A.8.
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	18195393	Cable carrier installation, without TF	E.7., A.7. 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. 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. 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/ Core color	Signal	Contact	Connector view
M23, female, 12-pin 	3	A+, cos+	Red (RD)	A+, cos+	1	D-sub, male, 15-pin 
	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 _B	Gray (GY)	U _B	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

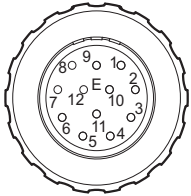
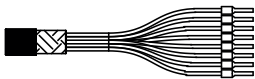


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Types

Design and cable cross section	Part number	Installation type	Encoder
$5 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	28128982	Fixed installation	E.7., A.7. 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. E.8., A.8.

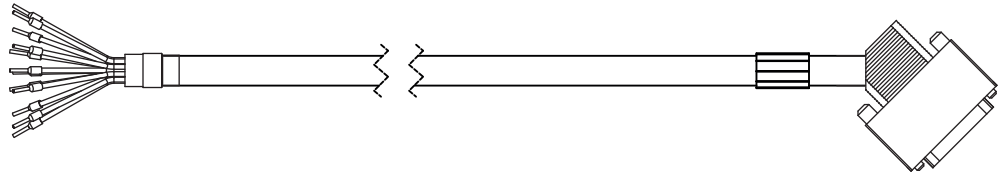
Pin assignment for EK8R, EK8C, EK8S, EK8W, AK8W, AK8Y, AK8H EV8R, EV8C, EV8S, AV8W, AV8Y, AV8H ES7R, ES7C, ES7S, AS7W, AS7Y, AS7H EG7R, EG7C, EG7S, AG7W, AG7Y EV7R, EV7C, EV7S, AV7W, AV7Y EI71, EI72, EI76, EI7C, EI8C, EI8R

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
M23, female, 12-pin 	3	A+, cos+	Red (RD)	A+, cos+	–	Open end 
	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 _B	Gray (GY)	U _B	–	
	11	GND	Pink (PK)	GND	–	
	9	TF+	Gray-pink (GYPK)	TF+	–	
	10	TF-	Red-blue (RDBU)	TF-	–	

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9.5.17 E.7., A.7., E.8., A.8. encoder - open end to D-Sub15

Figure

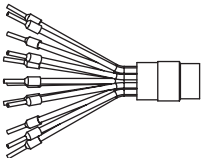
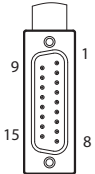


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Types

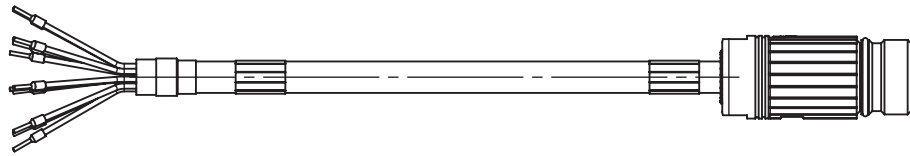
Design and cable cross section	Part number	Installation type	Encoder
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	13622021	Fixed installation	E.7., A.7. E.8., A.8.
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	13622048	Cable carrier installation	E.7., A.7. E.8., 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. 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. 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/ Core color	Signal	Contact	Connector view
Open end 	–	A+, cos+	Red (RD)	A+, cos+	1	D-sub, male, 15-pin 
	–	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 _B	Gray (GY)	U _B	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

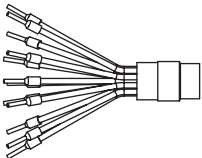
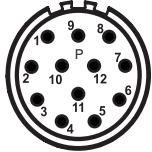


9007203412434187

Types

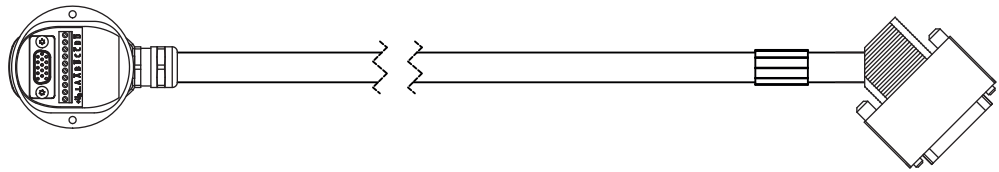
Design and cable cross section	Part number	Installation type	Encoder
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	13623184	Fixed installation, without TF	E.7., A.7. E.8., A.8.
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	18140408	Cable carrier installation, without TF	E.7., A.7. 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. 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. 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/ Core color	Signal	Contact	Connector view
Open end 	–	A+, cos+	Red (RD)	A+, cos+	3	M23, male, 12-pin 
	–	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 _B	Gray (GY)	U _B	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



18014413327763083

Types

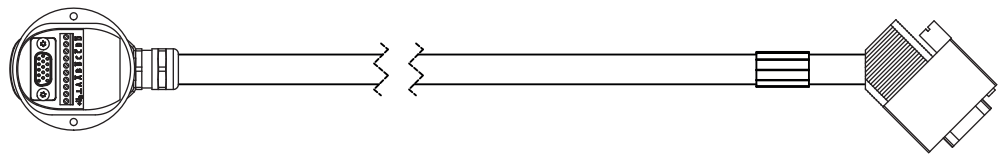
Design and cable cross section	Part number	Installation type	Encoder
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	28174658	Fixed installation	RK8M
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	28174666	Cable carrier installation	RK8M

Pin assignment for RK8M

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
	A	S1, cos+	Red (RD)	S1, cos+	2	D-sub, male, 15-pin
	\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 _B	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



18014400556987787

Types

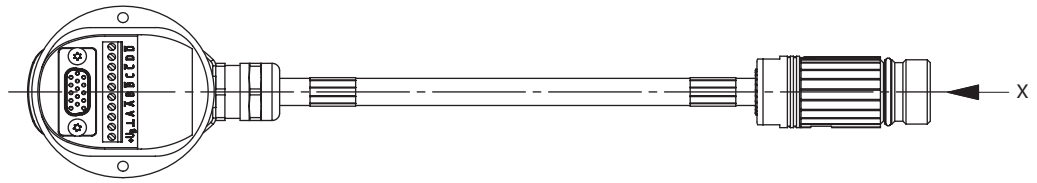
Design and cable cross section	Part number	Installation type	Encoder
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	28174674	Fixed installation	RK8M
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	28174682	Cable carrier installation	RK8M

Pin assignment for RK8M

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
	A	S1, cos+	Red (RD)	S1, cos+	2	D-sub, male, 9-pin
	\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 _B	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/ Core color	Signal	Contact	Connector view
	A	S1, cos+	Red (RD)	S1, cos+	3	M23, male, 12-pin
	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 _B	R1, ref+	Pink (PK)	R1, ref+	1	
	GND	R2, ref-	Gray (GY)	R2, ref-	2	

9.5.22 RK8M encoder - M23 to D-Sub15

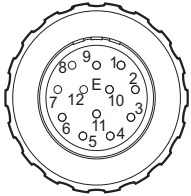
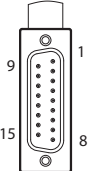
Figure



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/ Core color	Signal	Contact	Connector view
M23, female, 12-pin 	3	S1, cos+	Red (RD)	S1, cos+	2	D-sub, male, 15-pin 
	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

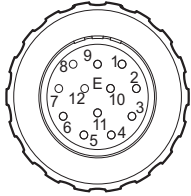
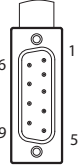


1801439985168267

Types

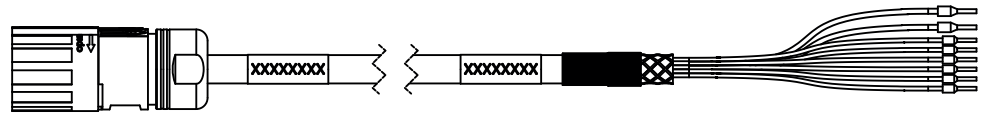
Design and cable cross section	Part number	Installation type	Encoder
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	28125649	Fixed installation	RK8M
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	28125657	Cable carrier installation	RK8M

Pin assignment for RK8M

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
M23, female, 12-pin 	3	S1, cos+	Red (RD)	S1, cos+	2	D-sub, male, 9-pin 
	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

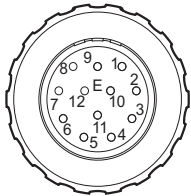
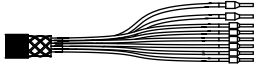


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Types

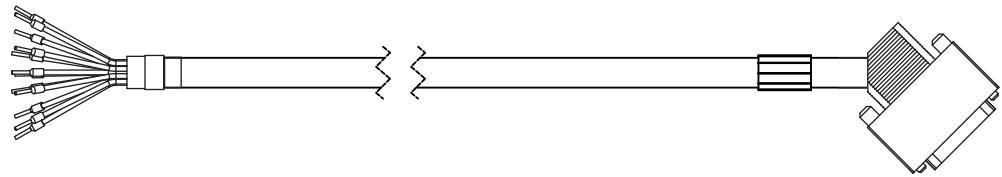
Design and cable cross section	Part number	Installation type	Encoder
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	28177371	Fixed installation	RK8M
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	28177398	Cable carrier installation	RK8M

Pin assignment for RK8M

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
M23, female, 12-pin 	3	S1, cos+	Red (RD)	S1, cos+	–	Open end 
	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

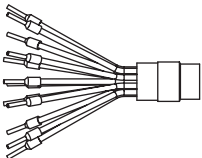
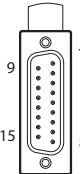


18014413327773451

Types

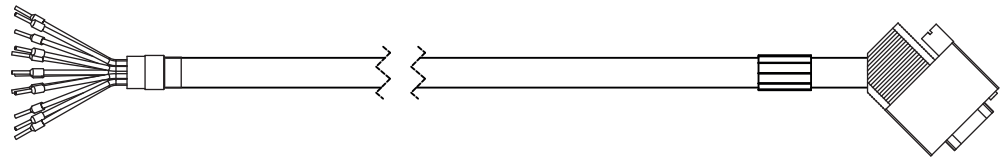
Design and cable cross section	Part number	Installation type	Encoder
$5 \times 2 \times 0.25 \text{ mm}^2$	13356356	Fixed installation	RK8M
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	13356364	Cable carrier installation	RK8M

Pin assignment for RK8M

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
Open end 	–	S1, cos+	Red (RD)	S1, cos+	2	D-sub, male, 15-pin 
	–	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

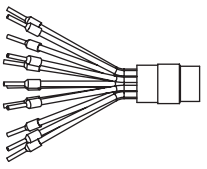
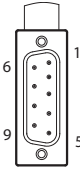


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Types

Design and cable cross section	Part number	Installation type	Encoder
5 × 2 × 0.25 mm ²	13356259	Fixed installation	RK8M
4 × 2 × 0.25 mm ² + 2 × 0.5 mm ²	13356267	Cable carrier installation	RK8M

Pin assignment for RK8M

Encoder connection			Encoder evaluation			
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
Open end 	–	S1, cos+	Red (RD)	S1, cos+	2	D-sub, male, 9-pin 
	–	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)					

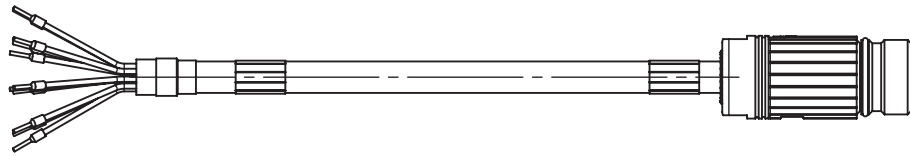
9

Connection technology

Design of encoder cables for DR.. motors

9.5.27 RK8M encoder - open end to M23

Figure

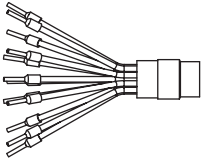
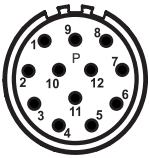


9007203412434187

Types

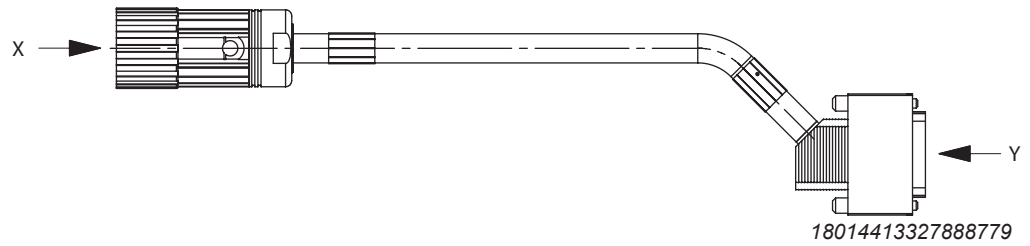
Design and cable cross section	Part number	Installation type	Encoder
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	28176626	Fixed installation	RK8M
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	28176618	Cable carrier installation	RK8M

Pin assignment for RK8M

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
Open end 	–	S1, cos+	Red (RD)	S1, cos+	3	M23, male, 12-pin 
	–	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

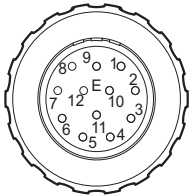
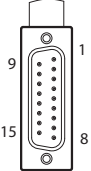
Figure



Types

Design and cable cross section	Part number	Installation type	Encoder
5 × 2 × 0.25 mm ²	13602659	Fixed installation	EH7.
5 × 2 × 0.25 mm ²	13623206	Cable carrier installation	EH7.

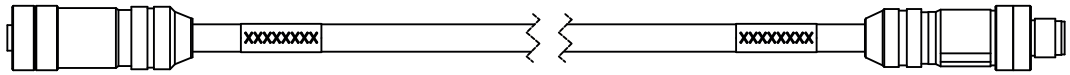
Pin assignment for EH7S, EH7R, EH7C, EH7T

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
M23, female, 12-pin 	5	A+, cos+	Red (RD)	A+, cos+	1	D-sub, male, 15-pin 
	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

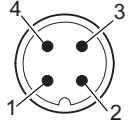



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Types

Design and cable cross section	Part number	Installation type	Encoder
5 × 2 × 0.25 mm ²	18156738	Fixed installation	EI7.

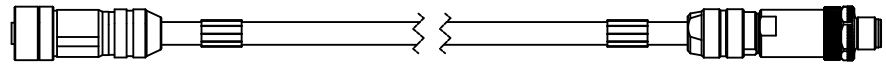
Pin assignment for EI71, EI72, EI76, EI7C

Encoder connection			Encoder evaluation			
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
M12, female, 4-pin 	1	U _B	Gray (GY)	U _B	1	M12, male, 4-pin 
	2	B+, sin ⁺¹)	Yellow (YE)	B+, sin ⁺¹)	2	
	3	GND	Pink (PK)	GND	3	
	4	A+, cos ⁺¹)	Brown (BN)	A+, cos ⁺¹)	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 ²	18148670	Fixed installation, without TF	EI7., EI7C FS
5 × 2 × 0.25 mm ²	18156762	Fixed installation, with TF	EI7., EI8C
4 × 2 × 0.25 mm ²	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/ Core color	Signal	Contact	Connector view
M12, female, 8-pin 	3	A+, cos+	Brown (BN)	A+, cos+	3	M12, male, 8-pin
	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 _B	Gray (GY)	U _B	1	
	2	GND	Pink (PK)	GND	2	

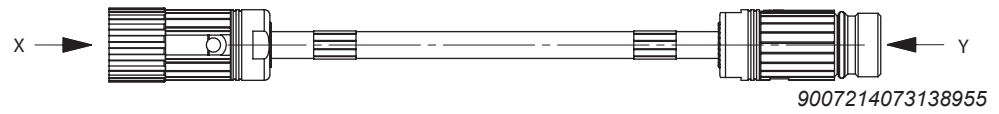
Pin assignment for EI7C FS safety encoder

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
M12, female, 8-pin 	3	A+, cos+	Brown (BN)	A+, cos+	3	M12, male, 8-pin
	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 _B	Gray (GY)	U _B	1	
	2	GND	Pink (PK)	GND	2	

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9.6.3 E.7./A.7./E.8./A.8. encoder - M23 to M23

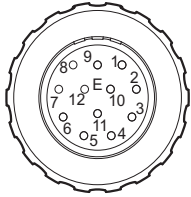
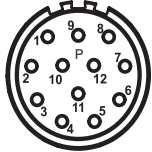
Structure



Types

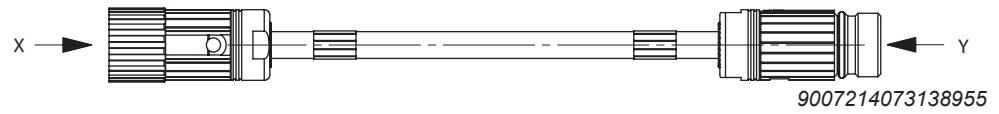
Design and cable cross section	Part number	Installation type	Encoder
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	13623192	Fixed installation, without TF	E.7., A.7. E.8., A.8.
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	18191971	Cable carrier installation, without TF	E.7., A.7. 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. 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. 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/ Core color	Signal	Contact	Connector view
M23, female, 12-pin 	3	A+, cos+	Red (RD)	A+, cos+	3	M23, male, 12-pin 
	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 _B	Gray (GY)	U _B	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

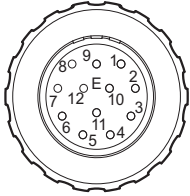
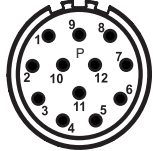
Figure



Types

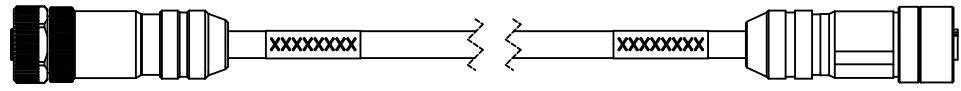
Design and cable cross section	Part number	Installation type	Encoder
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	28125711	Fixed installation	RK8M
$4 \times 2 \times 0.25 \text{ mm}^2 + 2 \times 0.5 \text{ mm}^2$	28125738	Cable carrier installation	RK8M

Pin assignment for RK8M

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
M23, female, 12-pin 	3	S1, cos+	Red (RD)	S1, cos+	3	M23, male, 12-pin 
	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



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Types

Design and cable cross section	Part number	Installation type	Encoder
4 × 2 × 0.25 mm ²	28111591	Cable carrier installation, without TF	EI7.

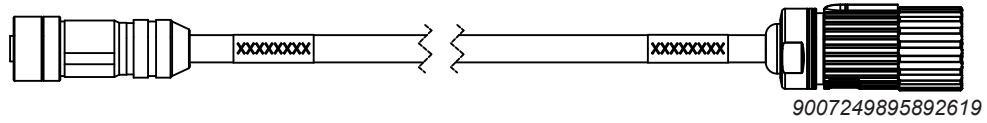
Pin assignment for EI71, EI72, EI76, EI7C

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
	3	A+, cos ⁺¹)	Brown (BN)	A+, cos ⁺¹)	4	
	5	B+, sin ⁺¹)	Yellow (YE)	B+, sin ⁺¹)	2	
	1	U _B	Gray (GY)	U _B	1	
	2	GND	Pink (PK)	GND	3	

1) Without inverted signal tracks.

9.6.6 EI7C FS safety encoder - M12, 8-pin to M23

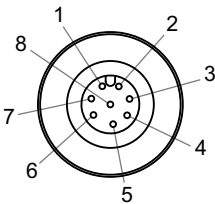
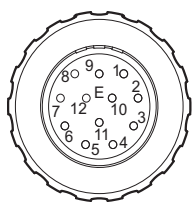
Figure



Types

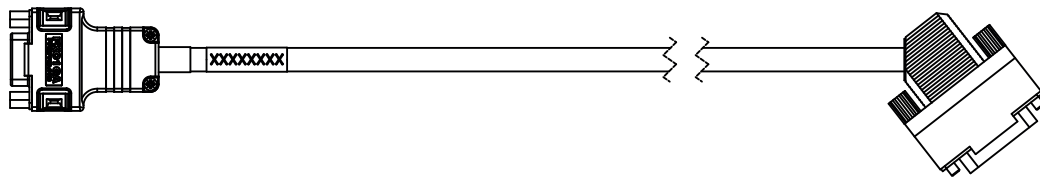
Design and cable cross section	Part number	Installation type	Encoder
4 × 2 × 0.25 mm ²	18121950	Cable carrier installation	EI7C FS

Pin assignment for EI7C FS

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
M12, female, 8-pin 	1	U _B	Gray (GY) Blue (BU)	U _B	12 11	M23, male, 12-pin 
	2	GND	Pink (PK) Red (RD)	GND	3 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



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Types

Design and cable cross section	Part number	Installation type	Encoder
5 × 2 × 0.25 mm ²	13356259	Fixed installation	RK8M

Pin assignment for RK8M

Encoder connection				Encoder evaluation		
Connector view	Contact	Signal	Cable/ Core color	Signal	Contact	Connector view
D-sub, female, 9-pin 	2	S1, cos+	Red (RD)	S1, cos+	2	D-sub, male, 15-pin
	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, 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 EI8C, EI8R	EH7C, EH7R, EH7S, AH7Y	EI71, EI72, EI76, EI7C ¹⁾
Cable cross section		Cable with part number from SEW-EURODRIVE 19065434 – (6 × 2 × 0.25 mm ²) 25633090 – (4 × 2 × 0.25 + 2 × 0.5 mm ²) 13251724 – (5 × 2 × 0.25 + 2 × 0.5 mm ²)	Cable with part number from SEW-EURODRIVE 13251724 – (5 × 2 × 0.25 mm ²)	
Manufacturer		HELUKABEL/Leoni		
Manufacturer's designation		Li9YCY/LEHC 005307		
Operating voltage U ₀ / 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) 25633090: 3 × D (once), 6 × D 13251724: 5 × 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/shielding	pF/m	Max. 95		
Capacitance core/core	pF/m	Max. 65		
Halogen-free		No		
Silicone-free		Yes		

Encoder identification		<p>EK8R, EK8C, EK8S, EK8W, EK8X, AK8W, AK8Y, AK8H</p> <p>EV8R, EV8C, EV8S, AV8W, AV8Y, AV8H</p> <p>ES7R, ES7C, ES7S, AS7W, AS7Y, AS7H</p> <p>EG7R, EG7C, EG7S, AG7W, AG7Y</p> <p>EV7R, EV7C, EV7S, AV7W, AV7Y</p> <p>EI8C, EI8R</p>	<p>EH7C, EH7R, EH7S, AH7Y</p>	<p>EI71, EI72, EI76, EI7C¹⁾</p>
Cable cross section		<p>Cable with part number from SEW-EURODRIVE</p> <p>19065434 – (6 × 2 × 0.25 mm²)</p> <p>25633090 – (4 × 2 × 0.25 + 2 × 0.5 mm²)</p> <p>13251724 – (5 × 2 × 0.25 + 2 × 0.5 mm²)</p>	<p>Cable with part number from SEW-EURODRIVE</p> <p>13251724 – (5 × 2 × 0.25 mm²)</p>	
Manufacturer		HELUKABEL/Leoni		
CFC-free		Yes		
Insulation internal (core)		PP		
Insulation external (sheath)		PVC		
Flame retardant/self-extinguishing		Flame retardant according to VDE0472, Part 802, Test type B, according to IEC 60332-1		
Conductor material		Cu blank		
Shielding		Braided copper, tinned		
Weight (cable)	kg/km	<p>19065434: 96.2</p> <p>25633090: 93</p> <p>13251724: 73.4</p>		

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, 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 EI8C, EI8R	EH7C, EH7R, EH7S, AH7Y	EI71, EI72, EI76, EI7C ¹⁾
Cable cross section		Cable with part number from SEW-EURODRIVE 19065442 – (4 × 0.25 + 2 × 0.5 mm ²) 25633104 – (4 × 0.25 + 2 × 0.5 mm ²) 13289284 – (4 × 2 × 0.25 mm ²)	Cable with part number from SEW-EURODRIVE 13289284 – (4 × 2 × 0.25 mm ²)	
Manufacturer		HELUKABEL/Leoni		
Manufacturer's designation		Li9YC11Y-HF, LEHC 005308, TOPGEBER 503 (74419)	TOPGEBER 503 (74419)	
Operating voltage U ₀ / U 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 25633104: 8 × D 13289284: 7.5 × D		
Outer diameter D	mm	19065442: 8.8 ± 0.2 25633104: 9.4 ± 0.2 13289284: 7.1 ± 0.2	7.1 ± 0.2	
Maximum acceleration	m/s ²	19065442: 5 25633104: 20 13289284: 50	50	
Maximum speed	m/min	19065442: 180 25633104: 180 13289284: 300	300	
Core identification		DIN 47100		
Sheath color		Green, similar to RAL6018		

Accessory identification		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 EI8C, EI8R	EH7C, EH7R, EH7S, AH7Y	EI71, EI72, EI76, EI7C ¹⁾
Cable cross section		Cable with part number from SEW-EURODRIVE 19065442 – (4 × 0.25 + 2 × 0.5 mm ²) 25633104 – (4 × 0.25 + 2 × 0.5 mm ²) 13289284 – (4 × 2 × 0.25 mm ²)	Cable with part number from SEW-EURODRIVE 13289284 – (4 × 2 × 0.25 mm ²)	
Manufacturer		HELUKABEL/Leoni		
Approval(s)		DESINA/VDE/UL/CE	DESINA/VDE/UL/ CE	DESINA/VDE/UL/ CSA/CE
Capacitance core/shield- ing	pF/m	19065442: max. 100 25633104: max. 95 13289284: max. 110		
Capacitance core/core	pF/m	19065442: max. 65 25633104: max. 60 13289284: max. 55	70	
Halogen-free		Yes		
Silicone-free		Yes		
CFC-free		Yes		
Insulation internal (core)		PP		
Insulation external (sheath)		PUR		
Flame retardant/self-extin- guishing		Flame retardant according to VDE0472, Part 802, Test type B, accord- ing to IEC 60332-1		
Conductor material		E-Cu blank		
Shielding		Braided copper, tinned		
Weight	kg/km	19065442: 108 25633104: 90 13289284: 68		
Minimum bending cycles		≥ 5 million		

1) EI7C encoders require a maximum of 8 cores, additional cores for potential temperature sensors.

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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)

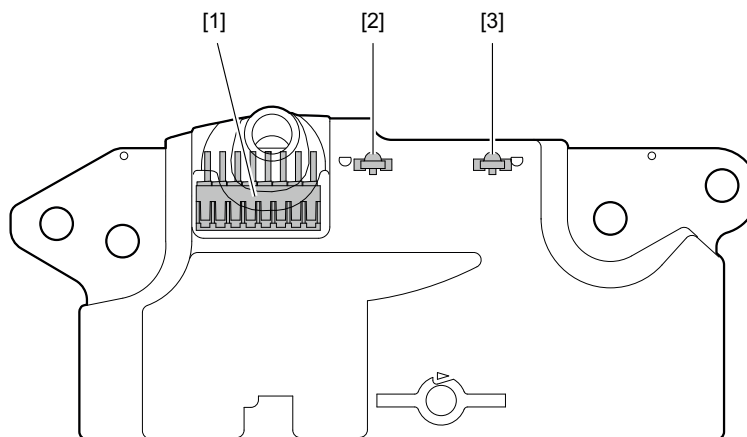
The runtime is determined for each of the following temperature ranges. This is then provided as a histogram for condition monitoring of the operating temperatures.

- 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

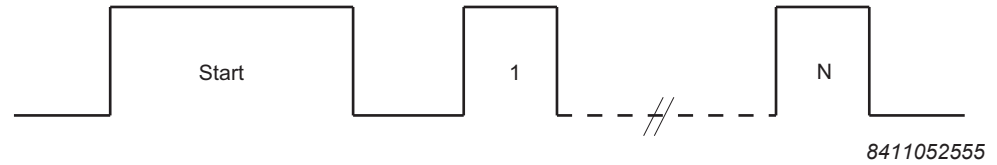
If the encoder is supplied with a voltage lower than that specified in chapter "EI7C FS" (→ 94) when it is switched on, it will automatically switch to the service mode. The service mode is used to configure and adjust the encoder. It may not be used as a safety encoder in this operating state.

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

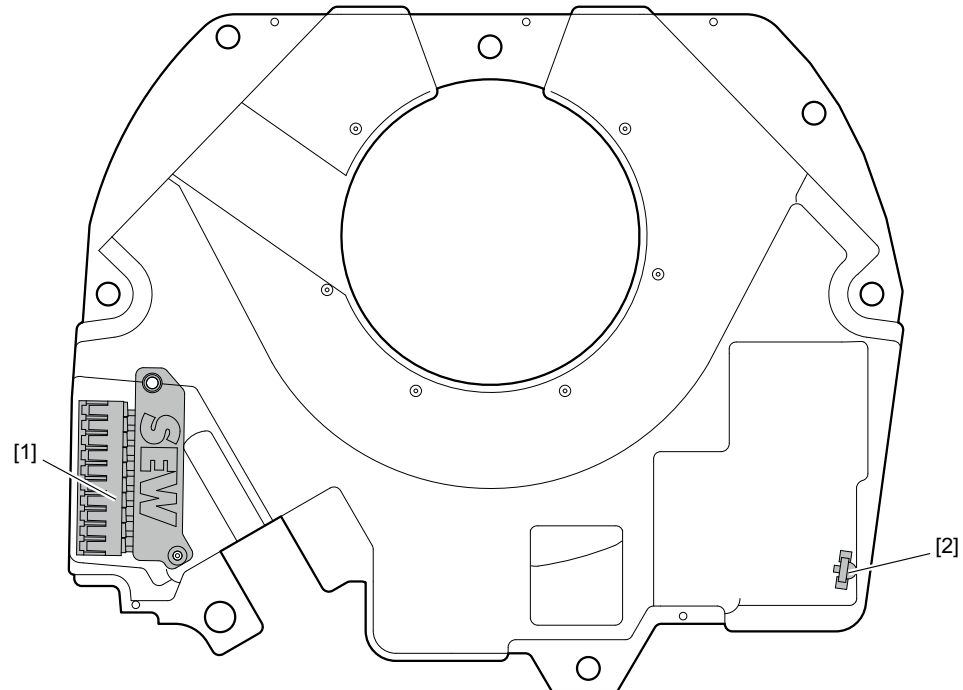
Displayed status	Green LED (status)	Red LED (fault)
No voltage or defective	OFF	OFF
Internal diagnostics fault	ON	ON
No fault	ON	OFF
Currently no fault Last fault is displayed.	ON	Fault code
A fault is currently present Current fault is displayed.	OFF	Fault code
	Temperature fault	1×
	Supply voltage 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 (Defined voltage range while switching on)	Amplitude OK	OFF	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. The meaning depends on the color and the frequency.

Diagnostics 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"> • Check the encoder and pole ring for damage or magnetizable contamination. Replace or clean the fan if necessary. • 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."). <p>Flashes 1 Hz: Fault regarding the encoder module electrical interface:</p> <ul style="list-style-type: none"> • Short circuit/overcurrent of the signal tracks: Eliminate the short circuit or limit the output current of the encoder module. • Interference on the signal tracks: Eliminate the external interference. Observe the information regarding connection technology.
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"> • If necessary, implement any necessary measures; see "Diagnostics red" as maintenance measures. <p>Flashes 1 Hz: Warning regarding the internal memory (encoder signal correction).</p> <ul style="list-style-type: none"> • The encoder signal correction is reinitialized every time the encoder is started.

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"> • No measures are required. • 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).
Permanently red 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"> • Check the encoder and pole ring for damage or magnetizable contamination. Replace or clean the fan if necessary. • 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).

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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"> • Check the encoder and pole ring for damage or magnetizable contamination. Replace or clean the fan if necessary. • 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).

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 E17. Service kits and retrofit sets

Retrofit set

The retrofit set includes the materials required to add an E17. 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

E17. retrofit set with connection unit

AE = Connection unit

FS = functional safety

Type	Motor size	Brake	Connection	FS	Material short text	Part number
E17.	DRN/DRU../DR2.71	Not relevant	AE	-	Retrofit set	28212185
E17.	DRN/DRU../DR2.80	Not relevant	AE	-	Retrofit set	28212207
E17.	DR.90 – 100 DR2.90	Not relevant	AE	-	Retrofit set	28212223
E17.	DR2.100	Not relevant	AE	-	Retrofit set	28225538
E17.	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 DR2.90	Not relevant	M12	-	Retrofit set	28214331
EI7.	DR2.100	Not relevant	M12	-	Retrofit set	28225546
EI7.	DRN/DRU../ 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

E17. service kits with connection unit

AE = Connection unit

FS = functional safety

Type	Motor size	Brake	Connection	FS	Material short text	Part number
E17.	DRN/DRU../DR2.71	Not relevant	AE	-	Service kit	28214404
E17.	DRN/DRU../DR2.80	Not relevant	AE	-	Service kit	28214420
E17.	DR..90 – 100 DR2.90	Not relevant	AE	-	Service kit	28214447
E17.	DR2.100	Not relevant	AE	-	Service kit	28225554
E17.	DRN/DRU../ DR2.112 – 132	Not relevant	AE	-	Service kit	28214463

EI7. service kits with M12 connector as connection option

FS = functional safety

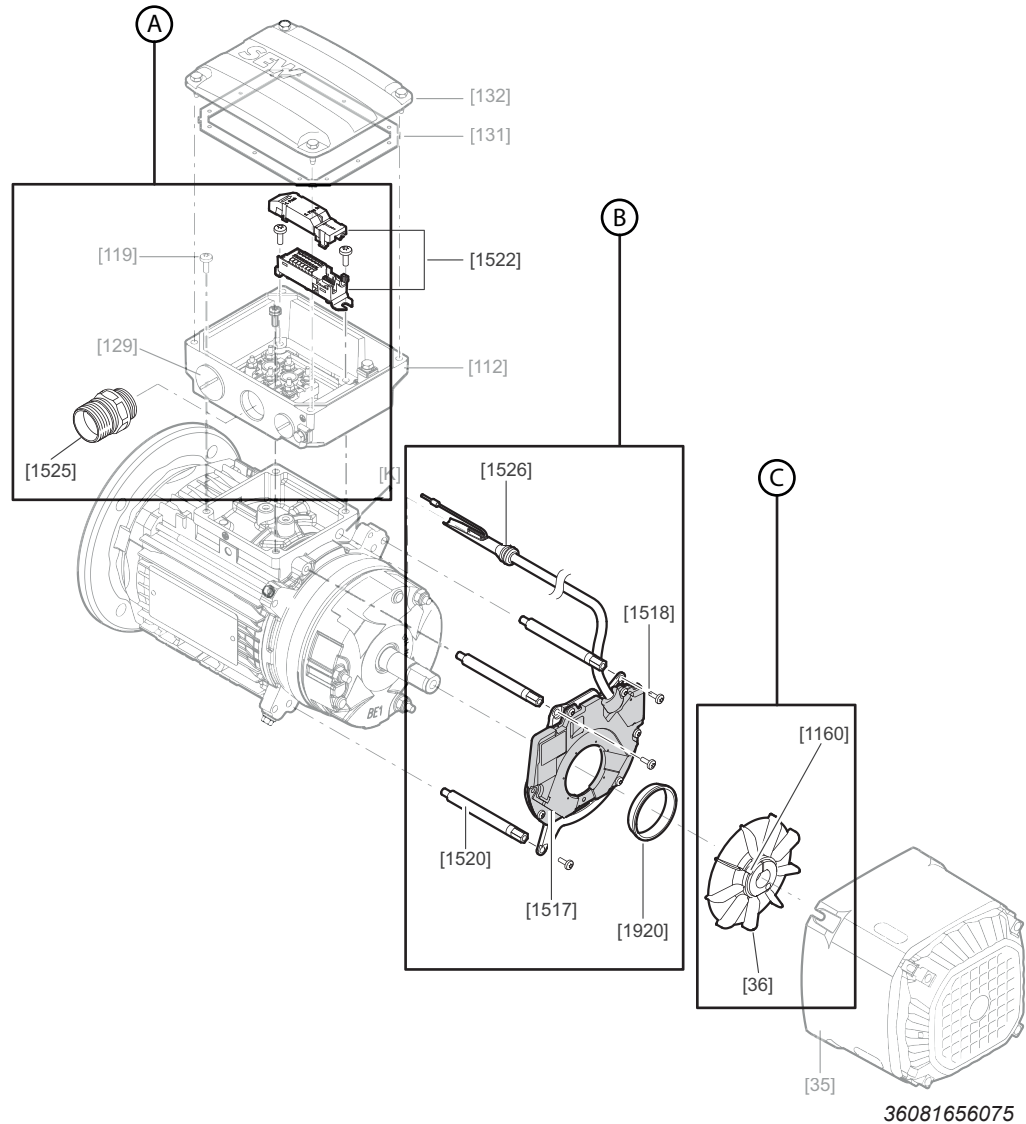
Type	Motor size	Brake	Connec- tion	FS	Material short text	Part number
EI7C	DRN63	Without brake	M12	–	Service kit	28254295
EI7C	DRN63	BE03	M12	–	Service kit	28254309
EI7.	DRN/DRU../DR2.71	Not relevant	M12	–	Service kit	28214366
EI7.	DRN/DRU../DR2.80	Not relevant	M12	–	Service kit	28214374
EI7.	DR.90 – 100 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 13295950 00134147 28261607	M12 connection components	EI8R / EI8C

11.3.3 .8. / .9. / .V8. service kits

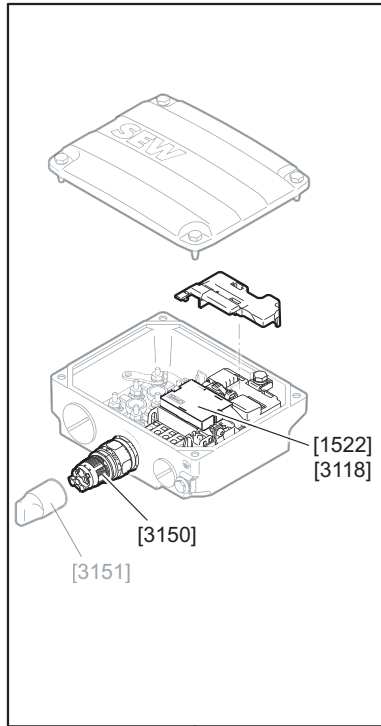
Currently, the EK8Z, AK8Z and EK9Z encoders cannot be retrofitted by the customer. Contact SEW-EURODRIVE if necessary.

Service kits are available to retrofit an encoder and to provide spare parts.

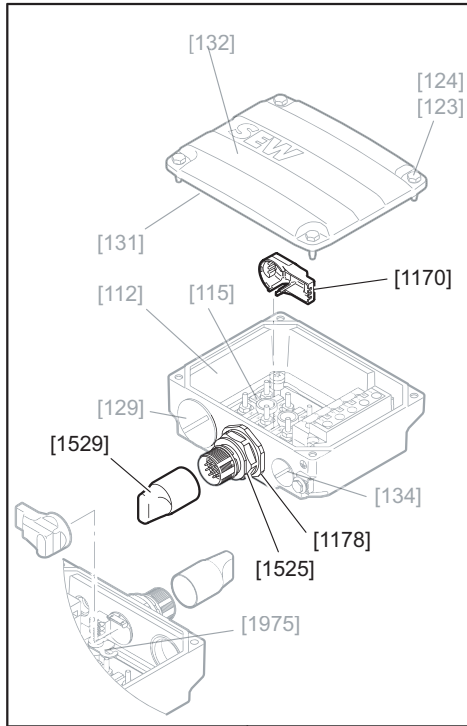
For the retrofit, kits from the following groups A – G are selected with the connection variant, suitable for the motor and encoder design.

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.

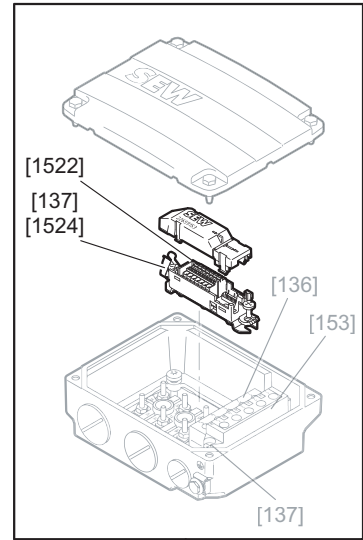
A	Encoder incl. connection cable on the encoder
B	Torque bracket for installing the encoder and additional connection components for the customer connection (integrated encoder connector or M23 connector with short cable on the encoder) or lower housing part connection unit for the cable connection in 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



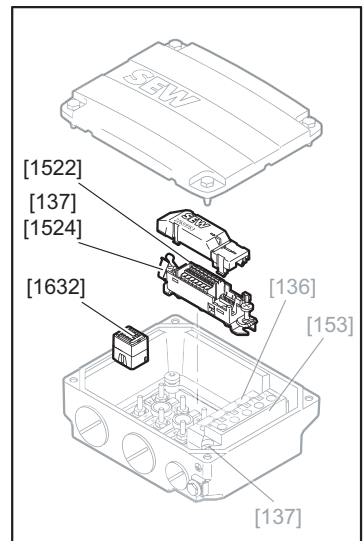
D1



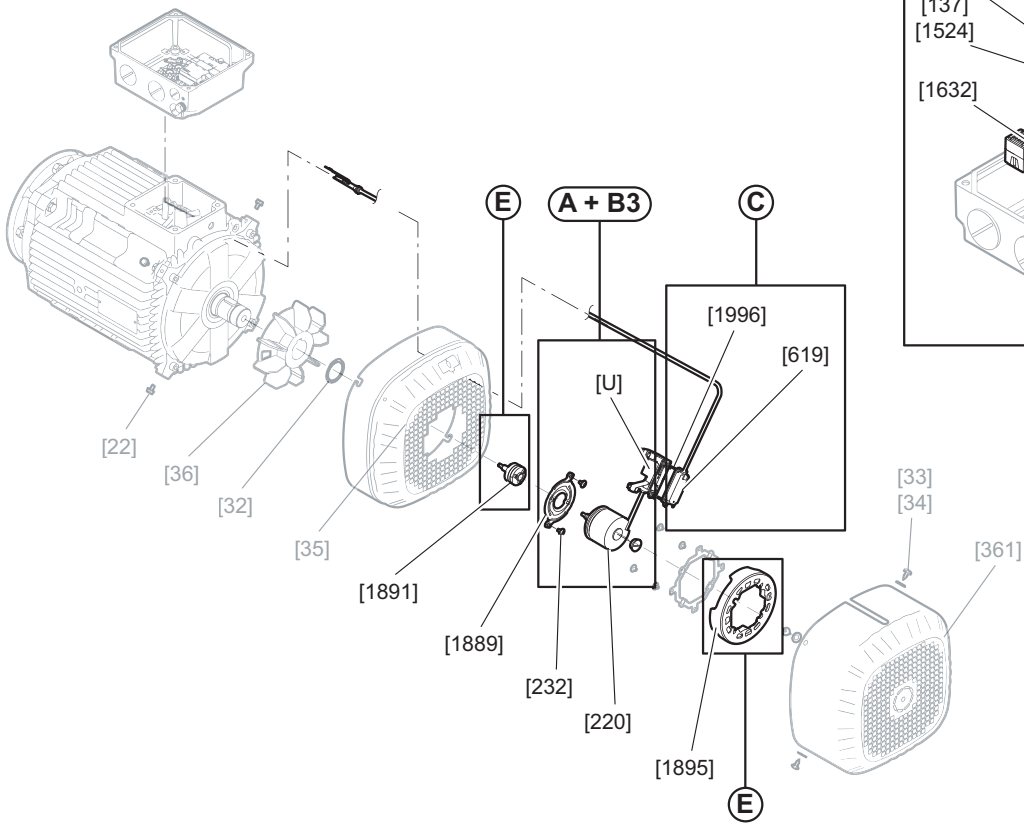
D2



D3

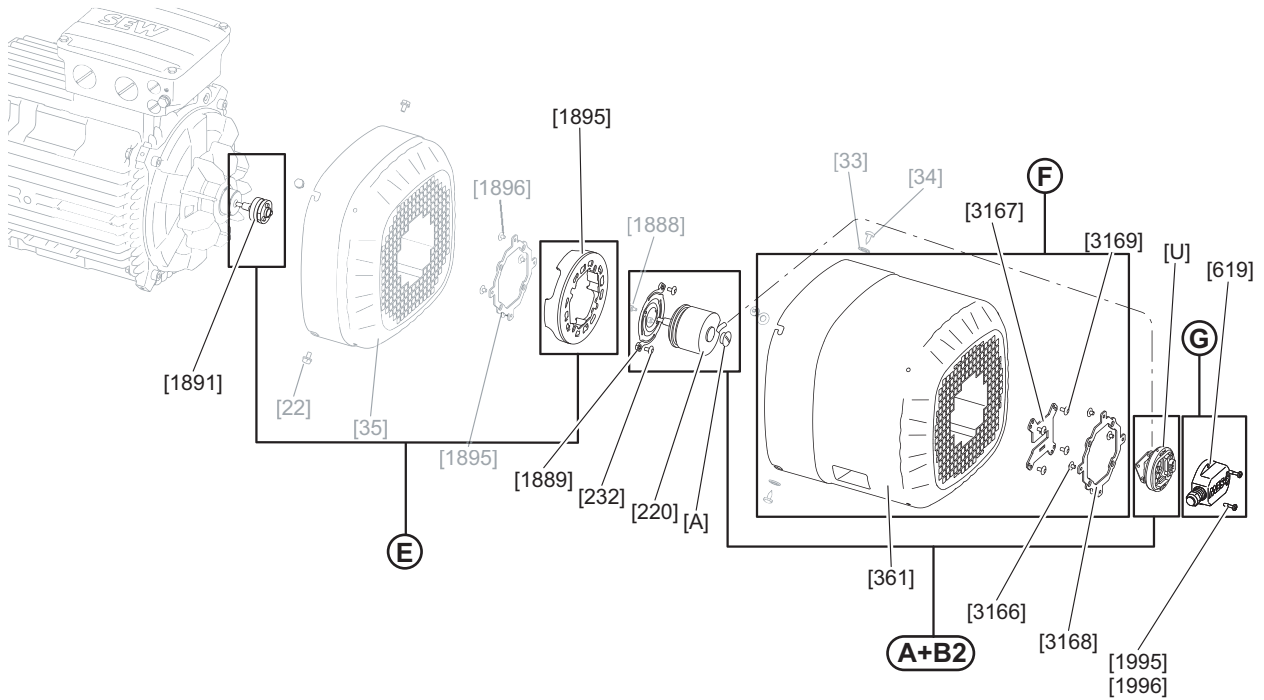


D3a

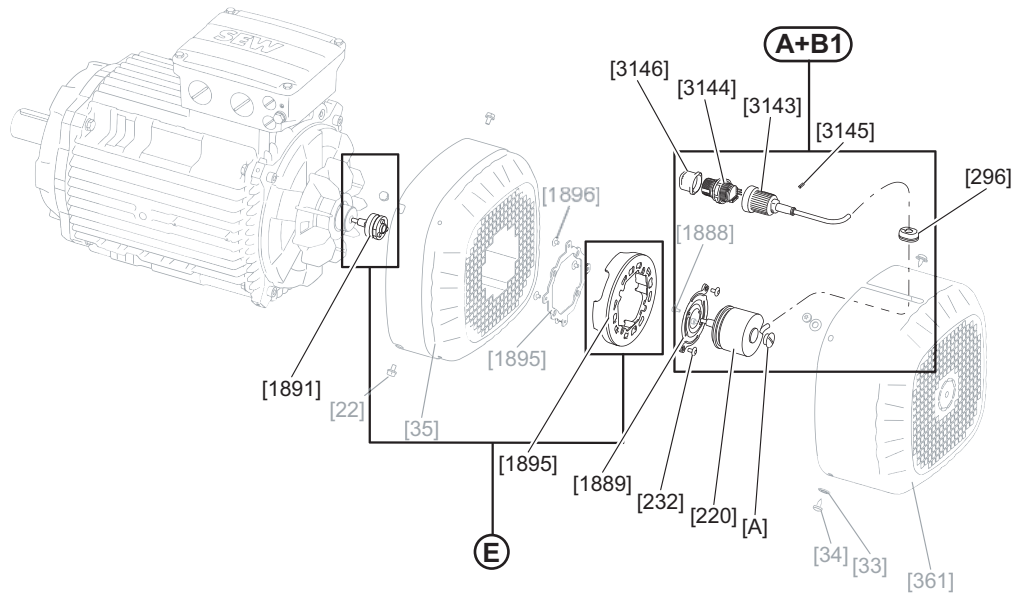


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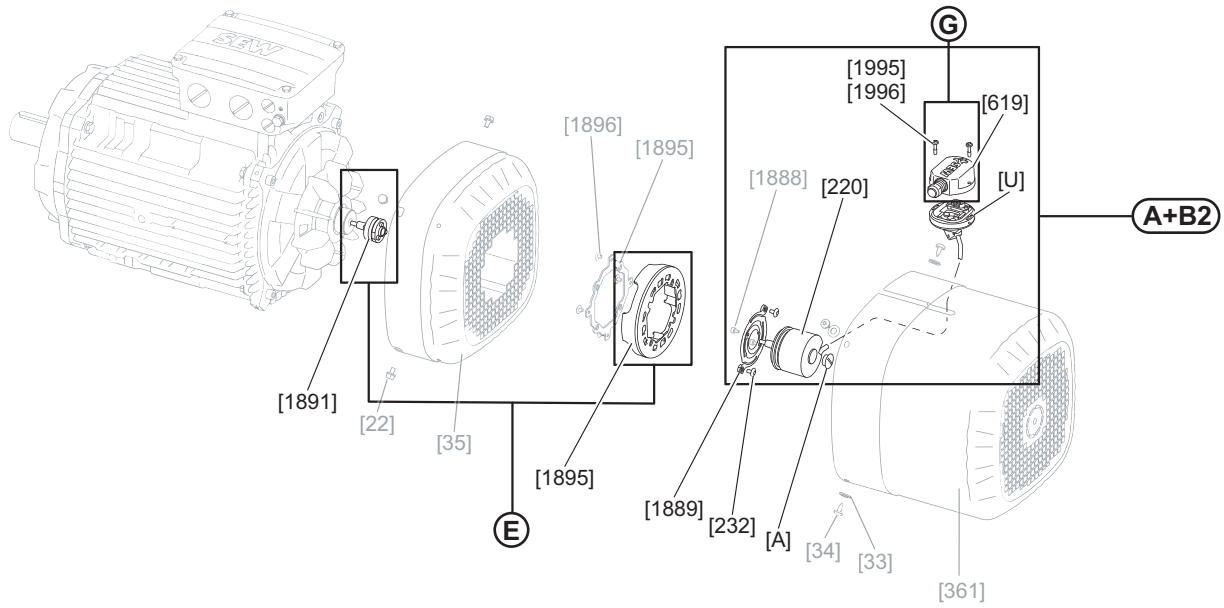
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- | | | | |
|--------|--------------------|--------|---------------------|
| [137] | Connection unit | [1525] | Connector |
| [220] | Rotary encoder set | [1529] | Protection cap |
| [232] | Round head screw | [1889] | Torque bracket |
| [619] | Connection 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 – 132S motors without brake	MOVILINK® DDI in the terminal box [D1]	C1	Cover cpl. DRN../K8Z/.K9Z L = 410 MOVILINK® DDI	28924290
DRN../DRU../DR2.71 – 132S motors with brake		C2	Cover cpl. DRN../K8Z/.K9Z L = 525 MOVILINK® DDI	28924150
DRN../DRU../DR2.132M – 180 motors with and without brake		C3	Cover cpl. DRN../K8Z/.K9Z L = 725 MOVILINK® DDI	28924304
DRN../DRU../DR2.71 – 132S motors without brake	<ul style="list-style-type: none"> M23 connector for connection in the ter- minal box [D2] Connection unit (ter- minal strip in the ter- minal box) for con- nection in the termi- nal box [D3/D3a] 	C4	Cover cpl. DRN../K8. L = 410	13606832
DRN../DRU../DR2.71 – 132S motors with brake		C5	Cover cpl. DRN../K8. L = 525	13608640
DRN../DRU../DR2.132M – 180 motors with and without brake		C6	Cover cpl. 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 DRN71 – 132S/ EI8./K8. [1522]	(E)DRN../DRU../DR2.71 – 180 (connection unit in the terminal box)	Connection unit DR2.71 – 180/ EI8./K8.BG	13605364
Configuration box EK8X DR71-315/EK8X [1632]	(E)DRN../DRU../DR2.71 – 180 (connection unit in the terminal box)	Connection unit DR71 – 315/EK8X	13666185
Connection unit litz wire set => configuration box	(E)DRN../DRU../DR2.71 – 180 (connection unit in the terminal box)	E-connector ZZ2C-S2CS000-02A26L200	28192877
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
Clamp W4521 A11-3.2-AI	(E)DRN../DRU../DR2.71 – 180 (connection unit in the terminal box)	Cable clamp d=3.2, B=5.2 Aluminum blank	29702356

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Serial letter E

The motor size is required to select the insulation coupling.

Motor size	Service kit	Material short text	Part number
DRN../DRU../ DR2. 63 – 200	No insulation coupling	–	–
DRN../DRU../ 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 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 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. 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 DR../(E)DRN../DRU../DR2.80 – 132S	Encoder service kit	13642847
AS7W	DR../(E)DRN../DRU../DR2.71 – 132 DR../(E)DRN../DRU../DR2.80 – 132S	Encoder service kit	13642855
ES7C	DR../(E)DRN../DRU../DR2.71 – 132 DR../(E)DRN../DRU../DR2.80 – 132S	Encoder service kit	13642863
ES7R	DR../(E)DRN../DRU../DR2.71 – 132 DR../(E)DRN../DRU../DR2.80 – 132S	Encoder service kit	13642871
ES7S	DR../(E)DRN../DRU../DR2.71 – 132 DR../(E)DRN../DRU../DR2.80 – 132S	Encoder service kit	13642898
XS7S	DR../(E)DRN../DRU../DR2.71 – 132 DR../(E)DRN../DRU../DR2.80 – 132S	Encoder service kit	13642987
XS7C	DR../(E)DRN../DRU../DR2.71 – 132 (DR../(E)DRN../DRU../DR2.80 – 132S	Encoder service kit	13643002
AG7W	DR../(E)DRN../DRU../DR2.160 – 280 DR../(E)DRN../DRU../DR2.132M – 280	Encoder service kit	13642901
AG7Y	DR../(E)DRN../DRU../DR2.160 – 280 DR../(E)DRN../DRU../DR2.132M – 280	Encoder service kit	13642928
EG7C	DR../(E)DRN../DRU../DR2.160 – 280 DR../(E)DRN../DRU../DR2.132M – 280	Encoder service kit	13642936
EG7R	DR.160-280 DRN132M – 2800	Encoder service kit	13642944
EG7S	DR.160-280 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: e.g. automotive, food, transport and logistics, raw 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-EURODRIVE, third party)/supply system)	
Brake control?	
FS motor option available (FS logo)? If so, which one?	
Are other options or retrofits available? If so, which ones?	
Grounding concept of the motor: How is the grounding carried out?	
Description of the electrical environment of the motor (other drives, switches, contactors, robots, safety 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 complained object in use? Are there any known problems with these other systems?	
Fault description	
Is there a defect or is there a functional failure 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?	
Information about operating conditions	
Supply voltage <ul style="list-style-type: none"> Nominal value and tolerance Number of additionally connected units to the encoder, type of units 	
Cable length	
Cable types <ul style="list-style-type: none"> Basic technical data (cross section, material, etc.) Shielding? If so, what kind? Are twisted pair signal cores present? Connector types? 	
Cable routing <ul style="list-style-type: none"> Description of the routing Distance to power cables Are cable ducts present? 	
Vibrations and shocks, internal to the motor <ul style="list-style-type: none"> Is a brake present? If so, what type? 	
Vibrations and shocks, external to the motor <ul style="list-style-type: none"> Total vibration of the drive? Vibrations through the motor shaft? 	
Thermal operating conditions: Operating temperature range	
Thermal operating conditions: Course/temperature gradient during use?	
Humidity values?	
Humidity: Course/gradient during use?	
Media in the environment <ul style="list-style-type: none"> Is the encoder exposed to special media such as cleaning agents? Course of exposure (permanent, 1x per week, 10 min, etc.) 	
Information about operating states in the application	

<p>Start of the system</p> <ul style="list-style-type: none"> • Course of the supply voltage • Chronological order/profile of connecting the sensor technology and power of the drive • Other special features? 	
<p>Ongoing operation of the system</p> <ul style="list-style-type: none"> • Course of the supply voltage • Chronological order/profile of connecting the sensor technology and power of the drive • Other special features? 	
<p>Switching off the system</p> <ul style="list-style-type: none"> • Course of the supply voltage • Chronological order/profile of connecting the sensor technology and power of the drive • Other special features? 	
Encoder evaluation	
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?	
Other?	
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
EI72		DeVilliers Way
EI76		Normanton
EI7C		West Yorkshire
EI7C FS		WF6 1GX
EI8C		United Kingdom
EI8R		
EI8Z		
EK8Z		
EK9Z		
AK8Z		

Encoder type	Manufacturer	Address of contact person in UK
EK8R EK8C EK8S EV8. RK8M AK8W AK8Y AV8.	Baumer Group	Baumer Ltd Shrivenham Hundred, Business Park Majors Road 33/36 SN6 8TZ Watchfield, Swindon United Kingdom
EK8R EK8C EK8S EK8W AK8W AK8Y	Kübler Group	OEM Automatic Ltd. Whiteacres Whetstone Leicester LE8 6ZG, England United Kingdom
AK8H	Sick	SICK (UK) Ltd. Waldkirch House 39 Hedley Road, St. Albans Hertfordshire AL1 5BN United Kingdom

13 Contacting SEW-EURODRIVE

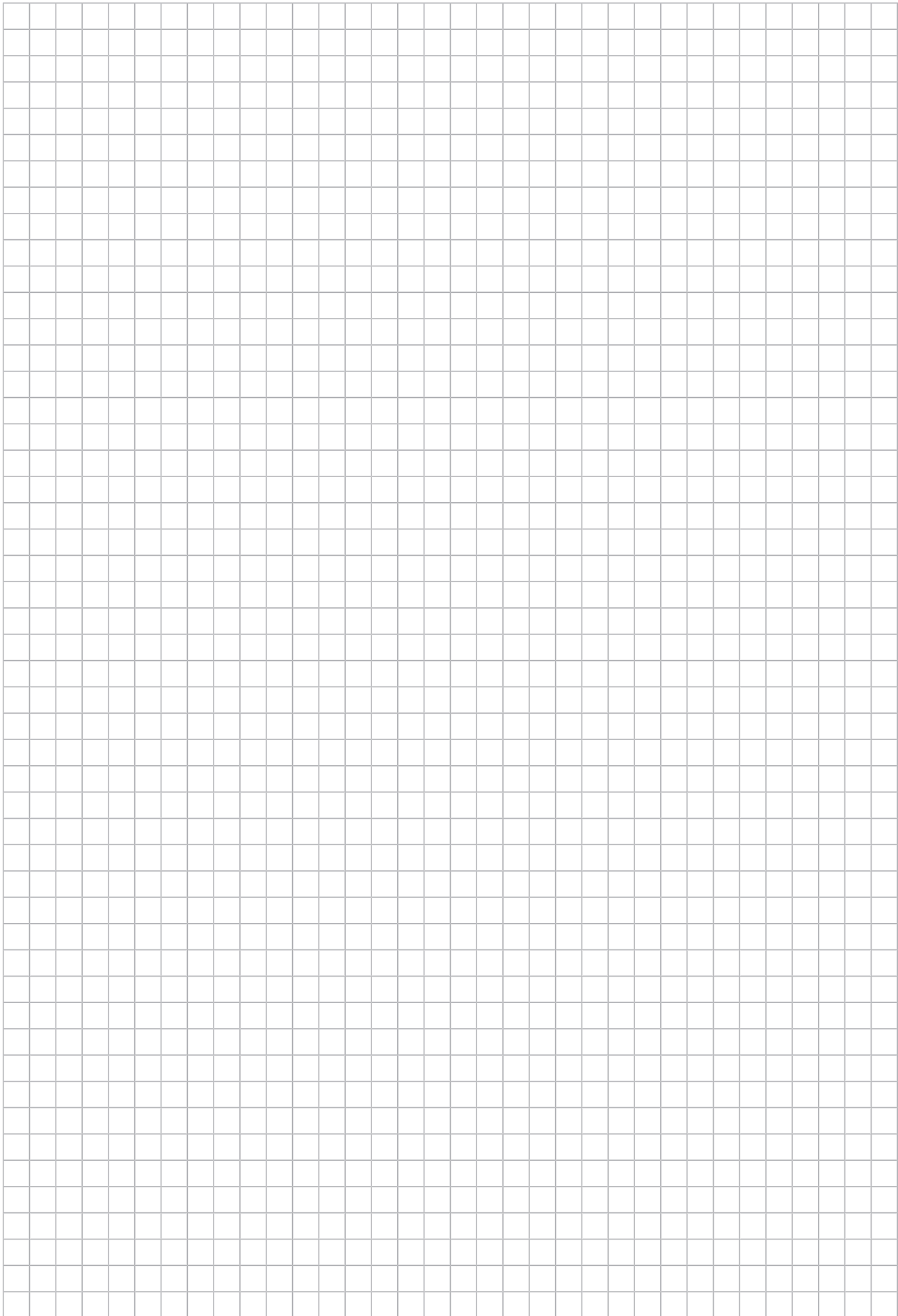
You can find the worldwide contact data and locations on the **SEW-EURODRIVE website** via the following link or the QR code shown below.

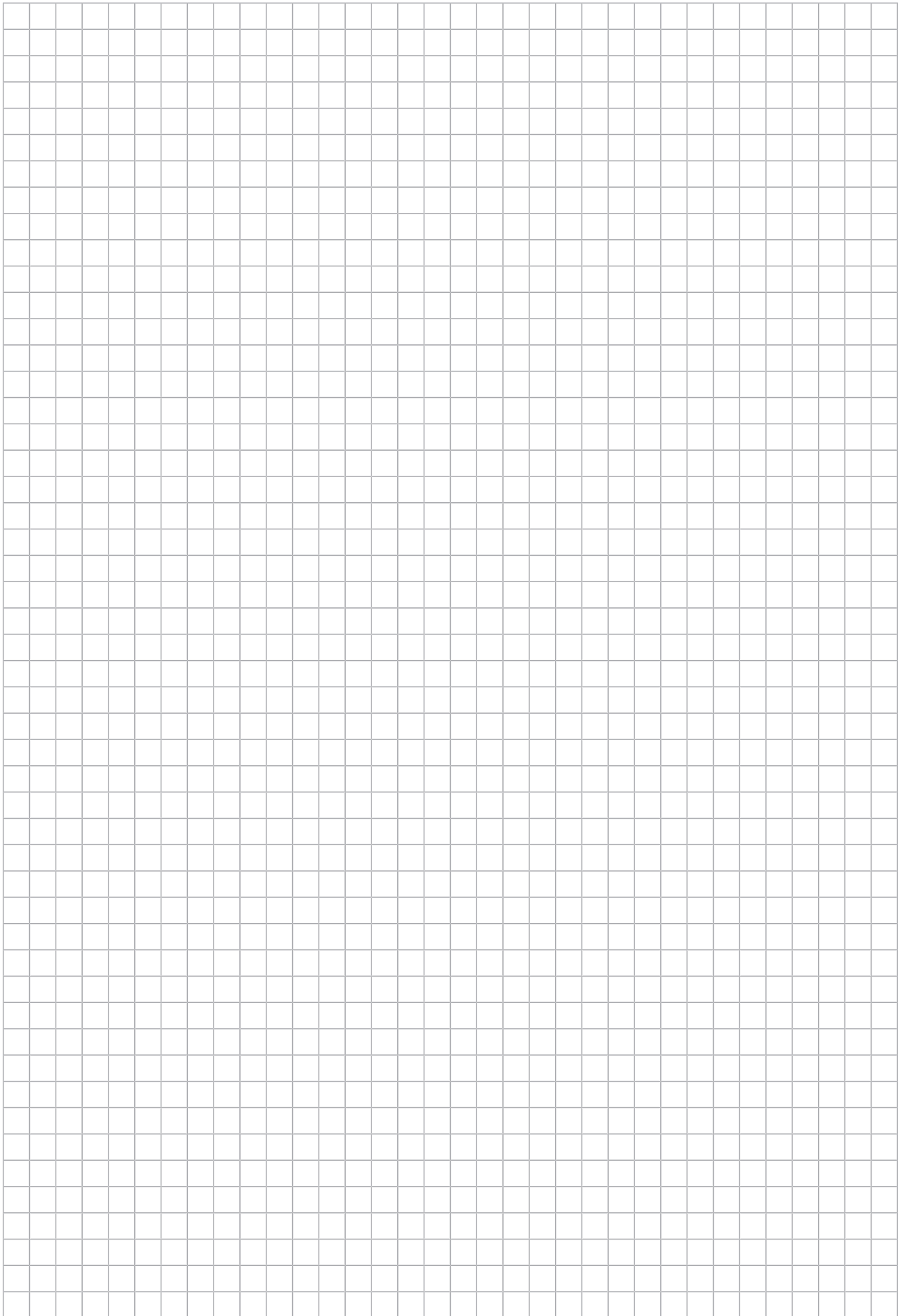
<https://www.sew-eurodrive.de/contacts-worldwide>

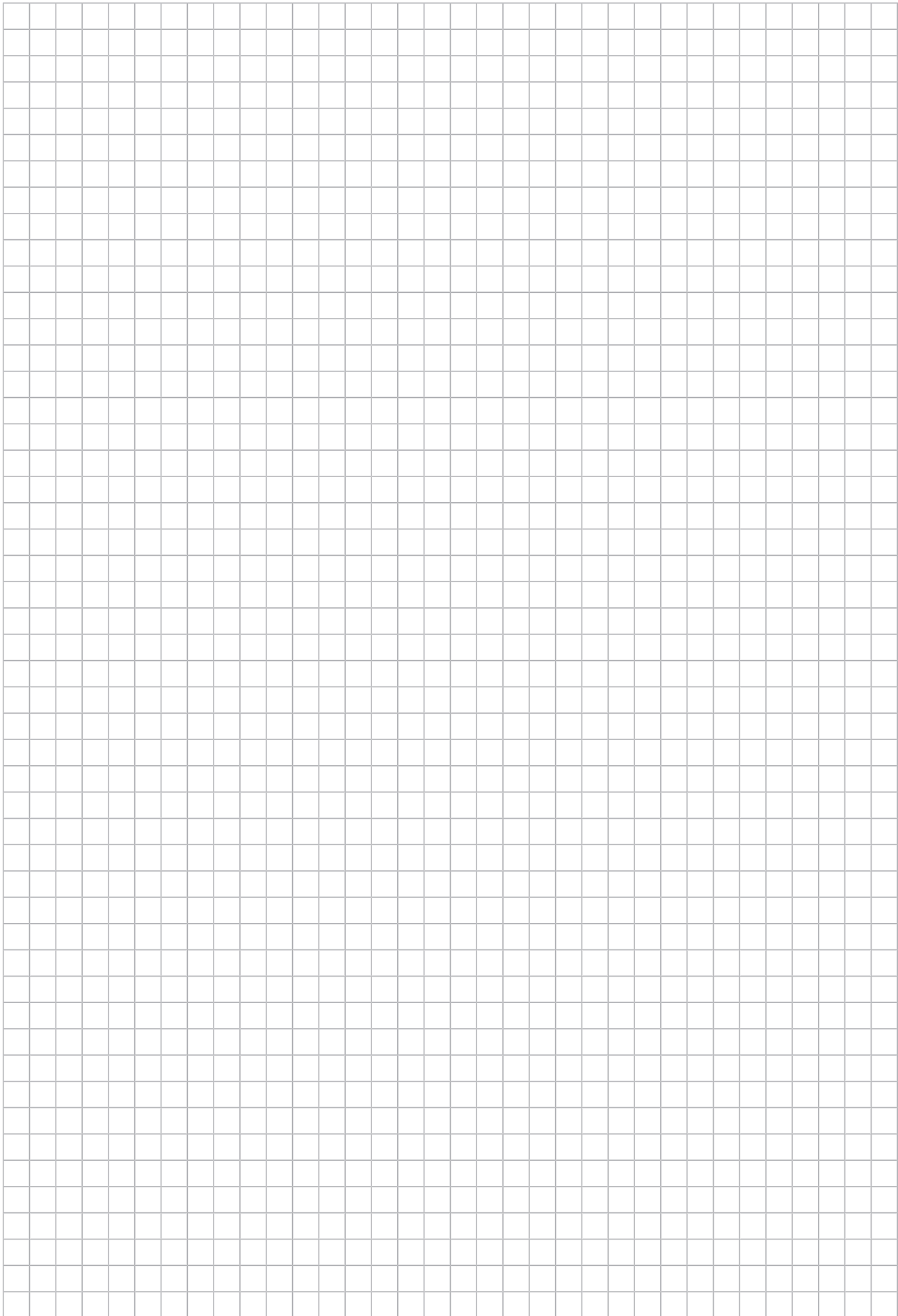


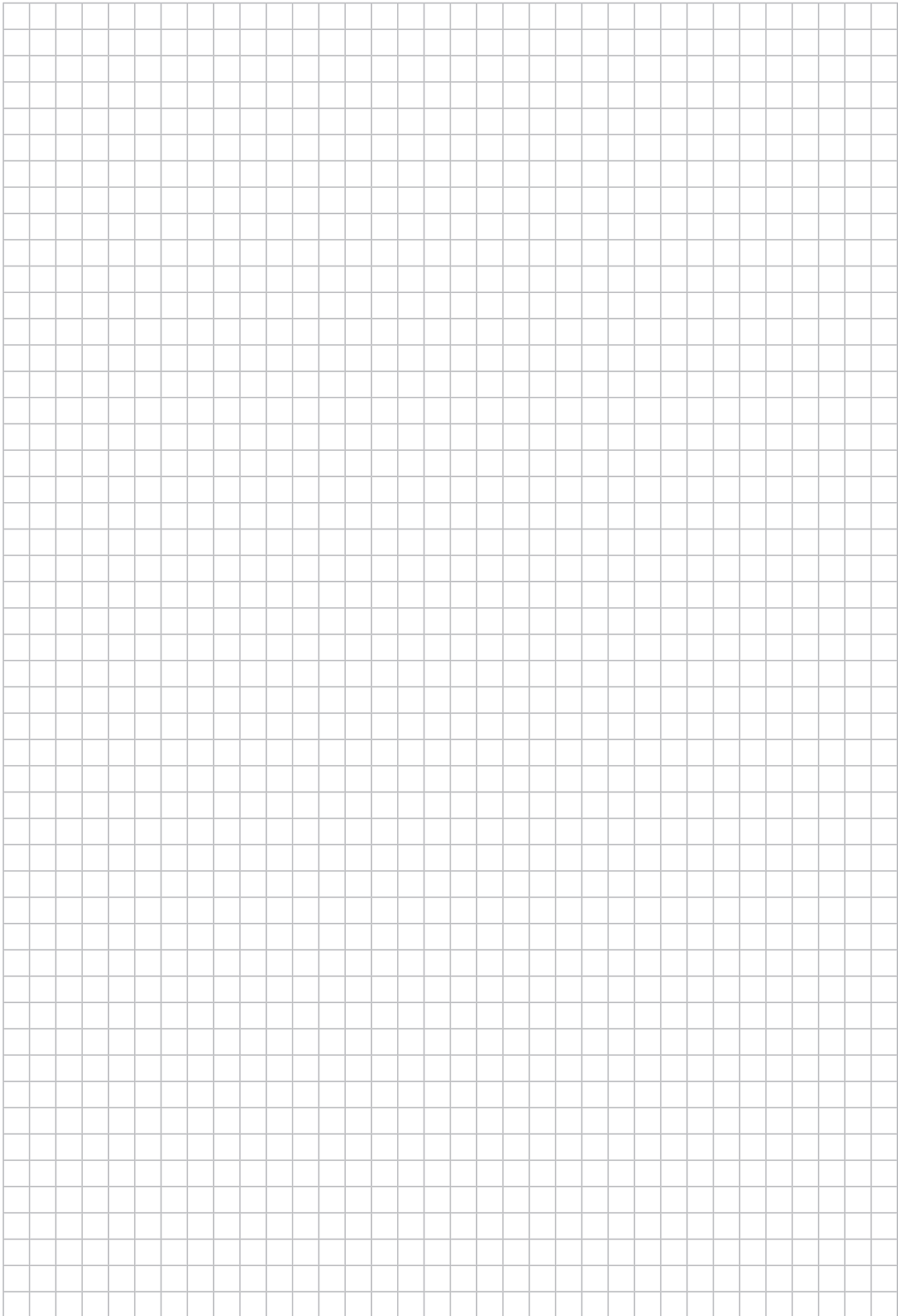
SEW
EURODRIVE

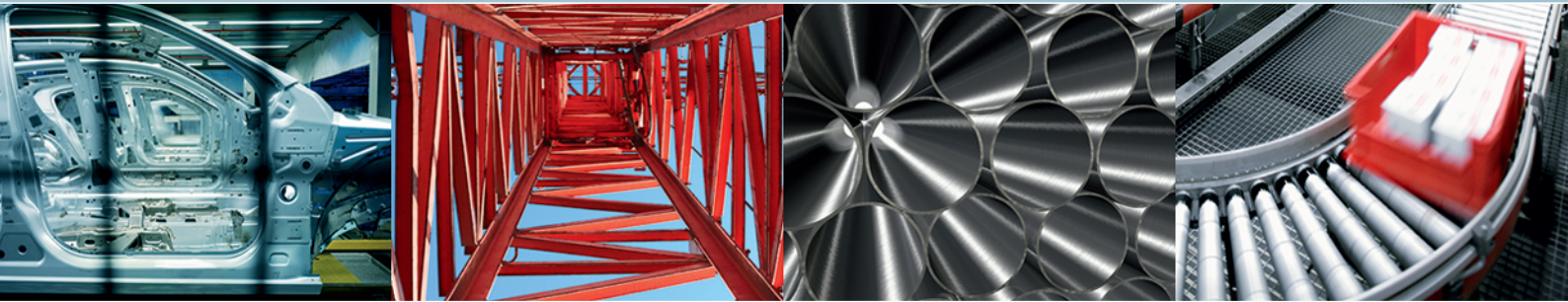
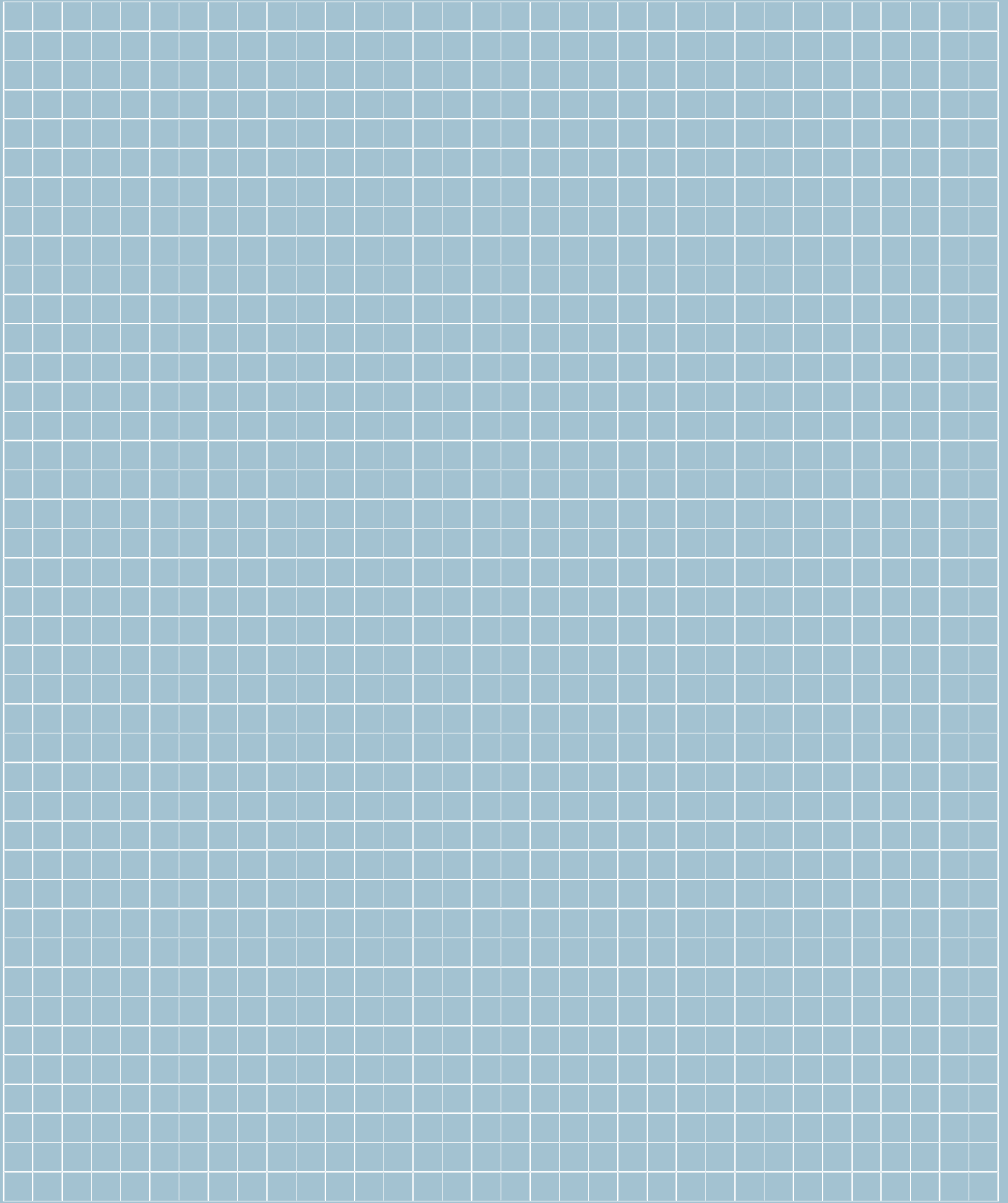














SEW-EURODRIVE
Driving the world

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

8.4.1 Incremental encoders

Technical data

EK8S, EK8R, EK8C

Encoder	Size, unit	EK8S	EK8R	EK8C
Signal 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 functional safety applications	U_{B_FS}	DC 7 V to 30 V	–	–
Maximum current consumption, free of load	I_{in}	100 mA (at $U_B = 7 V$)		
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) ($B' = B - \bar{B}$) ($A' = A - \bar{A}$)	U_{t_diff}	1 V ± 10%	–	–
Voltage output signal non-differential (peak-to-peak)	U_t	0.5 V ± 10%	$U_{Low} \leq 0.5 V$ $U_{High} \geq 2.5 V$	$U_B \leq 6 V$: TTL $U_{Low} = 0V$ ($\leq 0.5 V$) $U_{High} = 5V$ ($\geq 2.5 V$) $U_B > 6 V$: HTL $U_{Low} = 0V - 3 V$ $U_{High} = (U_B - 2.5 V) - U_B$
Signal level output, offset nominal against 0 V (A, B, C, \bar{A} , \bar{B} , \bar{C})	U_{t_o}	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_L/I_L	120 Ω ± 10%	120 Ω ± 10%	$U_B \leq 6 V$: 120 Ω ± 10% $U_B > 6 V$: 1 – 3 kΩ
Resistance between tracks and reference ground	R_{gnd}	≥ 1 kΩ	–	–
Load capacitance, output	C_o	≤ 20 nF	–	–
Voltage output signal, differential ($C' = C - \bar{C}$) (peak-to-peak)	$U_{t_diff_e}$	0.3 – 1.4 V	–	–
C track offset	g	192 mV ± 5 mV	–	–
Voltage output signal, non-differential (C, \bar{C}) (peak-to-peak)	U_{t_C}	–	$U_{Low} \leq 0.5 V$ $U_{High} \geq 2.5 V$	$U_B \leq 6 V$: $U_{Low} \leq 0.5 V$ $U_{High} \geq 2.5 V$ $U_B > 6 V$: $U_{Low} \leq 3 V$ $U_{High} \geq U_B - 2.5 V$
Phase angle track C', n = constant	k, l	k = 180° ± 90° l = 180° ± 90°	–	–
Signal width track C	W_C	see figure	90° electrical	90° electrical
Signal logic track C		see figure	C = log 1, when A = B = log 1	C = log 1, when A = B = log 1
Pulse duty factor according to IEC 60469-1, n = constant		–	50% ± 10%	50% ± 10%
Phase offset A: B; \bar{A} : \bar{B} n = constant	d	90° ± 2°	90° ± 20°	90° ± 20°
Accuracy of the incremental section ¹⁾		0.0194° (70 ")	0,033° (120 ")	0,033° (120 ")
Vibration resistance according to EN 60068-2-6		≤ 10 g (f > 18.5 Hz)		
Shock resistance according to EN 60068-2-27		≤ 100 g (t = 6 ms, 18 pulses)		

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ABS.VALUE ENCODER MULTITURN 27 BIT WITH PROFINET
OPERATE VOLTAGE 10-30V CLAMP FLANGE / SHAFT 10MM
CONNECTOR M12 RADIAL



Figure similar

product brand name	Measuring systems
Measuring procedure / for position feedback	Absolute
Manner of function / of absolute encoder	Multiturn
Operating voltage / of the rotary encoder / for DC	10 ... 30
Design of the interface	PROFINET IO mit RT / IRT
Design of input / for clock cycle	Differential line driver according to EIA Standard RS 485
Design of encoder output	PNO encoder profile
Property of the output / Short-circuit proof	Yes
Display version / for diagnostic function	Yes (green/red/yellow)
Transfer rate	100 Mbit/s
Speed	
<ul style="list-style-type: none"> • for digital measuring accuracy +/- 1 bit / with electrical rotation transmission / maximum 	5 800 1/min
<ul style="list-style-type: none"> • maximum 	6 000 1/min
Cable length	
<ul style="list-style-type: none"> • maximum 	100 m
Digital resolution	27 bit; (8192 increments x 16384 rpms)
Type of coding	
<ul style="list-style-type: none"> • for sampling 	Gray
<ul style="list-style-type: none"> • for transmission 	Binary, PROFINET
Product function	
<ul style="list-style-type: none"> • parameterizable preset 	Yes; Any
<ul style="list-style-type: none"> • parameterizable counting direction 	Yes
Measurement deviation angle of rotation / of absolute encoder	79"; with 8192 increments ($\pm 1/2$ LSB)
Friction torque / at 20 °C / maximum	0.01 N·m

Starting torque / at 20 °C / maximum	0.01 N·m
Axial force / at shaft <ul style="list-style-type: none"> • with n > 6000 rpm / maximum • with n ≤ 6000 rpm / maximum 	10 N 40 N
Cantilever force / at shaft extension <ul style="list-style-type: none"> • with n > 6000 rpm / maximum • with n ≤ 6000 rpm / maximum 	20 N 110 N
Rotary encoder shaft version	Solid shaft
Diameter / of rotary encoder shaft	10 mm
Length / of rotary encoder shaft	20 mm
Angular acceleration / maximum	100 000 rad/s ²
Moment of inertia / of rotor <ul style="list-style-type: none"> • with solid shaft encoder 	0.000003 kg·m ²
Resistance against vibration / at 55 Hz ... 2 kHz / acc. to IEC 60068-2-6	100 m/s ²
Shock acceleration <ul style="list-style-type: none"> • limited to 2 ms / acc. to IEC 60068-2-27 • limited to 6 ms / acc. to IEC 60068-2-27 	2 000 m/s ² 1 000 m/s ²
Protection class IP <ul style="list-style-type: none"> • without shaft input • with shaft input 	IP67 IP64
Ambient temperature / during operation	-40 ... +85
EMI immunity	Tested to DIN EN 50081 and EN 50082
Certificate of suitability	CE, cULus
Consumed current / minimum	130 mA
Consumed current / maximum	400 mA; (< 4 W)
Type of electrical connection	2 x connector M12, 4-pin for PROFINET Ports, 1 x connector M12, 4-pin for operating voltage
Telegram format	According to PNO encoder profile V4.1 Class1, Class 2, Class 3, Class 4, standard telegrams 81/82/83/84, Siemens telegram 860
Direction of connection opening	Radial
Measuring cycle	1 ... 100
Product function <ul style="list-style-type: none"> • parameterizable resolution per revolution • parameterizable resolution per revolution / Note • parameterizable total resolution • parameterizable total resolution / Note • parameterizable speed signal • parameterizable limit switch • parameterizable isochronous mode • Slave-to-slave communication parameterizable • online parameterization 	Yes Any 1 ... 8192 Yes Any 1 ... 16384 Yes No Yes No Yes
Certificate of suitability / PI certificate	Yes

Profile / is supported	PNO encoder profile V4.1
Flange type	Clamping flange
Net weight	0.43 kg

Further information

Information und Download Center

https://www.automation.siemens.com/mcms/infocenter/content/en/Pages/order_form.aspx

Technical documentation

<http://w3.siemens.com/mcms/mc-solutions/en/motion-control/support/technical-documentation/Pages/technical-documentation.aspx>

Industry Mall

<https://eb.automation.siemens.com/mall/en/WW/Catag/Product/6FX20015QN25/all>

Industry Online Support

<http://support.automation.siemens.com/WW/view/en/6FX20015QN25/all>

last modified:

09.03.2015

CABO PANFLAT 8X1,0 MM² 70C 750V BT SN ESP PR

Produto:

Cabo chato flexível múltiplo, com condutores de cobre nu, isolado e coberto com composto PVC. Este cabo foi especialmente desenvolvido para bombas submersíveis ou movimentos constantes, em aplicações como pontes rolantes e peças de máquinas em movimento.

Construção:

- Conductor: fios de cobre eletrolítico nu, têmpera mole, encordoamento classe 5 (até 35mm²) ou 6 (a partir de 50mm²);
- Isolação: composto termoplástico de cloreto de polivinila (PVC). Veias pretas identificadas por números;
- Blindagem: trança de fios de cobre estanhado com 86% de cobertura;
- Cobertura: composto termoplástico de cloreto de polivinila (PVC). Cor: Preta.

Itens:

Item	Descrição	Altura x Largura [mm x mm]	Peso [kg/m]
21902700321002	CABO PANFLAT 8X1,0 MM ² 70C 750V BT SN ESP PR	5,45 X 35,08	0,2841

Propriedades:

- Temperatura de trabalho: estabilidade térmica de -5°C até 70°C;
- Tensão de isolamento: 750V;
- Resistente a chama;
- Boa resistência a óleos;
- Moderada resistência a ácidos e bases;
- Boa flexibilidade;
- Raio de curvatura mínimo: 6 vezes a altura do cabo.

CABO PANFLAT 8X6,0 MM² 70C 750V PR

Produto:

Cabo chato flexível múltiplo, com condutores de cobre nu, isolado e coberto com composto PVC. Este cabo foi especialmente desenvolvido para movimentos constantes, em aplicações como pontes rolantes e peças de máquinas em movimento.

Construção:

- Conductor: fios de cobre eletrolítico nu, têmpera mole, encordoamento classe 5 (até 35mm²) ou 6 (a partir de 50mm²);
- Isolação: composto termoplástico de cloreto de polivinila (PVC). Veias pretas identificadas por números;
- Cobertura: composto termoplástico de cloreto de polivinila (PVC). Cor: Preta.

Itens:

Item	Descrição	Altura x Largura [mm x mm]	Peso [kg/m]
21900001630002	CABO PANFLAT 8X6,0 MM ² 70C 750V PR	7,01 X 44,36	0,7369

Propriedades:

- Temperatura de trabalho: estabilidade térmica até 70°C;
- Tensão de isolamento: 750V;
- Resistente a chama;
- Boa resistência a óleos;
- Moderada resistência a ácidos e bases;
- Boa flexibilidade;
- Raio de curvatura mínimo: 6 vezes a altura do cabo.

Norma aplicável: EPAN22

CABO PANFLAT 8X1,0 MM² 70C 750V BT SN ESP PR

Produto:

Cabo chato flexível múltiplo, com condutores de cobre nu, isolado e coberto com composto PVC. Este cabo foi especialmente desenvolvido para bombas submersíveis ou movimentos constantes, em aplicações como pontes rolantes e peças de máquinas em movimento.

Construção:

- Conductor: fios de cobre eletrolítico nu, têmpera mole, encordoamento classe 5 (até 35mm²) ou 6 (a partir de 50mm²);
- Isolação: composto termoplástico de cloreto de polivinila (PVC). Veias pretas identificadas por números;
- Blindagem: trança de fios de cobre estanhado com 86% de cobertura;
- Cobertura: composto termoplástico de cloreto de polivinila (PVC). Cor: Preta.

Itens:

Item	Descrição	Altura x Largura [mm x mm]	Peso [kg/m]
21902700321002	CABO PANFLAT 8X1,0 MM ² 70C 750V BT SN ESP PR	5,45 X 35,08	0,2841

Propriedades:

- Temperatura de trabalho: estabilidade térmica de -5°C até 70°C;
- Tensão de isolamento: 750V;
- Resistente a chama;
- Boa resistência a óleos;
- Moderada resistência a ácidos e bases;
- Boa flexibilidade;
- Raio de curvatura mínimo: 6 vezes a altura do cabo.

CABO PANFLAT 8X6,0 MM² 70C 750V PR

Produto:

Cabo chato flexível múltiplo, com condutores de cobre nu, isolado e coberto com composto PVC. Este cabo foi especialmente desenvolvido para movimentos constantes, em aplicações como pontes rolantes e peças de máquinas em movimento.

Construção:

- Conductor: fios de cobre eletrolítico nu, têmpera mole, encordoamento classe 5 (até 35mm²) ou 6 (a partir de 50mm²);
- Isolação: composto termoplástico de cloreto de polivinila (PVC). Veias pretas identificadas por números;
- Cobertura: composto termoplástico de cloreto de polivinila (PVC). Cor: Preta.

Itens:

Item	Descrição	Altura x Largura [mm x mm]	Peso [kg/m]
21900001630002	CABO PANFLAT 8X6,0 MM ² 70C 750V PR	7,01 X 44,36	0,7369

Propriedades:

- Temperatura de trabalho: estabilidade térmica até 70°C;
- Tensão de isolamento: 750V;
- Resistente a chama;
- Boa resistência a óleos;
- Moderada resistência a ácidos e bases;
- Boa flexibilidade;
- Raio de curvatura mínimo: 6 vezes a altura do cabo.

Norma aplicável: EPAN22

CABO PANFLAT 10X2,5 MM² 70C 750V PR

Produto:

Cabo chato flexível múltiplo, com condutores de cobre nu, isolado e coberto com composto PVC. Este cabo foi especialmente desenvolvido para movimentos constantes, em aplicações como pontes rolantes e peças de máquinas em movimento.

Construção:

- Conductor: fios de cobre eletrolítico nu, têmpera mole, encordoamento classe 5 (até 35mm²) ou 6 (a partir de 50mm²);
- Isolação: composto termoplástico de cloreto de polivinila (PVC). Veias pretas identificadas por números;
- Cobertura: composto termoplástico de cloreto de polivinila (PVC). Cor: Preta.

Itens:

Item	Descrição	Altura x Largura [mm x mm]	Peso [kg/m]
21900000704002	CABO PANFLAT 10X2,5 MM ² 70C 750V PR	5,53 X 46,39	0,53

Propriedades:

- Temperatura de trabalho: estabilidade térmica até 70°C;
- Tensão de isolamento: 750V;
- Resistente a chama;
- Boa resistência a óleos;
- Moderada resistência a ácidos e bases;
- Boa flexibilidade;
- Raio de curvatura mínimo: 6 vezes a altura do cabo.

Norma aplicável: EPAN22

CABO PANFLAT 10X1,5 MM² 70C 750V PR

Produto:

Cabo chato flexível múltiplo, com condutores de cobre nu, isolado e coberto com composto PVC. Este cabo foi especialmente desenvolvido para movimentos constantes, em aplicações como pontes rolantes e peças de máquinas em movimento.

Construção:

- Conductor: fios de cobre eletrolítico nu, têmpera mole, encordoamento classe 5 (até 35mm²) ou 6 (a partir de 50mm²);
- Isolação: composto termoplástico de cloreto de polivinila (PVC). Veias pretas identificadas por números;
- Cobertura: composto termoplástico de cloreto de polivinila (PVC). Cor: Preta.

Itens:

Item	Descrição	Altura x Largura [mm x mm]	Peso [kg/m]
21900000703002	CABO PANFLAT 10X1,5 MM ² 70C 750V PR	4,92 X 38,21	0,3617

Propriedades:

- Temperatura de trabalho: estabilidade térmica até 70°C;
- Tensão de isolamento: 750V;
- Resistente a chama;
- Boa resistência a óleos;
- Moderada resistência a ácidos e bases;
- Boa flexibilidade;
- Raio de curvatura mínimo: 6 vezes a altura do cabo.

Norma aplicável: EPAN22

CABO PANFLAT 4X10 MM² 70C 1KV PR

Produto:

Cabo chato flexível múltiplo, com condutores de cobre nu, isolado e coberto com composto PVC. Este cabo foi especialmente desenvolvido para movimentos constantes, em aplicações como pontes rolantes e peças de máquinas em movimento.

Construção:

- Conductor: fios de cobre eletrolítico nu, têmpera mole, encordoamento classe 5 (até 35mm²) ou 6 (a partir de 50mm²);
- Isolação: composto termoplástico de cloreto de polivinila (PVC). Veias pretas identificadas por números;
- Cobertura: composto termoplástico de cloreto de polivinila (PVC). Cor: Preta.

Itens:

Item	Descrição	Altura x Largura [mm x mm]	Peso [kg/m]
21900000080002	CABO PANFLAT 4X10 MM ² 70C 1KV PR	8,80 X 29,80	0,5971

Propriedades:

- Temperatura de trabalho: estabilidade térmica até 70°C;
- Tensão de isolamento: 1KV;
- Resistente a chama;
- Boa resistência a óleos;
- Moderada resistência a ácidos e bases;
- Boa flexibilidade;
- Raio de curvatura mínimo: 6 vezes a altura do cabo.

Norma aplicável: EPAN22

Ficha técnica

6XV1878-2A

designação do tipo de produto

IE FC TP Standard Cable GP 4x2 (AWG 24, Type C)

descrição do produto

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	
• do isolamento do condutor isolado	polietileno (PE)
• do revestimento interior do cabo	FRNC
• do invólucro de cabo	PVC
cor	
• do isolamento dos condutores isolados dos condutores isolados de dados	branco e azul/azul, branco e laranja/laranja, branco e verde/verde, branco e marrom/marrom
• do invólucro de cabo	verde
raio de curvatura	
• em curvatura única / mínimo permitido	24 mm
• em curvatura múltipla / mínimo permitido	40 mm
carga de tração / máximo	100 N
peso por comprimento	74,5 kg/km
condições ambientais	
temperatura ambiente	
• durante operação	-40 ... +85 °C
• durante o armazenamento	-40 ... +80 °C
• durante o transporte	-40 ... +80 °C
• durante a montagem	-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	
• contra óleo mineral	Resistente ao óleo conforme IEC 60811-2-1 (4 h/70 °C)
• contra graxa	resistente condicionalmente
• contra água	resistente condicionalmente
capacidade de resistência radiológica / contra radiação UV	resistente
características do produto, funções do produto, componentes do produto / geral	
característica do produto	
• livre de halogênio	No
• com capacidade PoE	Si
• com capacidade PoE+	Si
• com capacidade PoE++	Si
• sem silicone	Si
comprimento do cabo / em Industrial Ethernet	
• em 100BaseTX	100 m
• em 1000BaseT	100 m
• em 10GBase	90 m
normas, especificações, aprovações	
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	
• aprovação EAC	Si
• marcação CE	Si
• conformidade RoHS	Si
conformidade do produto	
• ANSI/TIA-EIA 568-B.2 Cat.5e	Si
• IEC 61784-5-2-CP 2/2 (Ethernet/IP)	Si
padrão para cabeamento estruturado	Cat6A
sociedade de classificação de navios	
• American Bureau of Shipping Europe Ltd. (ABS)	No
• Bureau Veritas (BV)	No
• Det Norske Veritas (DNV)	No
• Germanischer Lloyd (GL)	No
• Lloyds Register of Shipping (LRS)	No
• Nippon Kaiji Kyokai (NK)	No
• Polski Rejestr Statkow (PRS)	No

mais informações / links da internet

link da Internet

- para o web site: Ajuda de seleção Cabos e Conectores 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://support.industry.siemens.com/cs/ww/de/view/109766358>

<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. 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 CybersecurityRSS Feed" em <https://www.siemens.com/cert>. (V4.7)

Homologações / certificados

General Product Approval

[Manufacturer Declaration](#)



EG-Konf.

[Declaration of Conformity](#)



CCC

[Fire safety / Physical security](#)

General Product Approval	Test Certificates	other	Environment	Industrial Communication
China RoHS	Special Test Certificate	Miscellaneous	Environmental Conformations	PROFINET

última alteração:

24/11/2025

Ficha técnica

6XV1840-2AU10

designação do tipo de produto

IE FC TP Standard Cable GP 2x2 (Type A)

descrição do produto

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://l.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 porcentual

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"> em curvatura única / mínimo permitido em curvatura múltipla / mínimo permitido 	19,5 mm 49 mm
carga de tração / máximo	150 N
peso por comprimento	61 kg/km
condições ambientais	
temperatura ambiente	
<ul style="list-style-type: none"> durante operação durante o armazenamento durante o transporte durante a montagem 	-40 ... +75 °C -40 ... +75 °C -40 ... +75 °C -40 ... +60 °C
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"> contra óleo mineral contra graxa contra água 	Resistente ao óleo conforme IEC 60811-2-1 (4 h/70 °C) resistente condicionalmente resistente condicionalmente
capacidade de resistência radiológica / contra radiação UV	resistente
características do produto, funções do produto, componentes do produto / geral	
característica do produto	
<ul style="list-style-type: none"> livre de halogênio com capacidade PoE com capacidade PoE+ sem silicone 	No Si Si Si
comprimento do cabo / em Industrial Ethernet	
<ul style="list-style-type: none"> em 100BaseTX 	100 m
normas, especificações, aprovações	
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"> aprovação EAC marcação CE 	Si Si
padrão para cabeamento estruturado	Cat5e
sociedade de classificação de navios	
<ul style="list-style-type: none"> American Bureau of Shipping Europe Ltd. (ABS) Bureau Veritas (BV) Det Norske Veritas (DNV) Germanischer Lloyd (GL) Lloyds Register of Shipping (LRS) Nippon Kaiji Kyokai (NK) Polski Rejestr Statkow (PRS) 	No No No No No No No
normas, especificações, aprovações / declaração ambiental de produto	
declaração ambiental de produto	Si
Potencial de Aquecimento Global [CO2 eq]	
<ul style="list-style-type: none"> total durante fabricação durante operação após final da vida útil 	0,9 kg 0,81 kg 0,02 kg 0,07 kg
mais informações / links da internet	
link da Internet	
<ul style="list-style-type: none"> para o web site: Ajuda de seleção Cabos e Conectores 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://support.industry.siemens.com/cs/ww/de/view/109766358 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. 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 CybersecurityRSS 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
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[Fire safety / Physical security](#)

[Special Test Certificate](#)

[Miscellaneous](#)



[PROFINET](#)

última alteração:

24/11/2025

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 4
- 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 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 ... 6,5 mm

secção transversal do condutor conectável 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"> • com capacidade PoE+ 	Si
<ul style="list-style-type: none"> • sem silicone 	Si
componente do produto	
<ul style="list-style-type: none"> • alívio da tração 	Si

normas, especificações, aprovações

comprovante de conformidade	
<ul style="list-style-type: none"> • conformidade RoHS 	Si
<ul style="list-style-type: none"> • aprovação UL 	Si
<ul style="list-style-type: none"> • aprovação cULus 	Si
<ul style="list-style-type: none"> • 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]	
<ul style="list-style-type: none"> • total 	0,277 kg
<ul style="list-style-type: none"> • durante fabricação 	0,263 kg
<ul style="list-style-type: none"> • durante operação 	0,0086 kg
<ul style="list-style-type: none"> • após final da vida útil 	0,0062 kg

mais informações / links da internet

link da Internet	
<ul style="list-style-type: none"> • para o web site: Ajuda de seleção Cabos e Conectores encaixáveis 	https://support.industry.siemens.com/cs/ww/de/view/109766358
<ul style="list-style-type: none"> • para o web site: Ajuda de seleção TIA Selection Tool 	https://www.siemens.com/tstcloud
<ul style="list-style-type: none"> • para o web site: Comunicação Industrial 	https://www.siemens.com/simatic-net
<ul style="list-style-type: none"> • para o web site: SiePortal 	https://sieportal.siemens.com
<ul style="list-style-type: none"> • para o web site: Base de dados de imagens 	https://www.automation.siemens.com/bilddb
<ul style="list-style-type: none"> • para o web site: Gestor de download CAX 	https://www.siemens.com/cax
<ul style="list-style-type: none"> • para o web site: Industry Online Support 	https://support.industry.siemens.com

indicações de segurança

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 www.siemens.com/cybersecurity-industry. 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 CybersecurityRSS Feed" em https://www.siemens.com/cert. (V4.7)</p>
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Homologações / certificados

General Product Approval					Test Certificates
Declaration of Conformity			China RoHS	Miscellaneous	Special Test Certificate
Maritime application	other	Environment	Industrial Communication		




[Miscellaneous](#)



[PROFINET](#)

última alteração:

24/11/2025 

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://l.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
- 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 (AWG24) e 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 ... 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	Si
• com capacidade PoE+	Si
• com capacidade PoE++	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	Cat6A

mais informações / links da internet

link da Internet	
• para o web site: Ajuda de seleção Cabos e Conectores encaixáveis	https://support.industry.siemens.com/cs/ww/de/view/109766358
• para o web site: Ajuda de seleção TIA Selection Tool	https://www.siemens.com/tstcloud
• para o web site: Comunicação industrial	https://www.siemens.com/simatic-net
• para o web site: SiePortal	https://sieportal.siemens.com
• para o web site: Base de dados de imagens	https://www.automation.siemens.com/bilddb
• para o web site: Gestor de download CAX	https://www.siemens.com/cax
• para o web site: Industry Online Support	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 . 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 https://www.siemens.com/cert . (V4.7)
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Homologações / certificados

General Product Approval	Test Certificates
--------------------------	-------------------



[China RoHS](#)



[Miscellaneous](#)

[Special Test Certificate](#)

Maritime application Industrial Communication



[PROFINET](#)

última alteração:

29/11/2025

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://l.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 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
- 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

• com capacidade PoE+	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
padrão para cabeamento estruturado	Cat6

mais informações / links da internet

link da Internet	
• para o web site: Ajuda de seleção Cabos e Conectores encaixáveis	https://support.industry.siemens.com/cs/ww/de/view/109766358
• para o web site: Ajuda de seleção TIA Selection Tool	https://www.siemens.com/tstcloud
• para o web site: Comunicação industrial	https://www.siemens.com/simatic-net
• para o web site: SiePortal	https://sieportal.siemens.com
• para o web site: Base de dados de imagens	https://www.automation.siemens.com/bilddb
• para o web site: Gestor de download CAx	https://www.siemens.com/cax
• para o web site: Industry Online Support	https://support.industry.siemens.com

indicações de segurança

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 www.siemens.com/cybersecurity-industry. 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 inscreva o "Siemens Industrial CybersecurityRSS Feed" em https://www.siemens.com/cert. (V4.7)</p>
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Homologações / certificados

General Product Approval

Declaration of Conformity			China RoHS		Miscellaneous
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Test Certificates	Maritime application	other	Industrial Communication
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Special Test Certificate				Miscellaneous	PROFINET
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última alteração: 24/11/2025 

BALANÇO PATRIMONIAL

Código	Classificação	Descrição	Saldo Atual
1	1	ATIVO	43.852.510,30D
2	1.1	ATIVO CIRCULANTE	39.118.132,73D
3	1.1.1	DISPONÍVEL	1.351.190,89D
12	1.1.2	CLIENTES	31.083.045,27D
18	1.1.3	OUTROS CRÉDITOS	2.178.958,42D
53	1.1.5	ESTOQUE	4.504.938,15D
501	1.2	ATIVO NÃO-CIRCULANTE	4.734.377,57D
88	1.2.2	AQUISIÇÃO DE BENS ATRAVÉS DE CONSÓRCIO	137.362,85D
111	1.2.3	IMOBILIZADO	4.596.000,82D
502	1.2.4	INTANGÍVEL	1.013,90D
149	2	PASSIVO	43.852.510,30C
150	2.1	PASSIVO CIRCULANTE	40.111.453,98C
382	2.1.1	RECURSOS DE TERCEIROS	27.399.022,42C
164	2.1.3	FORNECEDORES	11.502.136,83C
169	2.1.4	OBRIGAÇÕES TRIBUTÁRIAS	586.010,78C
185	2.1.5	OBRIGAÇÕES TRABALHISTA E PREVIDENCIÁRIA	624.283,95C
503	2.2	PASSIVO NÃO-CIRCULANTE	402.410,33C
217	2.2.1	PASSIVO EXIGÍVEL A LONGO PRAZO	402.410,33C
242	2.3	PATRIMÔNIO LÍQUIDO	3.338.645,99C
243	2.3.1	CAPITAL SOCIAL	100.000,00C
264	2.3.5	LUCROS OU PREJUÍZOS ACUMULADOS	3.238.645,99C
1311	6	CONTAS DE COMPENSAÇÃO	0,00
1312	6.1	CONTAS DE COMPENSAÇÃO	0,00



ANDRE ROBERTO MESSIAS
CRC - SP Nº. 1SP220530/O-3
CPF: 214.399.148-77

WALTER ANTONIO BRED A FRANÇO SO
ADMINISTRADOR
CPF:062.905.578-58



REPÚBLICA FEDERATIVA DO BRASIL
CADASTRO NACIONAL DA PESSOA JURÍDICA

NÚMERO DE INSCRIÇÃO 12.965.396/0002-71 FILIAL	COMPROVANTE DE INSCRIÇÃO E DE SITUAÇÃO CADASTRAL	DATA DE ABERTURA 03/06/2020
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NOME EMPRESARIAL ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA
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TÍTULO DO ESTABELECIMENTO (NOME DE FANTASIA) *****	PORTE DEMAIS
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CÓDIGO E DESCRIÇÃO DA ATIVIDADE ECONÔMICA PRINCIPAL 46.73-7-00 - Comércio atacadista de material elétrico

CÓDIGO E DESCRIÇÃO DAS ATIVIDADES ECONÔMICAS SECUNDÁRIAS 25.39-0-02 - Serviços de tratamento e revestimento em metais 25.99-3-02 - Serviço de corte e dobra de metais 27.31-7-00 - Fabricação de aparelhos e equipamentos para distribuição e controle de energia elétrica 33.12-1-02 - Manutenção e reparação de aparelhos e instrumentos de medida, teste e controle 33.13-9-01 - Manutenção e reparação de geradores, transformadores e motores elétricos 33.21-0-00 - Instalação de máquinas e equipamentos industriais 43.21-5-00 - Instalação e manutenção elétrica 43.22-3-01 - Instalações hidráulicas, sanitárias e de gás 46.37-1-02 - Comércio atacadista de açúcar 46.42-7-02 - Comércio atacadista de roupas e acessórios para uso profissional e de segurança do trabalho 46.51-6-01 - Comércio atacadista de equipamentos de informática 46.52-4-00 - Comércio atacadista de componentes eletrônicos e equipamentos de telefonia e comunicação 46.63-0-00 - Comércio atacadista de Máquinas e equipamentos para uso industrial; partes e peças 46.72-9-00 - Comércio atacadista de ferragens e ferramentas 46.79-6-99 - Comércio atacadista de materiais de construção em geral 47.42-3-00 - Comércio varejista de material elétrico 47.44-0-01 - Comércio varejista de ferragens e ferramentas 47.44-0-03 - Comércio varejista de materiais hidráulicos 47.44-0-99 - Comércio varejista de materiais de construção em geral 47.51-2-01 - Comércio varejista especializado de equipamentos e suprimentos de informática
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CÓDIGO E DESCRIÇÃO DA NATUREZA JURÍDICA 206-2 - Sociedade Empresária Limitada

LOGRADOURO R ZILDA RODRIGUES DE SOUZA OLIVEIRA	NÚMERO 493	COMPLEMENTO GALPA002
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CEP 29.164-009	BAIRRO/DISTRITO JARDIM LIMOEIRO	MUNICÍPIO SERRA	UF ES
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ENDEREÇO ELETRÔNICO MARCELA@ALUCEL.NET	TELEFONE (27) 3329-0233
--	-----------------------------------

ENTE FEDERATIVO RESPONSÁVEL (EFR) *****
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SITUAÇÃO CADASTRAL ATIVA	DATA DA SITUAÇÃO CADASTRAL 03/06/2020
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MOTIVO DE SITUAÇÃO CADASTRAL

SITUAÇÃO ESPECIAL *****	DATA DA SITUAÇÃO ESPECIAL *****
----------------------------	------------------------------------

Aprovado pela Instrução Normativa RFB nº 2.119, de 06 de dezembro de 2022.

Emitido no dia **01/08/2025** às **13:04:19** (data e hora de Brasília).

Página: **1/2**



REPÚBLICA FEDERATIVA DO BRASIL

CADASTRO NACIONAL DA PESSOA JURÍDICA

NÚMERO DE INSCRIÇÃO 12.965.396/0002-71 FILIAL	COMPROVANTE DE INSCRIÇÃO E DE SITUAÇÃO CADASTRAL	DATA DE ABERTURA 03/06/2020
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NOME EMPRESARIAL ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA
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CÓDIGO E DESCRIÇÃO DAS ATIVIDADES ECONÔMICAS SECUNDÁRIAS 47.53-9-00 - Comércio varejista especializado de eletrodomésticos e equipamentos de áudio e vídeo 47.89-0-99 - Comércio varejista de outros produtos não especificados anteriormente 49.30-2-02 - Transporte rodoviário de carga, exceto produtos perigosos e mudanças, intermunicipal, interestadual e internacional 62.02-3-00 - Desenvolvimento e licenciamento de programas de computador customizáveis 62.03-1-00 - Desenvolvimento e licenciamento de programas de computador não-customizáveis 82.19-9-99 - Preparação de documentos e serviços especializados de apoio administrativo não especificados anteriormente 85.99-6-04 - Treinamento em desenvolvimento profissional e gerencial 95.11-8-00 - Reparação e manutenção de computadores e de equipamentos periféricos 95.12-6-00 - Reparação e manutenção de equipamentos de comunicação
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CÓDIGO E DESCRIÇÃO DA NATUREZA JURÍDICA 206-2 - Sociedade Empresária Limitada

LOGRADOURO R ZILDA RODRIGUES DE SOUZA OLIVEIRA	NÚMERO 493	COMPLEMENTO GALPAO02
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CEP 29.164-009	BAIRRO/DISTRITO JARDIM LIMOEIRO	MUNICÍPIO SERRA	UF ES
--------------------------	---	---------------------------	-----------------

ENDEREÇO ELETRÔNICO MARCELA@ALUCEL.NET	TELEFONE (27) 3329-0233
--	-----------------------------------

ENTE FEDERATIVO RESPONSÁVEL (EFR) *****
--

SITUAÇÃO CADASTRAL ATIVA	DATA DA SITUAÇÃO CADASTRAL 03/06/2020
------------------------------------	---

MOTIVO DE SITUAÇÃO CADASTRAL

SITUAÇÃO ESPECIAL *****	DATA DA SITUAÇÃO ESPECIAL *****
----------------------------	------------------------------------

Aprovado pela Instrução Normativa RFB nº 2.119, de 06 de dezembro de 2022.

Emitido no dia **01/08/2025** às **13:04:19** (data e hora de Brasília).

Página: **2/2**

CERTIDÃO SIMPLIFICADA

Sistema Nacional de Registro de Empresas Mercantis - SINREM

Certificamos que as informações abaixo constam dos documentos arquivados nesta Junta Comercial e são vigentes na data da sua expedição.

Nome Empresarial: ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA NIRE (filial): 32900793861 Natureza Jurídica: Sociedade Empresária Limitada		Protocolo: ESC2500502971
Filial(ais) nesta Unidade da Federação		
1- NIRE: 32900793861 Endereço Completo RUA ZILDA RODRIGUES DE SOUZA OLIVEIRA, Nº 493, GALPAO 02; , JARDIM LIMOEIRO, Serra, ES, CEP:29164009		CNPJ: 12.965.396/0002-71
2- NIRE: 32900761314 Endereço Completo AVENIDA BRASIL, Nº 2078, GALPAO C;BOX 28; , SAO DIOGO II, Serra, ES, CEP:29163165		CNPJ: 12.965.396/0003-52
Último Arquivamento		Situação ATIVA
Data 26/07/2022	Número 20250665638	Status SEM STATUS
Ato/eventos 310 / 030 - ALTERACAO DE FILIAL COM SEDE EM OUTRA UF		

Esta certidão foi emitida automaticamente em 11/08/2025, às 13:42:55 (horário de Brasília).
Se impressa, verificar sua autenticidade no <https://www.simplifica.es.gov.br>, com o código **GP1MUS13**.

Paulo Cezar Juffo
Secretário-Geral





ESTADO DO ESPÍRITO SANTO
SECRETARIA DE ESTADO DA FAZENDA

Certidão Negativa de Débitos para com a Fazenda Pública Estadual - MOD. 2

Certidão N° 20250001544780

Identificação do Requerente: CNPJ N° 12.965.396/0002-71

Certificamos que, até a presente data, não existe débito contra o portador do Cadastro de Pessoa Jurídica acima especificado, ficando ressalvada à Fazenda Pública Estadual o direito de cobrar quaisquer dívidas que venham a ser apuradas.

Certidão emitida via Sistema Eletrônico de Processamento de Dados, nos termos do Regulamento do ICMS/ES, aprovado pelo Decreto n° 1.090-R, de 25 de outubro de 2002.

Certidão emitida em **20/10/2025**, válida até **18/01/2026**.

A autenticidade deste documento poderá ser confirmada via internet por meio do endereço **www.sefaz.es.gov.br** ou em qualquer Agência da Receita Estadual.

Vitória, 20/10/2025.

Autenticação eletrônica: **001D.283D.48C0.E03F**





PODER JUDICIÁRIO
 TRIBUNAL DE JUSTIÇA DO ESTADO DO ESPÍRITO SANTO
 R. Des. Homero Mafra, 60 Enseada do Suá, Vitória - ES | CEP: 29.050-275 | Tel: (27) 3334-2000.

CERTIDÃO NEGATIVA DE PRIMEIRA INSTÂNCIA NATUREZA DE RECUPERAÇÃO JUDICIAL E EXTRAJUDICIAL (FALÊNCIA E CONCORDATA)

Dados da Certidão

Razão Social: ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA

CNPJ: 12.965.396/0002-71

Data de Expedição: 03/12/2025 14:41:51

Validade: 30 DIAS

Nº da Certidão: * 2025399823 *

-- ENDEREÇO --

Município: - NÃO INFORMADO -

Bairro: - NÃO INFORMADO -

Logradouro: - NÃO INFORMADO -

Número: - NÃO INFORMADO -

Complemento: - NÃO INFORMADO -

CEP: - NÃO INFORMADO -

-- CONTATO --

Email: - NÃO INFORMADO -

Telefone Fixo: - NÃO INFORMADO -

Telefone Celular: - NÃO INFORMADO -

CERTIFICA que, consultando a base de dados do Sistema de Gerenciamento de Processos do Poder Judiciário do Estado do Espírito Santo (E-Jud, SIEP, PROJUDI e PJe) até a presente data e hora, **NADA CONSTA** contra o solicitante .

Observações

- a. Certidão expedida gratuitamente através da Internet;
- b. Os dados do(a) solicitante acima informados são de sua responsabilidade, devendo a titularidade ser conferida pelo interessado e/ou destinatário;
- c. O prazo de validade desta certidão é de 30 (trinta) dias, contados da data da expedição, conforme disposto no art. 467 do Código de Normas da Corregedoria Geral da Justiça. Após essa data será necessária a emissão de uma nova certidão;
- d. A autenticidade desta certidão poderá ser confirmada na página do Tribunal de Justiça do Estado do Espírito Santo - www.tjes.jus.br -, utilizando o número da certidão acima identificado;
- e. Em relação as comarcas da entrância especial (Vitória/Vila Velha/Cariacica/Serra/Viana), as ações de: execução fiscal estadual, falência e recuperação judicial, e auditoria militar, tramitam, apenas, no juízo de Vitória;
- f. As ações de natureza cível abrangem inclusive aquelas que tramitam nas varas de Órfãos e Sucessões (Tutela, Curatela, Interdição,...), Juizado Especial Cível, Juizado Especial da Fazenda Pública, Execução Fiscal e Execução Patrimonial (observado o item e);
- g. As ações de natureza criminal abrangem, dentre outras: as de auditoria militar e de juizados especiais criminais;
- h. As matérias atinentes as varas de família e infância e juventude são objeto de certidão específica;
- i. A base de dados do sistema de gerenciamento processual (1ª INSTÂNCIA: eJUD, SIEP, PROJUDI, PJe-1G; 2ª INSTÂNCIA: Sistema de Segunda Instância, PJe-2G) contém o registro de todos os processos distribuídos no Judiciário do Estado do Espírito Santo, com exceção do SEEU;
- j. A certidão negativa referente ao Sistema Eletrônico de Execução Unificado – SEEU deverá ser requerida ao Cartório do Ofício de Distribuidor da Comarca, conforme Ato Normativo Conjunto nº. 009/2021.



MINISTÉRIO DA FAZENDA
Secretaria da Receita Federal do Brasil
Procuradoria-Geral da Fazenda Nacional

**CERTIDÃO NEGATIVA DE DÉBITOS RELATIVOS AOS TRIBUTOS FEDERAIS E À DÍVIDA
ATIVA DA UNIÃO**

Nome: ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA
CNPJ: 12.965.396/0001-90

Ressalvado o direito de a Fazenda Nacional cobrar e inscrever quaisquer dívidas de responsabilidade do sujeito passivo acima identificado que vierem a ser apuradas, é certificado que não constam pendências em seu nome, relativas a créditos tributários administrados pela Secretaria da Receita Federal do Brasil (RFB) e a inscrições em Dívida Ativa da União (DAU) junto à Procuradoria-Geral da Fazenda Nacional (PGFN).

Esta certidão é válida para o estabelecimento matriz e suas filiais e, no caso de ente federativo, para todos os órgãos e fundos públicos da administração direta a ele vinculados. Refere-se à situação do sujeito passivo no âmbito da RFB e da PGFN e abrange inclusive as contribuições sociais previstas nas alíneas 'a' a 'd' do parágrafo único do art. 11 da Lei nº 8.212, de 24 de julho de 1991.

A aceitação desta certidão está condicionada à verificação de sua autenticidade na Internet, nos endereços <<http://rfb.gov.br>> ou <<http://www.pgfn.gov.br>>.

Certidão emitida gratuitamente com base na Portaria Conjunta RFB/PGFN nº 1.751, de 2/10/2014.

Emitida às 10:54:13 do dia 29/08/2025 <hora e data de Brasília>.

Válida até 25/02/2026.

Código de controle da certidão: **9890.7AEE.A15D.4237**

Qualquer rasura ou emenda invalidará este documento.

[Voltar](#)[Imprimir](#)

Certificado de Regularidade do FGTS - CRF

Inscrição: 12.965.396/0002-71
Razão Social: ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA
Endereço: R ZILDA RODRIGUES DE SOUZA OLIVEIRA 493 GALPAO02 / JARDIM LIMOEIRO / SERRA / ES / 29164-009

A Caixa Econômica Federal, no uso da atribuição que lhe confere o Art. 7, da Lei 8.036, de 11 de maio de 1990, certifica que, nesta data, a empresa acima identificada encontra-se em situação regular perante o Fundo de Garantia do Tempo de Serviço - FGTS.

O presente Certificado não servirá de prova contra cobrança de quaisquer débitos referentes a contribuições e/ou encargos devidos, decorrentes das obrigações com o FGTS.

Validade: 13/11/2025 a 12/12/2025

Certificação Número: 2025111302251792387678

Informação obtida em 01/12/2025 15:19:34

A utilização deste Certificado para os fins previstos em Lei esta condicionada a verificação de autenticidade no site da Caixa:
www.caixa.gov.br



PREFEITURA MUNICIPAL DA SERRA

RUA MAESTRO ANTONIO CICERO, N° 111 - CEP 29176-439 - CACAROCA - FONE

Secretaria Municipal da Fazenda

CERTIDÃO POSITIVA COM EFEITO NEGATIVA

de Débitos Tributários e de Dívida Ativa Municipal

N° 12109180/2025

Ressalvado o direito de a Fazenda Municipal cobrar e inscrever quaisquer débitos de responsabilidade do sujeito passivo acima identificado que vierem a ser conhecidos e apurados após a expedição dessa certidão, é certificado que constam em seu nome, nesta data, débitos de exigibilidade suspensa nos termos do art. 151 da Lei 5.172, de 25 de outubro de 1996, Código Tributário Nacional (CTN) e do art. 178 da Lei 3833, de 29 de dezembro de 2011, Código Tributário Municipal (CTM).

Conforme disposto nos artigos 205 e 206 do CTN, este documento tem os mesmos direitos da Certidão Negativa.

CRC 8460560 Crc Original: 8460560 Situação: Ativo
Razão Social/Nome ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA
CNPJ / CPF 12.965.396/0002-71
Inscrição Estadual/RG
Endereço 29164-009 - RUA ZILDA RODRIGUES DE SOUZA OLIVEIRA, 493
Bairro GALPAO 02;
JARDIM LIMOEIRO Cidade SERRA Estado ES

Serra, 01 de Dezembro de 2025

Esta Certidão é valida até:01/01/2026

Data Geração: 01/12/2025

Data Emissão: 01/12/2025

A veracidade da informação poderá ser verificada na seguinte página da Internet: <http://www.serra.es.gov.br/>

Identificação 12109180

Número da Certidão: 12109180/2025

Controle: 8460560

ATENÇÃO: Qualquer rasura ou emenda **INVALIDARÁ** este documento.



PODER JUDICIÁRIO
JUSTIÇA DO TRABALHO

CERTIDÃO NEGATIVA DE DÉBITOS TRABALHISTAS

Nome: ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA (MATRIZ E FILIAIS)

CNPJ: 12.965.396/0002-71

Certidão n°: 73353738/2025

Expedição: 01/12/2025, às 15:03:01

Validade: 30/05/2026 - 180 (cento e oitenta) dias, contados da data de sua expedição.

Certifica-se que **ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA (MATRIZ E FILIAIS)**, inscrito(a) no CNPJ sob o n° **12.965.396/0002-71**, **NÃO CONSTA** como inadimplente no Banco Nacional de Devedores Trabalhistas.

Certidão emitida com base nos arts. 642-A e 883-A da Consolidação das Leis do Trabalho, acrescentados pelas Leis ns.º 12.440/2011 e 13.467/2017, e no Ato 01/2022 da CGJT, de 21 de janeiro de 2022. Os dados constantes desta Certidão são de responsabilidade dos Tribunais do Trabalho.

No caso de pessoa jurídica, a Certidão atesta a empresa em relação a todos os seus estabelecimentos, agências ou filiais.

A aceitação desta certidão condiciona-se à verificação de sua autenticidade no portal do Tribunal Superior do Trabalho na Internet (<http://www.tst.jus.br>).

Certidão emitida gratuitamente.

INFORMAÇÃO IMPORTANTE

Do Banco Nacional de Devedores Trabalhistas constam os dados necessários à identificação das pessoas naturais e jurídicas inadimplentes perante a Justiça do Trabalho quanto às obrigações estabelecidas em sentença condenatória transitada em julgado ou em acordos judiciais trabalhistas, inclusive no concernente aos recolhimentos previdenciários, a honorários, a custas, a emolumentos ou a recolhimentos determinados em lei; ou decorrentes de execução de acordos firmados perante o Ministério Público do Trabalho, Comissão de Conciliação Prévia ou demais títulos que, por disposição legal, contiver força executiva.



DEFERIDO

JUNTA COMERCIAL ER LIMEIRA
 22 NOV. 2010
 Raquel Portes
 RG: 17.291.198 / ASSESSORA TÉCNICA

PROT. JUNTA COMERCIAL ER LIMEIRA
 0102 v. 8
 4 2010

JUNTA COMERCIAL DO ESTADO DE SÃO PAULO
 Rua Barra Funda, 930 - CEP 01152-000

JUNTA COMERCIAL
 PIRACICABA
 18 NOV 2010
 PROTOCOLO

CONVÊNIO PIRACICABA

N.I.R.E.
 SINGULAR
 MATRIZ
 FILIAL
 Exigência

Convênio Piracicaba
 Edileia S. Davanzo
 Resp. Visto Prévio

35224876944



CNPJ DA SEDE
 00.000.000/0000-00

CADASTRO
 ER - LIMEIRA

DADOS CADASTRAIS

ATO(S) Constituição Normal;			
NOME EMPRESARIAL COMERCIAL ELETRICA ALUCEL LTDA			
LOGRADOURO AVENIDA SAO PAULO			NÚMERO 945
COMPLEMENTO SALA 01	BAIRRO/DISTRITO PAULICEIA	CEP 13401-541	CÓDIGO DO MUNICÍPIO 5301
MUNICÍPIO Piracicaba			UF SP
CORREIO ELETRÔNICO venelcontabilidade@hotmail.com			TELEFONE 34355281
NOME DO ADVOGADO		N. OAB	U.F.
VALORES RECOLHIDOS	IDENTIFICAÇÃO DO REPRESENTANTE DA EMPRESA		
GARE 54,00	NOME: ENEDIR DE ARAUJO CINTRA (Administrador)		
DARF 21,00	ASSINATURA: <i>Enedir de Araujo Cintra</i>		DATA ASSINATURA: 01/11/2010

DECLARO, SOB AS PENAS DA LEI, QUE AS INFORMAÇÕES CONSTANTES DO REQUERIMENTO/PROCESSO SÃO EXPRESSÃO DA VERDADE.

Controle Internet
 006933185-5

CONVÊNIO PIRACICABA

JUNTA COMERCIAL ER LINEIRA
22 NOV. 2010
Raquel Portes
RG:17.291.199 / ASSESSORA TÉCNICA

CONTRATO DE CONSTITUIÇÃO

DE

"COMERCIAL ELETRICA ALUCEL LTDA"

N.I.R.E.

SINGULAR

MATRIZ

FILIAL

1. **ENEDIR DE ARAUJO CINTRA**, brasileiro, natural de **PIRACICABA/SP**, casado em regime de comunhão parcial de bens, nascido em **28/08/1968**, empresário, portador da cédula de identidade RG nº. **17.668.768-3**, expedida pela **SSP/SP** e do CPF nº. **115.289.568-00**, residente e domiciliado nesta cidade **PIRACICABA/SP**, na rua **CORONEL BARBOSA, 333** apartamento 93, bairro **SÃO JUDAS TADEU**, cep 13.416-381, e

2. **WALTER ANTONIO BREDÁ FRANÇOZO**, brasileiro, natural de **PIRACICABA/SP**, casado em regime de comunhão parcial de bens, nascido em **22/06/1964**, empresário, portador da cédula de identidade RG nº. **13.753.643-4**, expedida pela **SSP/SP**, e do CPF nº. **062.905.578-58**, residente e domiciliado nesta cidade de **PIRACICABA/SP**, na rua **CHIQUINHA GONZAGA, 140**, bairro **PARQUE SANTA CECILIA**, cep 13.420-128 resolvem de comum acordo, (art. 997, I, CC/2002), constituir uma **SOCIEDADE LIMITADA**, mediante as seguintes cláusulas:

1ª A sociedade girará sob o nome empresarial: **COMERCIAL ELÉTRICA ALUCEL LTDA**, e terá sede e domicílio na **AVENIDA SÃO PAULO, 945, SALA 01** bairro **PAULICEIA** em **PIRACICABA/SP** e cep 13.401-541 (art. 997, II, CC/2002)

2ª O capital social será de **R\$100.000,00** (cem mil reais) dividido em **100.000** quotas de valor nominal de **R\$1,00** (um real), integralizadas, pelos sócios neste ato em moeda corrente do País. (art. 997, III, CC/2002) (art. 1.055, CC/2002):

Sócio Quotista	%	Quotas	Valor em R\$
ENEDIR DE ARAUJO CINTRA	50	50.000	50.000,00
VALTER ANTONIO BREDÁ FRANÇOZO	50	50.000	50.000,00
TOTAL	100	100.000	100.000,00

PROCESSO Nº 24876944

NOV 23 2010

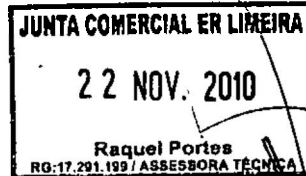
SECRETARIA DA FAZENDA
JUNTA COMERCIAL DO ESTADO DE SÃO PAULO
CERTIDÃO - Certificado que este documento foi registrado
sob número e data estampados mecanicamente.



ER. LUIZEA

SECRETARIA DA FAZENDA DE SÃO PAULO - SECRETÁRIO GERAL

SEM
TAVAN
DE
CERTIDÃO



3ª A sociedade terá por objeto e exploração do ramo de **“COMÉRCIO VAREJISTA DE MATERIAL ELETRICO, EQUIPAMENTOS DE TELEFONIA E COMUNICAÇÃO, ELETRODOMESTICOS E EQUIPAMENTOS DE AUDIO E VIDEO, VENDAS DE MATERIAIS DE SEGURANÇA E PROTEÇÃO INDIVIDUAL NO TRABALHO (EPI), E, SERVIÇOS NA AREA DE AUTOMAÇÃO INDUSTRIAL E MONTAGENS DE PAINÉIS INDUSTRIAIS”**.

4ª A sociedade iniciará suas atividades em 01/11/2010 e seu prazo de duração é indeterminado. (art. 997, II, CC/2002)

5ª As quotas são indivisíveis e não poderão ser cedidas ou transferidas a terceiros sem o consentimento do outro sócio, a quem fica assegurado, em igualdade de condições e preço direito de preferência para a sua aquisição se postas à venda, formalizando, se realizada a cessão delas, a alteração contratual pertinente. (art. 1.056, art. 1.057, CC/2002)

6ª A responsabilidade de cada sócio é restrita ao valor de suas quotas, mas todos respondem solidariamente pela integralização do capital social. (art. 1.052, CC/2002)

7ª A administração da sociedade caberá aos sócios: **ENEDIR DE ARAUJO CINTRA** e **WALTER ANTONIO BREDIA FRANÇO SO**, com os poderes e atribuições de direito de uso da gerência exercendo a administração dos negócios podendo praticar todos os atos e operações referentes aos objetivos sociais, podendo assinar conjunta ou isoladamente, conforme as conveniências autorizado o uso do nome empresarial, vedado, no entanto, em atividades estranhas ao interesse social ou assumir obrigações seja em favor de qualquer dos quotistas ou de terceiros, bem como onerar ou alienar bens imóveis da sociedade, sem autorização do outro sócio. (artigos 997, VI; 1.013. 1.015, 1064, CC/2002)

8ª Ao término de cada exercício social, em 31 de dezembro, o administrador prestará contas justificadas de sua administração, procedendo à elaboração do inventário, do balanço patrimonial e do balanço de resultado econômico, cabendo aos sócios, na proporção de suas quotas, os lucros ou perdas apurados. (art. 1.065, CC/2002)

9ª Nos quatro meses seguintes ao término do exercício social, os sócios deliberarão sobre as contas e designarão administrador (es) quando for o caso. (arts. 1.071 e 1.072, § 2º e art. 1.078, CC/2002)

10ª A sociedade poderá a qualquer tempo, abrir ou fechar filial ou outra dependência, mediante alteração contratual assinada por todos os sócios.

NOV 23 2010

PROCESO Nº 24876944

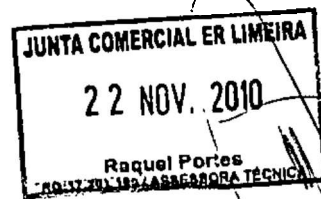
SECRETARIA DA FAZENDA
COMISSÃO COMERCIAL DO ESTADO DE SÃO PAULO
CERTIDÃO - Certificado que este documento foi registrado
sob número e data estampados mecanicamente.



PA. LIBRESA

ATA REGISTRO DE PROPOSTAS - SECRETÁRIO GERAL

SEMESTRAL TAVAN S
DE CERTIDÃO



11ª Os sócios poderão, de comum acordo, fixar uma retirada mensal, a título de "pro labore", observadas as disposições regulamentares pertinentes.

12ª Falecendo ou interditado qualquer sócio, a sociedade continuará suas atividades com os herdeiros, sucessores e o incapaz. Não sendo possível ou inexistindo interesse destes ou do(s) sócio(s) remanescente(s), o valor de seus haveres será apurado e liquidado com base na situação patrimonial da sociedade, à data da resolução, verificada em balanço especialmente levantado.

Parágrafo único - O mesmo procedimento será adotado em outros casos em que a sociedade se resolva em relação a seu sócio. (art. 1.028 e art. 1.031, CC/2002)


13ª Os administradores declaram, sob as penas da lei, de que não estão impedidos de exercer a administração da sociedade, por lei especial, ou em virtude de condenação criminal, ou por se encontrar (em) sob os efeitos dela, a pena que vede, ainda que temporariamente, o acesso a cargos públicos; ou por crime falimentar, de prevaricação, peita ou suborno, concussão, peculato, ou contra a economia popular, contra o sistema financeiro nacional, contra normas de defesa da concorrência, contra as relações de consumo, fé pública, ou a propriedade. (art. 1.011, § 1º, CC/2002)

14ª Fica eleito o foro de Piracicaba/SP para o exercício e o cumprimento dos direitos e obrigações resultantes deste contrato.

E por estarem assim justos e contratados assinam o presente instrumento em 03 vias.

Piracicaba/SP, 01 de novembro de 2010

aa) 
WALTER ANTONIO BREDA FRANÇOSO

aa) 
ENEDIR DE ARAUJO CINTRA

NOV 23 2010

NUCESP Nº 2 24876944

SECRETARIA DA FAZENDA
JUNTA COMERCIAL DO ESTADO DE SÃO PAULO
CERTIDÃO - Certidão que este documento foi registrado
sob número e data estampados mecanicamente.



EL. LUZERA

SECRETARIA DE ECONOMIA E FINANÇAS - SECRETÁRIO GERAL

SEMESTRAL

DE CERTIDÃO



JUNTA COMERCIAL DO ESTADO DE SÃO PAULO
 Rua Barra Funda, 930 - CEP 01152-000

JUNTA COMERCIAL
 PIRACICABA
 - 8 NOV 2010
 PROTOCOLO

CONVÊNIO PIRACICABA

EXIGÊNCIA

N.I.R.E.
 SINGULAR
 MATRIZ
 FILIAL

Convênio Piracicaba
 Edneia S. Davanzo
 Resp. Visto Previo

JUNTA COMERCIAL ER LIMEIRA
 16 NOV. 2010
 Raquel Portes
 RG:17.291.199 / ASSESSORA TÉCNICA

JUNTA C
 PIRAC
 - 8 NOV
 PROT

DADOS-CADASTRAIS

SEM EXIGÊNCIA ANTERIOR		NIRE DA SEDE	CNPJ DA SEDE 00.000.000/0000-00
ATO(S) Constituição Normal;			
NOME EMPRESARIAL COMERCIAL ELETRICA ALUCEL LTDA			
LOGRADOURO AVENIDA SAO PAULO		NÚMERO 945	
COMPLEMENTO	BAIRRO/DISTRITO PAULICEIA	CEP 13401-541	CÓDIGO DO MUNICÍPIO 5301
MUNICÍPIO Piracicaba		UF SP	
CORREIO ELETRÔNICO venelcontabilidade@hotmail.com		TELEFONE 34343509	
NOME DO ADVOGADO		N. OAB	U.F.
VALORES RECOLHIDOS	IDENTIFICAÇÃO DO REPRESENTANTE DA EMPRESA		
GARE 54,00 DARF 21,00	NOME: ENEDIR DE ARAUJO CINTRA (Administrador) ASSINATURA: <i>Enedir de Araujo Cintra</i> DATA ASSINATURA: 01/11/2010		

DECLARO, SOB AS PENAS DA LEI, QUE AS INFORMAÇÕES CONSTANTES DO REQUERIMENTO/PROCESSO SÃO EXPRESSÃO DA VERDADE.

Controle Internet
 006861194-3

Edneia S. Davanzo

JUNTA COMERCIAL DO ESTADO DE SÃO PAULO

Nº Protocolo: _____

CUMPRIR A(S) SEGUINTE(S) EXIGÊNCIA(S) no prazo de 30 DIAS contados da data da ciência do despacho ou da sua publicação, SOB PENA DE SER CONSIDERADO NOVO PROCESSO E DE PAGAMENTO DO PREÇO RESPECTIVO NOVAMENTE (ART.57§ 3º Dec. 1.800/96)

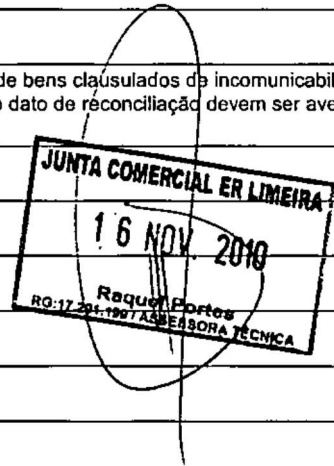
- | | |
|--|--------------------------|
| A assinatura da identidade difere da assinatura do requerimento (art 1.153, cc/2002) | <input type="checkbox"/> |
| A ata de assembléia deve mencionar o nome empresarial, o local, dia, mês e ano de sua realização, o nome do presidente e do secretário dos trabalhos e o "quorum" de deliberação (art. 1.074, CC/2002) | <input type="checkbox"/> |
| A atividade indicada não é empresária (arts. 982 e 1.150, CC/2002) | <input type="checkbox"/> |
| A data de início de atividade não pode ser anterior a data da lavratura do requerimento (art 997, cc/2002) | <input type="checkbox"/> |
| A soma da participação dos sócios não totaliza o capital social | <input type="checkbox"/> |
| Acrescentar ao nome empresarial a expressão EPP ou Empresa de Pequeno Porte (art.7º,Lei nº 9.841/99) | <input type="checkbox"/> |
| Acrescentar ao nome empresarial a expressão ME ou Microempresa (art.7º,Lei nº 9.841/99) | <input type="checkbox"/> |
| Anexar (nova) BUSCA de nome Empresarial (Deliberação Jucesp Nº05/86) | <input type="checkbox"/> |
| Anexar a revogação da determinação judicial e do impedimento de arquivamento de ato ou de registro de indisponibilidade de bens | <input type="checkbox"/> |
| Anexar aprovação prévia do órgão governamental competente (art. 53,IX, DEC.1.800/96) | <input type="checkbox"/> |
| Anexar autorização do Juiz para o inventariante assinar alterações em nome do espólio (art.991 Código Processo Civil) | <input type="checkbox"/> |
| Anexar Certidão de Quitação de Tributos e Contribuições Federais para com a Fazenda Nacional , emitida pela Receita Federal(IN nº 89/01) | <input type="checkbox"/> |
| Anexar Certidão Negativa de Débito - CND, fornecida pelo Instituto Nacional de Seguro Social - INSS (IN nº 89/01) | <input type="checkbox"/> |
| Anexar Certidão negativa de Inscrição na Dívida Ativa da União, expedida pela Procuradoria Geral da Fazenda Nacional (IN nº 89/01) | <input type="checkbox"/> |
| Anexar certidão ou ato de nomeação do inventariante (art.1.797 do cc/2002e art 990 e incisos do Código Processo Civil) | <input type="checkbox"/> |
| Anexar Certidão Simplificada expedida pela Junta Comercial da Sede (IN nº56/96) | <input type="checkbox"/> |
| Anexar Certificado de Regularidade do Fundo de Garantia por Tempo de Serviço (FGTS),fornecido pela Caixa Econômica Federal (IN nº 89/01) | <input type="checkbox"/> |
| Anexar comprovante (DARF) de pagamento complementar do Cadastro Nacional de Empresas Mercantis - CNE (Dec.Lei nº 2.056/83, Lei nº 8.934/94 e IN/DNRC nº 57, de 06/03/96), no valor de R\$ _____ | <input type="checkbox"/> |
| Anexar comprovante (DARF) de pagamento do Cadastro Nacional de Empresas Mercantis - CNE (Dec.Lei nº 2.056/83, Lei nº 8.934/94 e IN/DNRC nº 57, de 06/03/96) | <input type="checkbox"/> |
| Anexar comprovante de pagamento complementar do preço do serviço - Processo terminado após o prazo para cumprimento de exigência é considerado como novo processo e sujeito a pagamento de novo preço (art.57, § 3º ,Dec.1.800/96), no valor de R\$ _____ | <input type="checkbox"/> |
| Anexar comprovante de pagamento complementar do preço devido (art.34, IV, Dec.1.800/96) no valor de R\$ _____ | <input type="checkbox"/> |
| Anexar comprovante de pagamento do preço devido - Processo retomado após o prazo para cumprimento de exigência é considerado como novo processo e sujeito a pagamento de novo preço (art.57, § 3º ,Dec.1.800/96) | <input type="checkbox"/> |
| Anexar comprovante de pagamento do preço do serviço - (art.34, IV,Dec.1.800/96) | <input type="checkbox"/> |
| Anexar cópia autenticada da identidade do titular (art.34,V, Dec.1.800/96) | <input type="checkbox"/> |
| Anexar cópia da identidade do signatário do requerimento de registro | <input type="checkbox"/> |
| Anexar Declaração de Inatividade (ME e EPP), nos termos do decreto nº 3.474/2000 | <input type="checkbox"/> |
| Anexar FCN preenchida (art.34, III, Dec. 1.800/96) ou Cadastro Digital em disquete | <input type="checkbox"/> |
| Anexar formal de partilha (art.32, II, e Lei 8.934/94 e art.47 do Decreto 1.800/96) | <input type="checkbox"/> |

JUNTA COMERCIAL DO ESTADO DE SÃO PAULO

Anexar ou inserir no instrumento declaração, sob as penas da lei, firmada pelo(s) administrador(es) que não está(ão) condenado(s) por nenhum crime, cuja pena vede o exercício da administração empresaria (art. 1.011,1)	<input type="checkbox"/>
Anexar outorga uxória ou autorização marital (art.53, VIII, b, Dec. 1.800/96)	<input type="checkbox"/>
Anexar procuração ,por instrumento público ou particular (com firma reconhecida),com poderes específicos para a prática do ato (art.654, cc/2002)	<input type="checkbox"/>
Anexar procuração específica, outorgada a representante no Brasil, com poderes para receber citação judicial, com assinatura do outorgante reconhecida pelo Consulado brasileiro, no país respectivo, acompanhada da tradução efetuada por tradutor público	<input type="checkbox"/>
Anexar procuração por instrumento público - analfabeto (§ 2º ,art215,cc/2002)	<input type="checkbox"/>
Apor assinatura dos sócios no instrumento ou declaração (art.40, Dec.1.800/96)	<input type="checkbox"/>
Atividade indicada não é empresária (art.966, § único, cc/2002)	<input type="checkbox"/>
Cadastro Digital difere do documento apresentado, regularizar	<input type="checkbox"/>
Colidência de nome empresarial Alterar o nome (art. 1.156 e art 1.163, cc/2002)	<input type="checkbox"/>
Compatibilizar atividades das filiais com as da empresa	<input type="checkbox"/>
Compatibilizar destaque de capital das filiais com o capital da empresa	<input type="checkbox"/>
Complementar a qualificação do titular (art.968,cc/2002)	<input type="checkbox"/>
Comunicação de Microempresa ou Empresa de Pequeno Porte - protocolizar a parte, substituir , assinar(art.32,II,b,Dec.1.800/96)	<input type="checkbox"/>
Convocação da assembleia em desacordo com a lei (art. 1.152, CC/2002)	<input type="checkbox"/>
Datar o instrumento ou declaração (art. 33,Dec.1.800/96)	<input type="checkbox"/>
Declaração de Microempresa ou Empresa de Pequeno Porte - Anexar , substituir ,assinar (art.32,II,b,Dec.1.800/96)	<input type="checkbox"/>
Declaração de Requerimento de Empresário em 4 vias de igual teor	<input type="checkbox"/>
Declarar a data do encerramento do exercício social (art.53, III, e, Dec. 1.800/96)	<input type="checkbox"/>
Declarar a importância repartida entre os sócios (art.53, X, Dec. 1.800/96)	<input type="checkbox"/>
Declarar a participação dos sócios nos lucros e perdas (art.997, VII, CC/2002)	<input type="checkbox"/>
Declarar o foro	<input type="checkbox"/>
Declarar o(s) motivo(s) da dissolução (art.53, X, Dec. 1.800/96)	<input type="checkbox"/>
Declarar, no preâmbulo, que a alteração se deu por deliberação majoritária (art.54, Dec. 1.800/96)	<input type="checkbox"/>
Declarar, no preâmbulo, que o distrato se deu por deliberação majoritária (art.54, Dec. 1.800/96)	<input type="checkbox"/>
Definir o objeto , indicando gênero e espécies das atividades a serem desenvolvidas declaração precisa e detalhada (art.53,III,b,§ 2º, Dec.1.800/96)	<input type="checkbox"/>
Erro na composição do nome empresarial -- Retificar e substituir o instrumento (art.1.156, cc/2002)	<input type="checkbox"/>
Erro no preenchimento de campo(s) do formulário - Retificar e substituir o Requerimento de Empresário (IN nº ___/02)	<input type="checkbox"/>
Estrangeiro, sem visto permanente, não pode ser empresário (art.99, Lei 6.815/80)	<input type="checkbox"/>
Exclusão de sócio - informar justa causa da exclusão (art. 1.085, CC/2002)	<input type="checkbox"/>
Gerência - o uso do nome empresarial é privativo do administrador que tem o necessário poder previsto no contrato ou em ato separado que formalizou a sua designação (art. 1.064, CC/2002)	<input type="checkbox"/>
Identificar as duas testemunhas - Nome, nº de identidade, órgão expedidor e Unidade Federativa (art.40, Dec. 1.800/96)	<input type="checkbox"/>
Incluir, no preâmbulo, resolução de promover o distrato	<input type="checkbox"/>

JUNTA COMERCIAL DO ESTADO DE SÃO PAULO

- Informações do instrumento não conferem com as constantes dos atos arquivados (art.53, I, Dec. 1.800/96)
- Inserir o NIRE na qualificação da empresa (art.53, § 1º, Dec. 1.800/96)
- Instrumento em 3 vias de igual teor, com no mínimo uma via original e demais em xerox autenticadas
- Instrumento ou declaração com rasuras, emendas ou entrelinhas - Retificar em novo instrumento ou declaração (art.35, Dec.1.800/96)
- Maior de 16 e menor de 18 anos - Apresentar Certidão de Emancipação ou indicar sua forma (art 976, cc/2002)
- Mencionar a(s) pessoa(s) que assume(m) o ativo e passivo da empresa e a guarda dos livros (art.53, X, Dec. 1.800/96)
- O ato constitutivo deve ser visado por advogado, com a indicação do nome, número e seção da OAB (art.36, Dec. 1.800/96)
- O Empresário já possui firma registrada (in ___/2001)
- O valor da cota não pode ser inferior a fração de centavo (IN nº ___/___)
- Os pactos e declarações antenupciais do empresário, o título de doação, herança ou legado, de bens clausulados de incomunicabilidade ou inalienabilidade, a sentença que decretar ou homologar a separação judicial do empresário e do ato de reconciliação devem ser averbados no registro civil antes de arquivados na Junta Comercial (art 11.53, cc/2002)
- Outras exigências a especificar e fundamentar
- Outras exigências a especificar e fundamentar:
- Para a participação de menores na sociedade, o capital deverá ser totalmente integralizado
- Preencher o(s) seguinte(s) campo(s) do formulário (IN nº ___/02): _____
- Reconhecer firma na procuração (§ 2, art.644 combinado com o art 1.153, cc/2002)
- Requerimento de Empresário sem assinatura Assinar (IN n ___/02 e art.40, Dec. 1.800/96)
- Requerimento de Empresário sem firma (assinatura autógrafo) (inciso II do art.968, cc/2002)
- Substituir o instrumento por outro legível, que permita sua reprografia e microfilmagem (IN nº 44/94)
- Substituir o instrumento por outro, na forma específica de alteração contratual (art.43, III, Dec. 1.800/96)
- Suprimir, do preâmbulo, o nome do sócio que não participa de deliberação (art. 1.076, CC/2002)
- Transcrever o objeto, na sua totalidade (art.45, Dec.1.800/96)



Outras Exigencias a especificar e fundamentar - complementar o endereço empresarial no cadastro web conforme o contrato (pela 1)

Data: ___/___/___ - A cláusula do capital, esta incorreta no quadro demonstrativo de distribuição de cotas nos valores, tanto de cotas como total.



JUCESP PROTOCOLO
2.199.662/25-1



**19º ALTERAÇÃO CONTRATUAL DA SOCIEDADE LIMITADA UNIPESSOAL
ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA
CNPJ: 12.965.396/0001-90**

Pelo presente instrumento contratual, as partes a seguir nomeadas e qualificadas a saber:

WALTER ANTONIO BREDÁ FRANCOSO, brasileiro, casado sob o regime de comunhão parcial de bens, empresário, portador do RG nº 13.753.643-4 SSP/SP, CPF 062.905.578-58, residente e domiciliado na Rua Chiquinha Gonzaga, nº 140, Parque Santa Cecília, Piracicaba/SP, CEP 13420-128,

Único sócio da sociedade empresária limitada unipessoal que vem girando sob o nome empresarial de: **"ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA"** com sede na Rua Lucas Sampronha, nº 261, Guamium, CEP 13413-042, Piracicaba/SP, devidamente cadastrada no CNPJ sob nº 12.965.396/0001-90 e NIRE 35224876944, tendo a Filial I na Avenida Brasil, 2078, São Diogo II, Galpão C, Box 26, CEP 29.163-165, Serra/ES, cadastrada no CNPJ sob nº 12.965.396/0002-71 e NIRE 32900793861 e a Filial II na Avenida Presidente Vargas, 2001 – Sala 103, Alto da Boa Vista, Ribeirão Preto/SP, CEP: 14025-700 cadastrada no CNPJ sob nº 12.965.396/0004-33 e NIRE 35906751445, resolve proceder a seguinte alteração de seu contrato social, sob as cláusulas e condições seguintes:

CLÁUSULA PRIMEIRA

A sociedade resolve constituir a **FILIAL III**, neste ato, com sede na Rua Lucas Sampronha, nº 290, Guamium, Piracicaba – SP, CEP 13413-042, com o objeto social de: "Fabricação de aparelhos e equipamentos para distribuição e controle de energia elétrica, Comércio de Maquinas e equipamentos para uso industrial, partes e peças e de açúcar, Prestação de Serviços na área de automação industrial e montagens e manutenção de painéis e equipamentos industriais, Manutenção e reparação de geradores, transformadores e motores elétricos, Instalação e manutenção elétrica, hidráulica, sanitária e de gás, Desenvolvimento e licenciamento de programas de computador customizáveis, Desenvolvimento e licenciamento de programas de computador não-customizáveis e Serviços de Engenharia".

Devido as mudanças acima, resolve o sócio consolidar o contrato social da empresa conforme abaixo:

CONSOLIDAÇÃO DE CONTRATO SOCIAL

DA DENOMINAÇÃO SOCIAL, SEDE E FILIAIS

Cláusula Um. A empresa gira sob a denominação social **"ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA"**.

Cláusula Dois. A empresa tem **SEDE** na Rua Lucas Sampronha, nº 261, Guamium, Piracicaba/SP, CEP 13413-042, a **FILIAL I** na Rua Zilda Rodrigues de Souza Oliveira, nº 493,

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Galpão 02, Jardim Limoeiro, Serra/ES CEP 29164-009, FILIAL II na Avenida Presidente Vargas, 2001 – Sala 103, Alto da Boa Vista, Ribeirão Preto/SP, CEP: 14025-700 e a FILIAL III na Rua Lucas Sampronia, nº 290, Guarnium, Piracicaba/SP, CEP 13413-042.

Cláusula Três. A sociedade poderá, a qualquer tempo, abrir ou fechar filiais ou outra dependência, mediante alteração do contrato social, observadas as normas legais.

DO OBJETO SOCIAL E DA DURAÇÃO

Cláusula Quatro. A matriz tem por objeto social o ramo de:

“Comércio atacadista e varejista de material elétrico, Equipamentos de telefonia e comunicação, Eletrodomésticos, Ferramentas em geral, áudio e vídeo, Equipamentos e materiais de segurança e proteção individual no trabalho (EPI), Materiais de construção em geral, ferragens e ferramentas, materiais hidráulicos, Equipamentos e suprimentos de informática, Máquinas e equipamentos para uso industrial, partes e peças e de açúcar; Fabricação de aparelhos e equipamentos para distribuição e controle de energia elétrica, Serviços na área de automação industrial e montagens e manutenção de painéis e equipamentos industriais. Manutenção e reparação de equipamentos de comunicação, computadores, equipamentos periféricos, geradores, transformadores e motores elétricos, Instalação e manutenção elétrica, hidráulica, sanitária e de gás, Prestação de serviços de Corte e dobra de metais, tratamento e revestimento em metais, apoio administrativo, Desenvolvimento e licenciamento de programas de computador customizáveis, Desenvolvimento e licenciamento de programas de computador não-customizáveis, Serviços de Engenharia, Treinamento em desenvolvimento profissional e gerencial, Transporte rodoviário de carga, exceto produtos perigosos e mudanças, intermunicipal, interestadual e internacional”.

A Filial I tem por objeto social o ramo de:

“Comércio atacadista e varejista de material elétrico, Equipamentos de telefonia e comunicação, Eletrodomésticos, Ferramentas em geral, áudio e vídeo, Equipamentos e materiais de segurança e proteção individual no trabalho (EPI), Materiais de construção em geral, ferragens e ferramentas, materiais hidráulicos, Equipamentos e suprimentos de informática, Máquinas e equipamentos para uso industrial, partes e peças e de açúcar; Fabricação de aparelhos e equipamentos para distribuição e controle de energia elétrica, Serviços na área de automação industrial e montagens e manutenção de painéis e equipamentos industriais. Manutenção e reparação de equipamentos de comunicação, computadores, equipamentos periféricos, geradores, transformadores e motores elétricos, Instalação e manutenção elétrica, hidráulica, sanitária e de gás, Prestação de serviços de Corte e dobra de metais, tratamento e revestimento em metais, apoio administrativo, Desenvolvimento e licenciamento de programas de computador customizáveis, Desenvolvimento e licenciamento de programas de computador não-customizáveis, Treinamento em desenvolvimento profissional e gerencial, Transporte rodoviário de carga, exceto produtos perigosos e mudanças, intermunicipal, interestadual e internacional”.

A Filial II tem por objeto social o ramo de:

“Prestação de serviços administrativos e de apoio à matriz, tais como: digitação e organização de documentos; controle de processos e fluxos de trabalho e atendimento ao cliente”, CNAE (82.19-9-99).

A Filial III tem por objeto social o ramo de:

“Fabricação de aparelhos e equipamentos para distribuição e controle de energia elétrica, Comercio de Maquinas e equipamentos para uso industrial, partes e peças e de açúcar, Prestação de Serviços na área de automação industrial e montagens e manutenção de painéis e

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equipamentos industriais, Manutenção e reparação de geradores, transformadores e motores elétricos, Instalação e manutenção elétrica, hidráulica, sanitária e de gás, Desenvolvimento e licenciamento de programas de computador customizáveis, Desenvolvimento e licenciamento de programas de computador não-customizáveis e Serviços de Engenharia”.

Cláusula Cinco. O prazo de duração da empresa é indeterminado.

DA INTEGRALIZAÇÃO DO CAPITAL SOCIAL

Cláusula Seis. O Capital Social será de R\$ 100.000,00 (cem mil reais), dividido em 100.000 (cem mil) quotas sociais, no valor de R\$ 1,00 (um real) cada uma, totalmente integralizadas em moeda corrente do país, sendo assim sua distribuição:

WALTER ANTONIO BRED A FRANCOSO	100%	100.000 quotas	R\$ 100.000,00
TOTAL	100%	100.000 quotas	R\$ 100.000,00

Cláusula Sete. A responsabilidade do sócio é restrita ao capital social integralizado.

DA ADMINISTRAÇÃO E DO PRO LABORE

Cláusula Oito. A administração geral caberá ao sócio único, **WALTER ANTONIO BRED A FRANCOSO**, que assinará isoladamente todos os documentos inerentes à administração da sociedade. Sendo que, no exercício da administração, o sócio administrador terá direito a uma retirada mensal a título de pró-labore.

DO BALANÇO PATRIMONIAL, DOS LUCROS E PERDAS

Cláusula Nove. O exercício social da empresa coincidirá com o ano civil, encerrando-se, portanto, no dia 31 de dezembro de cada ano, quando será procedido o balanço geral, apurando-se eventuais lucros ou prejuízos havidos durante o exercício encerrado.

DO FALECIMENTO DO SÓCIO TITULAR

Cláusula Dez. Falecendo ou interditado o sócio a sucessão da empresa dar-se-á por alvará judicial ou na partilha, por sentença judicial ou escritura pública.

DA DECLARAÇÃO DE DESIMPEDIMENTO

Cláusula Onze. O administrador declara, sob as penas da lei, que não está impedido de exercer a administração da empresa, por lei especial ou em virtude de condenação criminal, ou por se encontrar sob os efeitos dela, a pena que vede, ainda que temporariamente, o acesso a cargos públicos, ou por crime falimentar, de prevaricação, peita ou suborno, concussão, peculato ou contra a economia popular, contra o sistema financeiro nacional, contra normas de defesa da concorrência, contra as relações de consumo, fé pública ou propriedade.

DA LEGISLAÇÃO APLICÁVEL

Cláusula Doze. O presente Instrumento de Sociedade Limitada rege-se pelas disposições do Código Civil Brasileiro, Lei nº. 10.406, de 10 de janeiro de 2002.

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J U C E S P
D E S T A C I D A D O
D O F O R O

Cláusula Treze. Fica eleito o *foro* desta cidade, para solucionar as divergências que houver em relação a empresa. Os casos omissos nesse Ato serão regidos pelas disposições das Leis vigentes do País.

E, assim por estarem de comum acordo, assinam o presente Instrumento em 03 (três) vias de igual teor, devendo ficar uma das vias arquivada na Junta Comercial do Estado de São Paulo.

Piracicaba - SP, 02 de junho de 2025.

Assinado digitalmente na ZapSign por
WALTER ANTONIO BREDÁ FRANCOSO

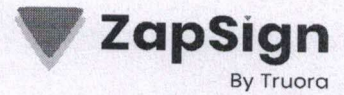
Walter Antonio Breda Francoso Data: 03/06/2025 15:36:43.767 (UTC-0300)
WALTER ANTONIO BREDÁ FRANCOSO



Relatório de Assinaturas

Datas e horários em UTC-0300 (America/Sao_Paulo)

Última atualização em 03 Junho 2025, 15:36:44



By Truora

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Assinaturas

1 de 1 Assinaturas

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<p>Pontos de autenticação:</p> <p>Telefone: + 5519984200006</p> <p>E-mail: walter@alucel.net</p> <p>Nível de segurança: Validado por código único enviado por e-mail</p>	<p>Localização aproximada: -22.673575, -47.631651</p> <p>IP: 189.113.46.10</p> <p>Dispositivo: Mozilla/5.0 (iPhone; CPU iPhone OS 18_4_1 like Mac OS X)</p> <p>AppleWebKit/605.1.15 (KHTML, like Gecko) Version/18.4 Mobile/15E148</p> <p>Safari/604.1</p>

INTEGRIDADE CERTIFICADA - ICP-BRASIL

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Contratado: (I) **Banco do Brasil S.A.**, com sede em Brasília, Distrito Federal, por sua agência 8193-0 - EMPRESA SUMARE, SP, inscrita no CNPJ n.º 00.000.000/7696-14, (II) **Associação de Poupança e Empréstimo - Poupex**, CNPJ n.º 00.655.522/0001-21, sociedade civil sem fins lucrativos, com sede em Brasília, Distrito Federal, na qualidade de gestora do produto da Poupança Poupex, doravante denominada **Poupex**, por intermédio do **Banco do Brasil S.A.**.

Proponente/Contratante: **EMPRESA COMERCIAL ELETRICA ALUCEL LTDA**, CNPJ n.º 12.965.396/0002-71, COM VAREJ DE APAR E EQUIP P/ COMUNIC PECAS E ACESSORIOS, constituída em 14/05/2020, sediada à AVENIDA BRASIL 2078 GALPAO C BOX 26, CEP 029163-165, telefone(s) (19) 99764-6884.

Dirigente(s)

Nome	CPF
WALTER ANTONIO BREDAS FRANCOSO	062.905.578-58

Dados da conta

Agência 8193-0, Conta-Corrente n.º 540-1, Poupança Ouro n.º 510.000.540-4 e Poupança Poupex n.º 960.000.540-6 abertas em 07/12/2021.

Declarações e autorizações

O(s) **Proponente(s)/Contratante(s)** declara(m)-se estar ciente(s) e autoriza(m) o BANCO DO BRASIL S.A. a disponibilizar todos os seus dados, às empresas do seu conglomerado ou aos seus prestadores de serviço, com a finalidade específica de realizar as atividades necessárias à plena execução deste Instrumento, ao cumprimento das obrigações legais e ou regulatórias a ele vinculadas e para garantia da prevenção à fraude e à segurança.

O(s) **Dirigentes(s)** declara(m)-se estar ciente(s) e autoriza(m) o BANCO DO BRASIL S.A. a disponibilizar todos os seus dados pessoais, inclusive os sensíveis, às empresas do seu conglomerado ou aos seus prestadores de serviço, com a finalidade específica de realizar as atividades necessárias à plena execução deste Instrumento, ao cumprimento das obrigações legais e/ou regulatórias a ele vinculadas e para garantia da prevenção à fraude e à segurança.

O tratamento e processamento de dados pessoais dos dirigentes pelo BANCO DO BRASIL S.A. será realizado com o propósito de permitir a plena e adequada execução do objeto desta Proposta/Contrato, bem como para o cumprimento de obrigação legal e/ou regulatória, em observância aos princípios e regras estabelecidas nas legislações sobre proteção de Dados Pessoais vigentes, incluindo, mas não se limitando à Lei nº 13.709, de 14 de agosto de 2018 (LGPD).

O(s) **Dirigentes(s)**, igualmente para os fins de cumprimento da LGPD, autoriza(m) que seus dados pessoais, inclusive os sensíveis, sejam utilizados em situações relacionadas aos processos de contratação e condução do objeto desta Proposta/Contrato, os quais serão mantidos sob estreita proteção e segurança de acessos.

O(s) **Dirigente(s)** declara(am) estar ciente(s) que o BANCO DO BRASIL S.A. poderá manter e tratar, em meio físico ou eletrônico, os seus dados pessoais que sejam necessários para a execução desta Proposta/Contrato ou para cumprimento de obrigações legais e regulatórias ou, ainda, para garantia da prevenção à fraude e à segurança do titular, assegurando, mediante requerimento a ser encaminhado por meio eletrônico, o direito de acesso facilitado às informações sobre o tratamento de seus dados pessoais, na forma estabelecida na LGPD.



Os dados pessoais fornecidos pelo(s) **Dirigente(s)** às empresas que atuam como Correspondente Bancário do BANCO DO BRASIL S.A. ou por este contratadas/conveniadas terão o tratamento de acordo com as determinações da LGPD e serão encaminhados ao BANCO DO BRASIL, para possibilitar as tratativas necessárias à abertura de conta decorrente desta Proposta/Contrato.

O(s) **Dirigente(s)** declara(am) estar ciente(s) que as informações acerca das atividades de tratamento de dados pessoais pelo BANCO DO BRASIL S.A. e a forma de requerer o acesso aos direitos encontram-se declaradas em sua Política de Privacidade, cujo inteiro teor está disponível no site bb.com.br/privacidade.

O(s) **Dirigentes(s)** declara(am) estar ciente(s) ainda que o BANCO DO BRASIL S.A., mesmo depois de encerrado a(o) presente Proposta/Contrato, manterá seus dados pessoais arquivados para o cumprimento de obrigação legal e regulatória, sob estreita proteção e segurança de acessos.

O **Proponente/Contratante** identificado propõe e o **Contratado ACEITA** a abertura de conta(s)-corrente(s) e/ou conta(s) de Poupança Ouro e/ou Poupança Pouplex.

O **Proponente/Contratante declara-se** ciente e de pleno acordo com as disposições contidas nas Cláusulas Gerais do Contrato de Conta-Corrente e Conta de Poupança Ouro e/ou Poupança Pouplex, registrado no Cartório do 1º Ofício de Registro de Títulos e Documentos da cidade de Brasília (DF), sob o microfilme n.º 985.086 em 12/04/2021, que integram este contrato, e também, com as Informações essenciais - Conta-corrente e conta-poupança, formando um documento único e indivisível, cuja cópia foi previamente disponibilizada ao **Proponente/Contratante** por meio de e-mail ou via física e, a partir do ato da assinatura deste instrumento, estará disponível para consulta, a qualquer tempo, no sítio do Banco do Brasil na internet (www.bb.com.br), na opção autoatendimento, e/ou no aplicativo do Banco do Brasil no celular.

O **Proponente/Contratante declara-se** ciente de que os saldos devedores na(s) conta(s)-corrente(s) ora aberta(s) e que não forem pagos nos respectivos vencimentos poderão ser automaticamente compensados com créditos existentes em outras contas-correntes ou aplicações financeiras de que o **Proponente/Contratante** seja titular no Banco do Brasil, mediante débito nas contas respectivas, o que desde já autoriza.

O **Proponente/Contratante declara-se** ciente de que as dívidas líquidas que não forem pagas no vencimento e que tenham como credor o Banco do Brasil, em quaisquer de suas agências, serão compensadas com os créditos existentes na(s) conta(s)-corrente(s) e/ou na(s) conta(s) de Poupança Ouro e/ou Pouplex ora aberta(s), mediante débito em conta, o que desde já autoriza.

O acolhimento desta Proposta/Contrato não implica em aceitação da proposta por parte do Banco do Brasil S.A., estando tal aceitação condicionada à assinatura de funcionário do Banco do Brasil S.A. e a eventual aprovação do limite de crédito.

Para **informações, sugestões, reclamações ou quaisquer outros esclarecimentos que se fizerem necessários** a respeito desta Proposta/Contrato, o Contratado coloca à disposição do **Proponente/Contratante** os telefones da Central de Relacionamento do Banco do Brasil - CRBB 4004-0001* ou 0800-729-0001, Serviço de Atendimento ao Cliente - SAC 0800-729-0722, para Deficientes Auditivos 0800-729-0088, Suporte Técnico Pessoa Física 0800-729-0200, Suporte Técnico Pessoa Jurídica 3003-0500* ou 0800-729-0500. Caso o **Proponente/Contratante**



considere que a solução dada à ocorrência registrada anteriormente mereça revisão, deve entrar em contato com a Ouvidoria BB pelo 0800-729-5678. Privacidade e Proteção de Dados Pessoais: bb.com.br/privacidade.

* Custos de ligações locais e impostos serão cobrados conforme o Estado de origem. No caso de ligação via celular, custos da ligação mais impostos conforme a operadora.

Declara, sob as penas da lei, que as informações constantes deste documento são verdadeiras.

Contratado



Proponente/Contratante

Razão Social: COMERCIAL ELETRICA ALUCEL LTDA

CNPJ: 12.965.396/0002-71

Documento assinado eletronicamente por WALTER ANTONIO BREDA FRANCO SO, CPF 062.905.578-58, através de digitação de senha eletrônica em 07/12/2021 às 10:51:03.

Autenticação N°: B79D53FD7A95F75A



A FORÇA QUE **MOVE INDÚSTRIAS.**
A ENERGIA QUE **IMPULSIONA O FUTURO.**



Licitante: Alucel Suprimentos Industriais LTDA

CNPJ: 12.965.396/0002-71

**Endereço: RUA ZILDA RODRIGUES DE SOUZA OLIVEIRA, GALPÃO 2 JARDIM LIMOEIRO Nº 493,
CEP 29.164-009 - SERRA-ES**

PIRACICABA - SP

☎ (19) 3429 2929

BELO HORIZONTE - MG

☎ (31) 99426 6643

RIBEIRÃO PRETO - SP

☎ (16) 3421 6634

SANTO ANDRÉ - SP

☎ (11) 2669 2540

CAMPINAS - SP

☎ (19) 3429 2927

SERRA - ES

☎ (19) 3429 2929



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A FORÇA QUE **MOVE INDÚSTRIAS.**
A ENERGIA QUE **IMPULSIONA O FUTURO.**



DECLARAÇÃO DE DADOS CADASTRAIS E INDICAÇÃO DE REPRESENTANTE

Razão social: Alucel Suprimentos Industriais LTDA

CNPJ: 12.965.396/0002-71

Inscrição Estadual: 083.659.749

Endereço: Rua Zilda Rodrigues de Souza Oliveira, Nº 493 - galpão 2

Bairro: Jardim Limoeiro

Cidade: Serra

Estado: Espírito Santo

CEP: 29164-009

Telefone: (19) 3429-2929

E-mail: marcela@alucel.net

INFORMAÇÕES BANCÁRIAS

Banco para recebimento do pagamento: Banco do Brasil (001)

Nome da agência: Sumaré

Número da agência: 8193-0

Endereço da agência: Rua Dom Barreto, 678

Nº da conta corrente: 540-1

Bairro: Centro

Cidade: Sumaré

UF: SP

CEP: 13.170-902

Serra, 01 de Dezembro de 2025.

Representante da Alucel Suprimentos Industriais LTDA:

WALTER ANTONIO BREDA

FRANCOSO:06290557858

Assinado de forma digital por

WALTER ANTONIO BREDA

FRANCOSO:06290557858

Dados: 2025.12.03 16:19:02 -03'00'

Alucel Suprimentos Industriais LTDA

Walter Antonio Breda Francoso – Sócio Proprietário

RG 13753643 SSP/SP

PIRACICABA - SP

☎ (19) 3429 2929

BELO HORIZONTE - MG

☎ (31) 99426 6643

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A FORÇA QUE **MOVE INDÚSTRIAS.**
A ENERGIA QUE **IMPULSIONA O FUTURO.**



DECLARAÇÃO DE INEXISTÊNCIA DE FATO IMPEDITIVO

ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA, CNPJ/MF N.o: 12.965.396/0002-71, com endereço na Rua Zilda Rodrigues de Souza Oliveira, 493, Jardim Limoeiro, Galpão 2, CEP 29.164-009, Serra/ES, **DECLARA**, sob penas da lei, que até a presente data não sofre os efeitos da declaração de inidoneidade, nem está suspenso de participar em licitações promovidas por qualquer órgão governamental, autárquico, fundacional, de empresa pública ou sociedade de economia mista do Estado do Paraná, inexistindo fatos impeditivos para sua habilitação no presente processo licitatório, comprometendo-se a informar ocorrências posteriores.

Serra, 01 de Dezembro de 2025

**WALTER ANTONIO
BREDA**

FRANCOSO:06290557858

Assinado de forma digital por
WALTER ANTONIO BREDA
FRANCOSO:06290557858
Dados: 2025.12.03 16:19:15 -03'00'

Alucel Suprimentos Industriais LTDA

Walter Antonio Breda Francoso – Sócio Proprietário
RG 13753643 SSP/SP

PIRACICABA - SP

☎ (19) 3429 2929

BELO HORIZONTE - MG

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☎ (19) 3429 2929



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A FORÇA QUE **MOVE INDÚSTRIAS.**
A ENERGIA QUE **IMPULSIONA O FUTURO.**



DECLARAÇÃO DE NÃO UTILIZAÇÃO DE MÃO DE OBRA DE MENORES

ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA, CNPJ/MF N.º: 12.965.396/0002-71, com endereço na Rua Zilda Rodrigues de Souza Oliveira, 493, Jardim Limoeiro, Galpão 2, CEP 29.164-009, Serra/ES, por intermédio de seu representante legal o Sr. Walter Antonio Breda Francoso, portador da carteira de identidade n° 13753643 SSP/SP e CPF n° 062.905.578-58, **DECLARA**, para fins do disposto no inciso V do art 73 da lei Estadual n° 15.608/07, que não emprega menor de dezoito anos em trabalhos noturnos, perigoso ou insalubre e não emprega menor de dezesseis anos.

Serra, 01 de Dezembro de 2025

WALTER ANTONIO
BREDA
FRANCOSO:06290557858

Assinado de forma digital por
WALTER ANTONIO BREDA
FRANCOSO:06290557858
Dados: 2025.12.03 16:19:29 -03'00'

Alucel Suprimentos Industriais LTDA

Walter Antonio Breda Francoso – Sócio Proprietário
RG 13753643 SSP/SP

PIRACICABA - SP

(19) 3429 2929

BELO HORIZONTE - MG

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SERRA - ES

(19) 3429 2929



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DECLARAÇÃO DE CUMPRIMENTO DOS CRITÉRIOS DE QUALIDADE AMBIENTAL E SUSTENTABILIDADE SÓCIO-AMBIENTAL

ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA, CNPJ/MF N.º: 12.965.396/0002-71, com endereço na Rua Zilda Rodrigues de Souza Oliveira, 493, Jardim Limoeiro, Galpão 2, CEP 29.164-009, por intermédio de seu representante legal o Sr. Walter Antonio Breda Francoso, portador da carteira de identidade n.º 13753643 SSP/SP e CPF n.º 062.905.578-58, para fins de participação no presente Pregão Eletrônico, sob n.º. 1000000120, bem como para todos os demais fins legais **DECLARA** que atende e subordina-se aos critérios de qualidade ambiental e sustentabilidade socio ambiental, previstos do Decreto Estadual n.º 6.252 de 22/03/2006 e nas demais normas legais de proteção ao meio ambiente.

Serra, 01 de Dezembro de 2025

WALTER ANTONIO
BREDA

FRANCOSO:06290557858

Assinado de forma digital por
WALTER ANTONIO BREDA
FRANCOSO:06290557858

Dados: 2025.12.03 16:19:42 -03'00'

Alucel Suprimentos Industriais LTDA

Walter Antonio Breda Francoso – Sócio Proprietário

RG 13753643 SSP/SP

PIRACICABA - SP

(19) 3429 2929

BELO HORIZONTE - MG

(31) 99426 6643

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(19) 3429 2929



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A FORÇA QUE **MOVE INDÚSTRIAS.**
A ENERGIA QUE **IMPULSIONA O FUTURO.**



DECLARAÇÃO DE ACEITE DO EDITAL

ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA, CNPJ/MF N.º: 12.965.396/0002-71, com endereço na Rua Zilda Rodrigues de Souza Oliveira, 493, Jardim Limoeiro, Galpão 2, CEP 29.164-009, Serra/ES, neste ato representada pelo Sr. Walter Antonio Breda Francoso, portador da carteira de identidade nº 13753643 SSP/SP e CPF nº 062.905.578-58, abaixo assinado, **DECLARA** que aceita integral e irrevogavelmente os termos do Edital em epígrafe, inclusive e especialmente o que se refere às especificações constantes do Termo de Referência e seus anexos, os quais, integram o Edital.

Serra, 01 de Dezembro de 2025

WALTER ANTONIO
BRED A

FRANCOSO:06290557858

Assinado de forma digital por
WALTER ANTONIO BRED A
FRANCOSO:06290557858
Dados: 2025.12.03 16:20:04 -03'00'

Alucel Suprimentos Industriais LTDA

Walter Antonio Breda Francoso – Sócio Proprietário

RG 13753643 SSP/SP

PIRACICABA - SP

☎ (19) 3429 2929

BELO HORIZONTE - MG

☎ (31) 99426 6643

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SERRA - ES

☎ (19) 3429 2929



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DECLARAÇÃO DE CUMPRIMENTO DA LEI 13.709/2018

1. A **ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA**, CNPJ/MF N.º: 12.965.396/0002-71, com endereço na Rua Zilda Rodrigues de Souza Oliveira, 493, Jardim Limoeiro, Galpão 2, CEP 29.164-009, Serra/ES, neste ato representada pelo Sr. Walter Antonio Breda Francoso, portador da carteira de identidade nº 13753643 SSP/SP e CPF nº 062.905.578-58, **DECLARA**, por si e seus colaboradores, que conhece e age em conformidade com a Lei 13.709/2018 - Lei Geral de Proteção de Dados (LGPD);
2. Considerando que para a participação no processo licitatório haverá o tratamento de dados pessoais (nome, RG, CPF, nº registro profissional, endereço residencial e eletrônico) dos representantes legais das empresas, credenciados, responsáveis técnicos e equipe técnica, a **ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA declara** que detém todas as autorizações, licenças, permissões, concessões, consentimentos, direitos e garantias necessários para autorizar o compartilhamento dos dados pessoais acima com a Administração dos Portos de Paranaguá e Antonina APPA;
3. A **ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA** se compromete a observar as disposições do Termo de Referência sobre Proteção de Dados Pessoais desde a fase da licitação, independente da sua contratação ou não.

Serra, 01 de Dezembro de 2025

WALTER ANTONIO
BREDÁ
FRANCOSO:06290557858

Assinado de forma digital por
WALTER ANTONIO BREDÁ
FRANCOSO:06290557858
Dados: 2025.12.03 16:20:18
-03'00'

Alucel Suprimentos Industriais LTDA

Walter Antonio Breda Francoso – Sócio Proprietário
RG 13753643 SSP/SP

PIRACICABA - SP

☎ (19) 3429 2929

BELO HORIZONTE - MG

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☎ (19) 3429 2929



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DECLARAÇÃO DE VEDAÇÃO DE QUE FAMILIAR DE AGENTE PÚBLICO PRESTE SERVIÇOS AO GOVERNO DO PARANÁ

Nome: João Everton de Souza
Empresa: Alucel Suprimentos Industriais LTDA
Cargo: Gerente Comercial CPF 099.694.798-14
Telefone: (19) 98171-2451

Atenção

Para efeito da informação sobre a existência de parentes trabalhando no Governo do Estado do Paraná, objeto da Declaração abaixo, devem ser observados os seguintes tipos de relação consanguínea ou afim:

Pai/Mãe Neto(a)	Avô(ó)	Bisavô(ó)	Filho(a)
Bisneto(a) Cunhado(a)	Tio(a)	Irmão(ã)	Sobrinho(a)
Cônjuge Enteado(a)	Companheiro(a)	Sogro(a)	Padrasto/Madrasta

Eu, acima identificado, **DECLARO**, sob as penas da lei, em atendimento ao quanto disposto no Decreto nº 2485/2019, serem verdadeiras as informações e respostas constantes neste documento, estando ciente que será anexado a processos administrativos e constituirá documento público, assim como das implicações em termos de responsabilidade, inclusive e especialmente nos âmbitos administrativos, cível e criminal em caso de insinceridade:

Trabalho como empregado, cooperado ou de qualquer outra forma vinculado à pessoa jurídica conveniada ou contratada pelo Governo do Estado, E POSSUO um parente trabalhando ou vinculado ao Governo do Estado, em qualquer de seus órgãos ou entidades, incluindo suas autarquias e fundações públicas e sociedades de economia mista? () Sim
(X) Não

Caso tenha respondido SIM à pergunta acima relacione no quadro abaixo o(s) familiar(es) com vínculo(s) com o Governo do Estado:

Nome	Parentesco	Matrícula (CPF)	Cargo/Função	Órgão
------	------------	-----------------	--------------	-------

PIRACICABA - SP
☎ (19) 3429 2929

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☎ (31) 99426 6643

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☎ (16) 3421 6634

SANTO ANDRÉ - SP
☎ (11) 2669 2540

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☎ (19) 3429 2927

SERRA - ES
☎ (19) 3429 2929


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A FORÇA QUE **MOVE INDÚSTRIAS.**
A ENERGIA QUE **IMPULSIONA O FUTURO.**



Serra, 01 de Dezembro de 2025

A handwritten signature in blue ink, consisting of several overlapping loops and lines, positioned above a horizontal line.

Alucel Suprimentos Industriais LTDA

João Everton de Souza – Gerente Comercial

RG 9.800.41-X SSP/SP

PIRACICABA - SP

☎ (19) 3429 2929

BELO HORIZONTE - MG

☎ (31) 99426 6643

RIBEIRÃO PRETO - SP

☎ (16) 3421 6634

SANTO ANDRÉ - SP

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CAMPINAS - SP

☎ (19) 3429 2927

SERRA - ES

☎ (19) 3429 2929



DEMONSTRAÇÃO DO RESULTADO DO EXERCÍCIO EM 31/12/2024

Descrição	Saldo	Total
RECEITA BRUTA	<u>133.366.642,71</u>	<u>133.366.642,71</u>
DEVOLUÇÕES E DEDUÇÕES DE VENDAS	<u>(2.723.764,77)</u>	<u>(2.723.764,77)</u>
RECEITA LÍQUIDA DE VENDAS		<u>130.642.877,94</u>
IMPOSTOS SOBRE VENDAS	<u>(21.128.385,10)</u>	<u>(21.128.385,10)</u>
RECEITA LÍQUIDA		<u>109.514.492,84</u>
CMV	<u>(89.221.055,44)</u>	<u>(89.221.055,44)</u>
LUCRO BRUTO		<u>20.293.437,40</u>
DESPESAS OPERACIONAIS		<u>(17.212.870,09)</u>
DESPESAS COM PESSOAL	<u>(4.593.606,14)</u>	<u>(4.593.606,14)</u>
DESPESAS ADMINISTRATIVAS	<u>(12.619.263,95)</u>	<u>(12.619.263,95)</u>
RESULTADO FINANCEIRO	<u>(1.615.842,47)</u>	<u>(1.615.842,47)</u>
OUTRAS DESPESAS OPERACIONAIS	<u>(72.813,61)</u>	<u>(72.813,61)</u>
OUTRAS RECEITAS OPERACIONAIS	<u>21.986,80</u>	<u>21.986,80</u>
RESULTADO OPERACIONAL		<u>1.413.898,03</u>
DESPESAS NÃO OPERACIONAIS	<u>(28.772,39)</u>	<u>(28.772,39)</u>
RESULTADO ANTES DO IR E CSL		<u>1.385.125,64</u>
PROVISÕES PARA IR E CSL	<u>(450.581,59)</u>	<u>(450.581,59)</u>
LUCRO LÍQUIDO DO EXERCÍCIO		<u>934.544,05</u>



ANDRE ROBERTO MESSIAS
CRC - SP Nº. 1SP220530/O-3
CPF: 214.399.148-77

WALTER ANTONIO BREDIA FRANÇOSO
ADMINISTRADOR
CPF: 062.905.578-58

09/09/2025 - BANCO DO BRASIL - 08:53:22
819308193 0001

COMPROVANTE DE PAGAMENTO DE TITULOS

CLIENTE: ALUCEL SUPRIMENTOS IND.

AGENCIA: 8193-0 CONTA: 540-1



SINTEGRA/ICMS
Consulta Pública ao Cadastro
Estado do Espírito Santo



Cadastro atualizado até: 04/12/2025

IDENTIFICAÇÃO - PESSOA JURÍDICA

CNPJ: 12965396000271 **Inscrição Estadual:** 083.659.74-9
Razão Social: ALUCEL SUPRIMENTOS INDUSTRIAIS LTDA

ENDEREÇO

Logradouro: RUA ZILDA RODRIGUES DE SOUZA OLIVEIRA
Número: 493 **Complemento:** GALPAO 02;
Bairro: JARDIM LIMOEIRO
Município: SERRA **UF:** ES
CEP: 29164009 **Telefone:**

INFORMAÇÕES COMPLEMENTARES

Atividade Econômica:

COMERCIO ATACADISTA DE MATERIAL ELETRICO
COMERCIO VAREJISTA DE MATERIAL ELETRICO
COMERCIO VAREJISTA DE FERRAGENS E FERRAMENTAS
COMERCIO VAREJISTA DE MATERIAIS HIDRAULICOS.
COMERCIO VAREJISTA DE MATERIAIS DE CONSTRUCAO EM GERAL.
COM VAREJ ESPECIALIZADO DE ELETRODOMESTICOS E EQUIP DE AUDIO E VIDEO
COMERCIO VAREJISTA DE OUTROS PRODUTOS NAO ESPECIFICADOS ANTERIORMENTE
TRANSP ROD DE CARGA,EXC PROD PERIGOSOS E MUDANCA,INTERMUNIC,INTEREST,I
SERVICOS DE TRATAMENTO E REVESTIMENTO EM METAIS.
COM VAREJ ESPECIALIZADO DE EQUIPAMENTOS E SUPRIMENTOS DE INFORMATICA.
MANUT,REPARACAO D APARELHOS E INSTRUMENTOS DE MEDIDA,TESTE E CONTROLE
COM.ATAC.MAQUINAS E EQUIPAMENTOS P/USO INDUSTRIAL,PARTES E PECAS
MANUTENCAO E REPARACAO DE GERADORES,TRANSFORMADORES E MOTORES ELETRICO
INSTALACAODE MAQUINAS E EQUIPAMENTOS INDUSTRIAIS
INSTALACAO E MANUTENCAO ELETRICA
INSTALACOES HIDRAULICAS, SANITARIAS E DE GAS.
DESENVOLVIMENTO E LICENCIAMENTO PROGRAMAS COMPUTADOR CUSTOMIZAVEIS
DESENVOLVIMENTO E LICENCIAMENTO DE PROG DE COMPUTADOR NAO CUSTOMIZAVEI
PREPARACAODE DOC E SERV ESPECIALIZ.DE APOIO ADMINIST.NAO ESPEC ANTERIO
TREINAMENTO EM DESENVOLVIMENTO PROFISSIONAL E GERENCIAL.
REPARACAO E MANUTENCAO DE COMPUTADORES E DE EQUIPAMENTOS PERIFERICOS
REPARACAO E MANUTENCAO DE EQUIPAMENTOS DE COMUNICACAO

COMERCIO ATACADISTA DE ACUCAR
SERVICO DE CORTE E DOBRA DE METAIS.
COMERCIO ATAC ROUPAS ACESSORIOS P/USO PROFISSIONAL/SEGURANCA TRABALHO
COMERCIO ATACADISTA DE EQUIPAMENTOS DE INFORMATICA
COM ATACAD DE COMPONENTES ELETRONICOS E EQUIP DE TELEFONIA E COMUNICA
COMERCIO ATACADISTA DE FERRAGENS E FERRAMENTAS.
COMERCIO ATACADISTA DE MATERIAIS DE CONSTRUCAO EM GERAL
FABRICACAO DE APAREL E EQUIP P/DISTRIBUICAO E CONTROLE D ENERGIA ELETR

Data de Inicio de Atividade: 04/06/2020
Situação Cadastral Vigente: HABILITADO
Data desta Situação Cadastral: 04/06/2020
Regime de Apuração: ORDINÁRIO
Devedor contumaz: Não

A Inscrição Estadual (IE) com situação cadastral vigente **HABILITADO** indica que a empresa está **APTA** a realizar operações como contribuinte do ICMS.

Já a IE com situação cadastral **NÃO HABILITADA** indica que a empresa **NÃO** está **APTA** a realizar operações como contribuinte do ICMS, caso mantenha entre as suas atividades pelo menos um CNAE cuja inscrição estadual seja obrigatória. Caso a empresa não pertença a um CNAE cuja inscrição seja obrigatória e o CNPJ esteja ATIVO (consultar o site da Receita Federal do Brasil ? <http://www.receita.fazenda.gov.br>), a empresa poderá ser destinatária de mercadorias, bens e serviços **como CONSUMIDOR FINAL**. Neste caso, o número da Inscrição Estadual NÃO deverá constar em documentos que acobertem operações tributáveis pelo ICMS.

A lista dos CNAEs obrigados à Inscrição Estadual está disponível no endereço:
ftp://ftp.sefaz.es.gov.br/CNAE-F/cnaes_obrigadas_a_inscricao.pdf

OBSERVAÇÃO: Os dados acima são baseados em informações fornecidas pelo contribuinte, estando sujeitos a posterior confirmação pelo Fisco.

Data da Consulta: 04/12/2025

VOLTAR



Estado do Paraná
Secretaria de Estado da Fazenda
Receita Estadual do Paraná

Certidão Negativa

de Débitos Tributários e de Dívida Ativa Estadual
Nº 038543851-79

Certidão fornecida para o CNPJ/MF: **12.965.396/0002-71**

Nome: **CNPJ NÃO CONSTA NO CADASTRO DE CONTRIBUINTES DO ICMS/PR**

Ressalvado o direito da Fazenda Pública Estadual inscrever e cobrar débitos ainda não registrados ou que venham a ser apurados, certificamos que, verificando os registros da Secretaria de Estado da Fazenda, constatamos não existir pendências em nome do contribuinte acima identificado, nesta data.

Obs.: Esta Certidão engloba todos os estabelecimentos da empresa e refere-se a débitos de natureza tributária e não tributária, bem como ao descumprimento de obrigações tributárias acessórias.

Válida até 03/04/2026 - Fornecimento Gratuito

A autenticidade desta certidão deverá ser confirmada via Internet
www.fazenda.pr.gov.br