

CERTIFICATE

Certificate Number: 111045.000
Including Seven Page Addendum

The Quality Management System and implementation of:

CommScope, Inc.

With Virtual Central Function at:
1100 CommScope Place SE
Hickory, NC 28602
United States

meets the requirements of the standard:

ISO 9001:2015

Scope:

The sales, marketing, design, manufacture, test, repair, support, service, and distribution of telecommunications products, components, and services for the telecommunications, wireless, and broadcast networks industries

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Business Segments	Exceptions
Connectivity and Cable Solutions (CCS)	None
Networking, Intelligent Cellular & Security Solutions (NICS)	None
Outdoor Wireless Networks (OWN)	None
Access Network Solutions (ANS)	None



Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
Atlanta, GA 30339 USA
(215) 997-4519
<https://www.dekra.us/en/audits/>



CERTIFICATE ADDENDUM

Certificate Number: 111045.000
 ADDENDUM Page One of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Activities Legend:	HQ = Headquarters	MFG = Manufacturing	SER = Services (Professional Services and/or Technical Support)
	HW DE= Hardware Development	REP = Repair	SC = Purchasing, Supplier Management, Manufacturing Support, Repair Support
	SW DE= Software Development	SAL = Sales, Marketing	DIST = Distribution

Site Address	Site Activities
CommScope Inc 1100 CommScope Place SE Hickory, NC 28602 United States	HQ (Virtual)
ARRIS Technology, Inc. 3871 Lakefield Drive Suwanee, GA 30024 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 101 Tournament Dr. Horsham, PA, 19044 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 6450 Sequence Drive San Diego, CA 92121 United States	SW DE, SER
ARRIS Technology, Inc. 900 Chelmsford St. Lowell, MA 01851 United States	HW & SW DE, SER, SC

Certificate Expires: January 04, 2026
 Certificate Issued: January 05, 2023
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 Managing Director

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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
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The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
ARRIS Solutions, Inc. 2400 Ogden Ave., Suite 180 Lisle, IL 60532 United States	HW & SW DE, SAL, SER, SC
ARRIS 15 Sterling Drive Wallingford, CT 06492 United States	HW & SW DE, SER, SC
ARRIS Technology, Inc. 2450/2500 Walsh Avenue Santa Clara, CA 95051 United States	HW & SW DE, SAL, SER
Ruckus Wireless International Inc. 350 West Java Dr. Sunnyvale, CA 94089 United States	HW & SW DE, SER
Ruckus Wireless Network Technology (Shenzhen) Co. Ltd. Units C&D, 5th Floor, No. 2 Finance base, 8 KeFa Road, Shenzhen, China	SW DE, SC, HW DE

Certificate Expires: January 04, 2026
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Certificate Number: 111045.000
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The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
CommScope Asia (Suzhou) Technologies Co., Ltd. 77 Qiming Road, Suzhou Industrial Park Suzhou, Jiangsu 215121 Peoples Republic of China	MFG, SC
Ruckus Wireless International Inc., Taiwan Branch @ Neihsu District, Taipei City, Rui Road 411, 10th floor, Taipei	SW DE
ARRIS Group India Pvt Limited (AGIPL) Salarpuria Supreme, Ground Floor West Wing & First Floor Munnekolalu Village, Varthur Hobli, Outer Ring Road, Bangalore-560037	SW DE
ARRIS Group de Mexico S.A. de C.V. Av. La Paz 11721 Parque Industrial Pacifico Tijuana, BC 22643 Mexico	MFG, REP, SC
ARRIS Communications Ireland Limited Building 4300, Cork Airport Business Park Kinsale Road Cork County Ireland	HW & SW DE
ARRIS Group India Private Limited "The Senate" No:33/1, Ulsoor Road, Bangalore - 560 042 India	HW & SW DE

Certificate Expires: January 04, 2026
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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Four of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
ARRIS Group, Inc. 50 Stranmillis Embankment Belfast, BT95FL Northern Ireland	SW DE
CommScope Czech Republic, s.r.o Turanka 856/98B 627 00 Brno Czech Republic	HW DE,
CommScope CZ, spol. s.r.o. U Morusi 888, 53006 Pardubice Czech Republic Czech Republic	HW DE,
CommScope Connectivity UK Limited Units 1 and 4 Kinmel Park Industrial Estate Bodelwyddan, Denbighshire, LL18 5TZ United Kingdom	HW DE, MFG, SAL
CommScope Design & Integration UK Ltd. Unit 5 & 6 Eden Business Park Eden House Drive Old Malton, Malton, North Yorkshire YO17 6AE United Kingdom	HW DE, MFG, SC

Certificate Expires: January 04, 2026
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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Five of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
CommScope Design & Integration UK Limited 412 The Quadrant, Birchwood Park Warrington, WA3 6FW United Kingdom	SER
CommScope EMEA Ltd. Corke Abbey Avenue Bray, Co. Dublin Ireland	MFG, SAL
CommScope EMEA Ltd. Diestsesteenweg 692 3010 Kessel-Lo, Belgium	HW DE, MFG, SAL
CommScope Italy Srl Via Archimede, 22/24 Agrate Brianza (MB) 20864 Italy	HW DE, REP, SW DE
Telecom Networks Americas AV. HIPOLITO YRIGROYEN 2999, DEPOSITO 6 EL TALAR, TIGRE Buenos Aires B1618AXD Argentine Republic	SAL, DIST
CommScope Networks India Private Limited Salarpuria Softzone, A Block, 1st Floor Survey No 80/1, 81/1, 81/2, B Wing, Belandur Village, Varthur Hobli, Outer Ring Bangalore – Karnataka 560103 India	SW DE
ADC India Communications Ltd. No 10 C , 2nd Phase Peenya Industrial Area Bangalore – Karnataka 560058 India	MFG, SC

Certificate Expires: January 04, 2026
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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
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The Quality Management System and implementation of:

CommScope, Inc.

With site at:

CommScope Asia (Suzhou) Technologies Co.,Ltd.

77 Qiming Road, Suzhou Industrial Park
Suzhou, Jiangsu 215121
Peoples Republic of China

meets the requirements of the standard:

ISO 9001:2015

The validity of this certificate depends on the validity of the main certificate.

Scope:

Production of network cable, fiber cable and communication equipment component (copper patch cords, copper panel, accessories etc.)

Certification Structure: Multi-site

Certificate Expires:	January 04, 2026
Certificate Issued:	January 05, 2023
Certified Since:	January 10, 2001



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证书附录

证书编号: 111045.000

附录第7页,共7页

质量管理体系和实施:

CommScope, Inc.

其场所:

康普科技 (苏州) 有限公司

中国江苏省苏州工业园区启明路77号,邮编215121

符合以下标准要求:

ISO 9001:2015

本证书的有效性取决于主证书的有效性。

范围:

网络线、光缆、通信系统设备材料(网络跳线、配线装置等)的生产。

认证结构: 多场所

证书有效期: 2026.01.04

发证日期: 2023.01.05

首次发证日期: 2001.1.10



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Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2015

This is to certify that:

CommScope, Inc. of North Carolina
1100 CommScope Place SE
Hickory
North Carolina
28603-0339
USA

Holds Certificate No:

EMS 648387

and operates an Environmental Management System which complies with the requirements of ISO 14001:2015 for the following scope:

The environmental management system to control the risks associated with the manufacture, distribution, field support and central function of telecommunication products and services.

For and on behalf of BSI:

Carlos Pitanga, Chief Operating Officer Assurance – Americas

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

Page: 1 of 5



...making excellence a habit.™

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Telecommunications de Reynosa S. de R.L. de C.V. Av. Industrial Reynosa Lte 2 al 5 Parque Industrial Center Reynosa Tamaulipas 88780 Mexico	Manufacture and distribution of telecommunication products including antenna and cable.
CommScope Asia (Suzhou) Technologies Co., Ltd. EPZ II, 77 Qiming Road Suzhou Industrial Park Suzhou Jiangsu 215121 China	Manufacture and distribution of telecommunication products, including cable.
Andrew Telecommunications India Pvt. Ltd. Plot No. N-2, Phase IV Verna Industrial Estate Verna Salcette Goa 403 722 India	Manufacture and distribution of telecommunication products, including antenna and cable.
CommScope EMEA Ltd. Corke Abbey Avenue Bray County Dublin A98FY03 Ireland	Manufacture and distribution of telecommunication products, including cable and connectors.
CommScope Telecommunications (China) Co., Ltd. 68 West Su Hong Xi Lu Suzhou Industrial Park Suzhou Jiangsu 215021 China	Manufacture and distribution of telecommunication products, including antenna and cables.

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

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Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Wireless Systems GmbH Industriering 10 Buchdorf 86675 Germany	Manufacture and distribution of telecommunication products, including amplifiers and antenna systems.
CommScope, Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Corporate headquarters responsible for management system oversight of all locations listed on this certificate.
CommScope Inc. 6519 CommScope Road Catawba North Carolina 28609-0199 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Inc. 3642 US Hwy 70 East Claremont North Carolina 28610-0879 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Czech Republic s.r.o. Turanka 98B Brno 62700 Czech Republic	Manufacture and distribution of telecommunication products, including connectors and terminations.
CommScope Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Customer care, facility maintenance, and administrative functions.
ADC de Delicias, S. de R.L. de C.V. Blvd. Fernando Baeza No. 1301 Sur Delicias Chihuahua 33000 Mexico	Manufacturing and distribution of telecommunication products.

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

Page: 3 of 5

Certificate No: **EMS 648387**

Location	Registered Activities
ADC de Juarez S. de R.L. de C.V. Parque Industrial Antonio J Bermudez Ciudad Juarez Chihuahua 32470 Mexico	Manufacturing and distribution of telecommunication products.
CommScope Connectivity Belgium bvba Diestsesteenweg 692 Kessel-lo 3010 Belgium	Manufacture and distribution of telecommunication products.
CommScope Technologies de Juarez S. de R.L. de C.V. Santiago Troncoso 331 Praderas del Sur, Ciudad Juarez Chihuahua 32575 Mexico	Manufacture of Fiber Optic Splice Closures (FOSC), Fiber Guide Systems (FGS), Hardened Connectivity and Molding-Gel Filling, including: plastic injection molding, plastic extrusion, plastic and metal machining, and assembly operations.
CommScope Connectivity UK Limited Unit 1 Kinmel Park Bodelwyddan Rhyl, Denbighshire LL18 5TZ United Kingdom	Fibre optic cable manufacturing, termination and design of other telecommunication products and services.
CommScope 11312 S. Pipeline Road Eules Texas 76040 USA	Manufacture, distribution, field support and central function of telecommunication products.
ARRIS GROUP DE MEXICO SA DE CV Av. De la Paz, #11721 Parque Industrial Pacifico Tijuana Baja California 22643 Mexico	Manufacture, repair, support, repair service, distribution of products and components for telecommunications that provide integrated solutions for voice, video and data through the processes of SMT, manual and mechanical assembly, soldering (manual, selective, printed, wave) electrical testing and packaging.

Original Registration Date: 2016-03-01

Effective Date: 2022-03-15

Latest Revision Date: 2022-04-21

Expiry Date: 2025-03-14

Page: 4 of 5

Certificate No: **EMS 648387**

Location	Registered Activities
CommScope Design & Integration UK Ltd Unit 5 & 6, Eden Business Park Edenhouse Drive Old Malton Malton YO17 6AE United Kingdom	Manufacture and distribution of telecommunications products including cabinets.
Arris Indústria Eletrônica do Brasil Ltda. CNPJ: 09.154.836/0001-15 Avenida Torquato Tapajós, 9475 Tarumã Manaus Amazonas 69041-025 Brasil	Manufacturer and distribution of Receivers, Television signal Decoders and Modulator/Router.
CommScope Design and Integration UK Ltd. Lovell House, 412 The Quadrant Birchwood Park Warrington WA3 6FW United Kingdom	Telecommunications project management, site surveys, installations commissioning and rigging.

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

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FJWMPMPAD

Base Product



Singlemode MPO (Unpinned) to MPO (Unpinned), InstaPATCH® 360 Pre-terminated Trunk Cable, 12-Fiber, Low Smoke Zero Halogen

- *Product complies with the Build America, Buy America Act (BABAA) requirements of the Infrastructure Investment and Jobs Act of 2021 (Pub. L. 117- 58, §§ 70901-70953), or is the subject of a waiver approved by the Secretary of Commerce or designee. Compliance requirements and waiver applicability vary based on government funding program. Check the laws and regulations for your specific program.

Product Classification

Regional Availability	Asia Australia/New Zealand China Europe India Latin America Middle East/Africa North America
Portfolio	CommScope®
Product Type	Fiber trunk cable assembly
Product Brand	SYSTIMAX InstaPATCH® 360
Government Funding	Build America Buy America (BABA) compliant*
Ordering Note	For lengths greater than 999 ft (304 m), orders must be in meters Minimum length may vary based on cable configuration Not available in the United States or Canada

General Specifications

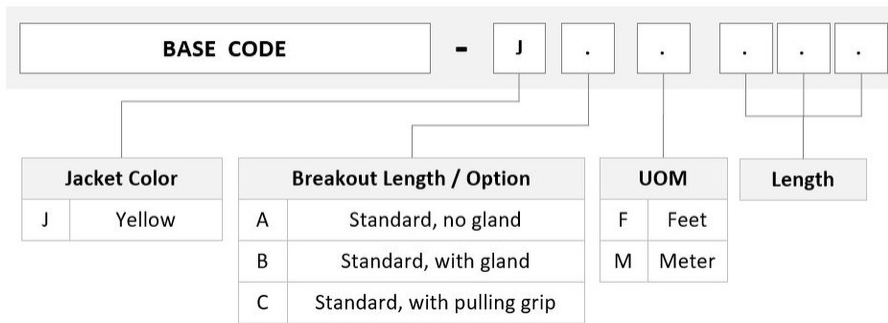
Color, boot A	Black
Color, connector A	Green
Color, boot B	Black
Color, connector B	Green
Construction Type	Stranded
Furcation Color	Yellow
Interface, Connector A	MPO-12/APC Female
Interface, Connector B	MPO-12/APC Female
Jacket Color	Yellow
Polarity	Method B (LL)
Fibers per Subunit, quantity	12
Total Fibers, quantity	12

Dimensions

FJWMPMPAD

Breakout Length	33 in
Cable Assembly Length Range (m)	3 – 999
Cable Assembly Length Range (ft)	10 – 999

Ordering Tree



Mechanical Specifications

Cable Retention Strength, maximum	11.24 lb @ 0 ° 4.40 lb @ 90 °
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Optical Specifications

Fiber Mode	Singlemode
Fiber Type	G.652.D G.657.A1, TeraSPEED®

Environmental Specifications

Operating Temperature	-10 °C to +60 °C (+14 °F to +140 °F)
Environmental Space	Dual Rated LSZH/Riser Indoor

Regulatory Compliance/Certifications

Agency	Classification
ANATEL	Compliant
CHINA-ROHS	Below maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant
UK-ROHS	Compliant

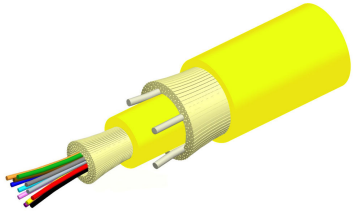
FJWMPMPAD



Included Products

- 760050328
N-012-MP-8W-F12YL/D
 - 860366137
- Fiber OSP cable, TeraSPEED® Low Smoke Zero Halogen Riser MPO Trunk, 12 fiber, Singlemode G.652.D and G.657.A1, Feet jacket marking, Yellow jacket color, Dca flame rating
 - MPO12, LOW LOSS, FEMALE, Singlemode, GREEN, 3mm

760050328 | N-012-MP-8W-F12YL/D



Fiber OSP cable, TeraSPEED® Low Smoke Zero Halogen Riser MPO Trunk, 12 fiber, Singlemode G.652.D and G.657.A1, Feet jacket marking, Yellow jacket color, Dca flame rating

Product Classification

Regional Availability	Asia Australia/New Zealand EMEA Latin America North America
Portfolio	CommScope®
Product Type	Fiber indoor cable
Product Series	N-MP

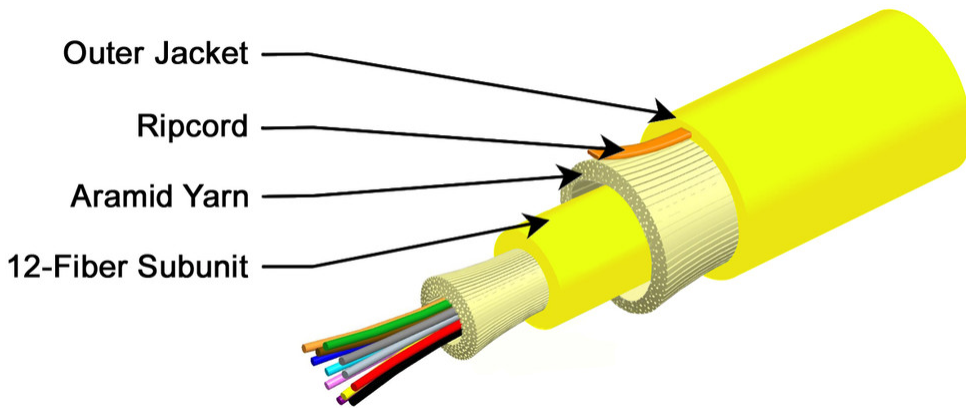
General Specifications

Cable Type	MPO trunk cable
Construction Type	Non-armored
Subunit Type	Gel-free
Jacket Color	Yellow
Jacket Marking	Feet
Total Fiber Count	12

Dimensions

Buffer Tube/Subunit Diameter	3 mm 0.118 in
Diameter Over Jacket	5.4 mm 0.213 in

Representative Image



Mechanical Specifications

Minimum Bend Radius, loaded	81 mm 3.189 in
Minimum Bend Radius, unloaded	54 mm 2.126 in
Tensile Load, long term, maximum	200 N 44.962 lbf
Tensile Load, short term, maximum	667 N 149.948 lbf
Compression	10 N/mm 57.101 lb/in
Compression Test Method	FOTP-41 IEC 60794-1 E3
Flex	300 cycles
Flex Test Method	FOTP-104 IEC 60794-1 E6
Impact	5.88 N-m 52.042 in lb
Impact Test Method	FOTP-25 IEC 60794-1 E4
Strain	See long and short term tensile loads
Strain Test Method	FOTP-33 IEC 60794-1 E1
Twist	10 cycles
Twist Test Method	FOTP-85 IEC 60794-1 E7
Vertical Rise, maximum	500 m 1,640.42 ft

Optical Specifications

Fiber Type	G.652.D and G.657.A1, TeraSPEED® OS2 OS2
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Environmental Specifications

Installation temperature	-20 °C to +60 °C (-4 °F to +140 °F)
Operating Temperature	-20 °C to +70 °C (-4 °F to +158 °F)

760050328 | N-012-MP-8W-F12YL/D

Storage Temperature	-40 °C to +70 °C (-40 °F to +158 °F)
Cable Qualification Standards	ANSI/ICEA S-83-596 Telcordia GR-409
EN50575 CPR Cable EuroClass Fire Performance	Dca
EN50575 CPR Cable EuroClass Smoke Rating	s1a
EN50575 CPR Cable EuroClass Droplets Rating	d1
EN50575 CPR Cable EuroClass Acidity Rating	a1
Environmental Space	Low Smoke Zero Halogen (LSZH) Riser
Flame Test Listing	NEC OFNR-ST1 (ETL) and c(ETL)
Flame Test Method	IEC 60332-3 IEC 60754-2 IEC 61034-2 UL 1666 UL 1685

Environmental Test Specifications

Heat Age	-20 °C to +85 °C (-4 °F to +185 °F)
Heat Age Test Method	IEC 60794-1 F9
Low High Bend	-20 °C to +70 °C (-4 °F to +158 °F)
Low High Bend Test Method	FOTP-37 IEC 60794-1 E11
Temperature Cycle	-20 °C to +70 °C (-4 °F to +158 °F)
Temperature Cycle Test Method	FOTP-3 IEC 60794-1 F1

Packaging and Weights

Cable weight	28 kg/km 18.815 lb/kft
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Regulatory Compliance/Certifications

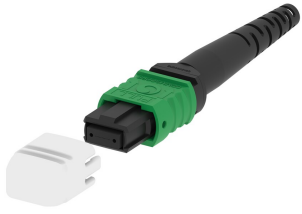
Agency	Classification
CENELEC	EN 50575 compliant, Declaration of Performance (DoP) available
CHINA-ROHS	Below maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant
UK-ROHS	Compliant



* Footnotes

Operating Temperature Specification applicable to non-terminated bulk fiber cable

860366137



MPO12, LOW LOSS, FEMALE, Singlemode, GREEN, 3mm

Product Classification

Regional Availability	Asia Australia/New Zealand EMEA Latin America North America
Portfolio	CommScope®
Product Type	Fiber connector
Product Brand	TeraSPEED®

General Specifications

Color	Green
Color, boot	Black
Ferrule Geometry	Angled
Interface	MPO/APC Female
Interface Feature	Unpinned
Total Fiber Count	12

Dimensions

Length	60.1 mm 2.366 in
Compatible Cable Diameter	3 mm 0.118 in

Material Specifications

Ferrule Material	Polymer
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Mechanical Specifications

Cable Retention Strength, maximum	11.24 lb @ 0 °
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Optical Specifications

Fiber Mode	Singlemode
Fiber Type	G.652.D and G.657.A1, TeraSPEED® OS2
Insertion Loss Change, mating	0.3 dB
Optical Components Standard	ANSI/TIA-568-C.3

860366137

Insertion Loss Change, temperature	0.3 dB
Insertion Loss, maximum	0.67 dB
Return Loss, minimum	55 dB

Packaging and Weights

Packaging quantity	1
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Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Below maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant
UK-ROHS	Compliant



* Footnotes

Insertion Loss Change, mating	TIA-568: Maximum insertion loss change after 500 matings
Insertion Loss Change, temperature	Maximum insertion loss change from -10 °C to +60 °C (+14 °F to +140 °F)

LIMITED WARRANTY



1. **Definitions.** For purposes of this Warranty, (i) "Buyer" shall mean the individual or entity identified on the applicable purchase order or supply agreement (or, if different, on Seller's quotation, order acknowledgement or statement of work), (ii) "Seller" shall mean the CommsScope entity identified on such entity's quotation, order acknowledgement, statement of work or supply agreement, (iii) "Hardware" means equipment designed and manufactured by or on behalf of Seller, or any third-party manufacturer's equipment offered for sale by Seller to Buyer, (iv) "Product" shall mean a product manufactured by or on behalf of Seller pursuant to the applicable supply agreement, quotation or order acknowledgement, and includes any combination of Hardware and Software, (v) "Services" means site engineering, system integration, product installation, implementation, training, maintenance and technical support services for Products, or other professional services provided by Seller to Buyer. Services exclude managed services and hosted cloud services provided by Seller, (vi) "Software" means Seller-licensed software, either embedded or standalone, including any updates provided, and any other enhancements, modifications, and bug fixes provided thereto, in object code form only (unless otherwise specified), and any full or partial copies thereof. Software does not include software created or owned by third parties, including but not limited to MediaKind Software, Google's Android Software or any third party application software, and (vii) "Warranty Period" means, unless a different time period is set forth in **Exhibit A**, (a) for Hardware, one year from date of original shipment from Seller's facility, (b) for Software-only Products, ninety (90) days from the date such Software is first made available to Buyer, or for Software embedded in a Hardware Product, ninety (90) days from date of original shipment of the Product from Seller's facility, and (c) for Services, thirty (30) days from the date the performance of such Services has been rendered.

2. **Limited Warranty.** Seller warrants that, as of the date of delivery, Seller has good title to the Product, free from any lawful security interest or other lien or encumbrance unknown to Buyer. In addition, during the Warranty Period, the Product and Services will be free from defects in materials or workmanship arising under proper and normal use. This Warranty shall apply only to the Products and Services and shall not apply to any other goods or materials, parts or components of a system or any system as a whole. This Warranty does not cover ordinary wear and tear. Seller does not warrant (i) Products not purchased from Seller or its authorized resellers; (ii) that the operation of the Product will be uninterrupted or error-free; (iii) that the Product will operate in combination with other third-party products selected by Buyer; or (iv) any products manufactured by third parties; provided that Seller will, to the extent permitted by the manufacturer, assign third-party warranties to Buyer. Seller gives no warranty for, and shall have no liability with respect to, any defects arising from any software (other than the Software), including, but not limited to MediaKind Software, Android Software or any third-party application software, downloaded to or otherwise used in conjunction with the Product. Seller further warrants to Buyer that during the Warranty Period, all Services performed by Seller for Buyer will be provided in a workmanlike manner.

3. **Disclaimers.** EXCEPT AS EXPRESSLY SET FORTH IN THIS LIMITED WARRANTY OR IN A SEPARATE, APPLICABLE SOFTWARE LICENSE AGREEMENT, ALL SOFTWARE IS LICENSED ON AN "AS IS" BASIS WITHOUT WARRANTY.

4. **Inspection and Return Authorization.** Buyer must promptly notify Seller of any claimed defect in the Product and/or Services. If Buyer claims that a Product is defective in materials or workmanship, Seller shall have the right to either examine the Product where it is located or, in its sole discretion, issue shipping instructions for return of the Product. Seller's inspection in response to a warranty claim shall not constitute acceptance or acknowledgment of the claim's validity. Except as otherwise agreed to in writing, Products may not be returned to Seller without prior authorization. Buyer must contact Seller to obtain an authorization number and return the Products to the location designated by Seller. Any Products returned to Seller without proper authorization will be returned to Buyer at Buyer's expense. Risk of loss, damage and insurance responsibilities for the Products shall not pass from Buyer to Seller until delivery of the Products to Seller's designated location. Buyer shall prepay all transportation charges for such return.

5. **Remedies.** Seller's sole and exclusive obligation and Buyer's exclusive remedy under this Warranty is Seller's repair or replacement of the defective Product or re-performance of Services or issuance of a credit for the net book value of the purchase price of the defective Product. Seller shall have sole discretion as to which of these remedies Seller will provide. Seller is not liable for any repair or maintenance costs incurred by Buyer, unless Seller authorizes such charges in writing in advance of the commencement of the work. If Seller elects to replace or repair the defective Product, the replaced or repaired Product will be warranted for the remainder of the Warranty Period applicable to the originally shipped Product, but the Warranty shall not be extended beyond the original Warranty Period. Replacement Products may be new, refurbished or contain refurbished materials.

6. **Notice and Waiver.** If Buyer discovers any defect in the Product, Buyer must provide prompt (and in no case later than thirty (30) days after discovery) written notice to Seller of the claimed defect. Such notice shall describe, in reasonable detail, the symptoms of such defect. The notice must be received by Seller during the Warranty Period for such Product. Failure to give timely notice of a claim shall result in Buyer's waiver of such claim.

7. **Transfer of Ownership.** This Warranty is not transferable unless Buyer is expressly authorized by Seller in writing to resell the Product. In addition, Buyer must notify Seller on or before the fifteenth (15th) day after the date on which it transfers ownership of the warranted Product. Any transfers in violation of this Section shall invalidate this Warranty. Notice of the transfer of ownership must be in writing and shall include the name and address of the new owner.

8. **Exclusions from Warranty.** This Warranty shall not apply to problems attributable to, or as a result of:

- (a) improper installation or misapplication of parts;
- (b) chain or system failures induced by other products or components;
- (c) lack of proper inspection or maintenance or failure to provide a suitable operating environment;
- (d) any consumables provided with the Product, including but not limited to batteries and other accessories, and any other materials, components or products manufactured by a third party;
- (e) power surges, fire, unusual mechanical, physical or electrical stress, severe weather conditions or acts of nature, including but not limited to, lightning or floods;
- (f) usage or operation not in accordance with published ratings, specifications or instructions, including but not limited to environmental specifications identified by Seller;
- (g) any adjustment, modification, alteration, removal or repair of any part of the Product, including but not limited to removal or alteration of serial numbers or other identifying marks not expressly authorized by Seller in writing;
- (h) accidental damage, misuse, abuse, neglect or unauthorized access of the Product or of any system of which the warranted Product is a part;
- (i) any type of aesthetic changes due to oxidation or corrosion occurring on stainless steel or galvanized steel parts installed in unusually corrosive marine and industrial atmospheres (in which case Seller's only obligation shall be to ensure that Product complies with Seller's published material specifications);
- (j) use of the Product for purposes other than that for which it was designed; or
- (k) mishandling during shipment of the Product.

LIMITED WARRANTY

This Warranty is for Products installed and used in accordance with Seller's design, installation and operating parameters. Buyer's failure to ensure conformity with such parameters will void all warranties. Under no circumstance shall Seller have any liability or obligation with respect to expenses, liabilities or losses associated with the installation or removal of any Product or the installation or removal of any components for inspection, testing or redesign occasioned by any defect or by any repair or replacement of a Product.

9. **Limitation on Liability.** THE WARRANTIES SET FORTH IN SECTION 2 HEREOF ARE EXCLUSIVE AND ARE MADE ONLY TO BUYER. SELLER MAKES NO OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY DISCLAIMS AND EXCLUDES ANY REPRESENTATION OR WARRANTY OF MERCHANTABILITY, NONINFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE AND ANY REPRESENTATION OR WARRANTY ARISING BY USAGE OF TRADE, COURSE OF DEALING OR COURSE OR PERFORMANCE. No person is authorized to give any additional warranties on Seller's behalf or to assume for Seller any other liability, except in a writing signed by an authorized officer of Seller. SELLER'S TOTAL LIABILITY FOR ANY CLAIM OR DAMAGE ARISING OUT OF AND/OR IN CONNECTION WITH THE MANUFACTURE, SALE, DELIVERY OR USE OF THE PRODUCTS OR SERVICES WILL BE LIMITED TO PROVEN DIRECT DAMAGES, NOT TO EXCEED (I) FOR PRODUCTS, THE DEPRECIATED VALUE OF THE PURCHASE PRICE OF SUCH PRODUCTS OR (II) FOR SERVICES, THE ACTUAL AMOUNT PAID TO SELLER FOR SERVICES DURING THE 12 MONTH PERIOD IMMEDIATELY PRIOR TO THE EVENT (OR SERIES OF EVENTS) GIVING RISE TO THE LIABILITY. IN NO EVENT WILL SELLER BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY CLAIM FOR LOSS OF ACTUAL OR ANTICIPATED DATA, USE, REVENUES OR PROFITS. The Products are not specifically designed, tested, manufactured or intended for operation or use in any inherently dangerous, life endangering or life support applications where any failure of the Products could lead to death, personal injury or significant physical or environmental damage (High Risk Activities). If Buyer uses the Products in High Risk Activities, including but not limited to nuclear facilities or the flight, navigation or communication of aircraft, Buyer agrees that neither Seller nor its third party licensors are liable in whole or in part, for any claims or damages arising from such use, and that Buyer shall indemnify and hold Seller and its third party licensors harmless from any and all claims for loss, cost, damage, expense or liability arising out of or in connection with any use of the Products in High Risk Activities. These limitations on liability will apply regardless of the form of action, whether in contract, tort, strict liability or otherwise, and whether damages were foreseeable and will survive failure of any exclusive remedies provided in Section 4 hereof.

10. **Choice of Law.** The terms and conditions contained herein and the rights of the parties to any transaction to which they relate shall be governed by and construed in accordance with the laws of the State of North Carolina, U.S.A. The United Nations Convention on Contracts for the International Sale of Goods shall not apply.

LIMITED WARRANTY

Exhibit A

Product Categories	Warranty Period from Original Shipment Date*
<p>Category A Products E6000® Converged Edge Router (CER); E6000n™ Remote PHY Devices (RPDs); E6000r™ Remote PHY Shelves; E6000n™ Remote MACPHY Devices (RMDs); vManager; Remote OLT (R-OLT); associated power supplies and accessories. FLX PON OLT portfolio including vOLT. CherryPicker products, Encoder products including ME-7000, SE-6000; DSR-4xxx, DSR-6xxx and DSR-7xxx series IRD products, and Uplink systems including TME-2020, VDP-1000, BNC, DEM, and SEM; All APEX Universal EQAM including APEX1000 and APEX3000; All Aloha interactive products including OM2000, ARPD, ADM4000 and NC1500 4.0. All SDM products. All VUE and VTM Software Products. All STDC products.</p>	Hardware One (1) Year Software Ninety (90) Days
<p>Category B Products All High and Standard Definition Transport Adapter MS4000™ Media Streamer</p>	Hardware One (1) Year Software Ninety (90) days ** For certain CPE, option for 1% overship in lieu of Hardware warranty is standard
<p>Category C Products Intentionally left blank.</p>	
<p>Category D Products All Third Party OEM Products: power meters; All VUE and VTM hardware platforms; NC1500 4.0 hardware platform; LQA256 Legacy QAM Adapter; Elemental Products including Live, Server, Delta, Conductor and StatMux; DC2180 Cabinet Node. Cooling Systems</p>	Pass Through from OEM: Hardware One (1) Year Software Ninety (90) Days
<p>Category E Products Intentionally left blank</p>	
<p>Category F Products All OM and SG optical node platforms, Flex Max® and Starline® amplifier platforms, RF Taps & Passives, and Optical Passives</p>	Hardware Five (5) Years within the United States and Canada Hardware Three (3) Years outside United States and Canada Software Ninety (90) Days
<p>Category F1 Products All CHP Headend Optical (HEO) Elements</p>	Hardware Three (3) Years Software Ninety (90) Days
<p>Category G1 Products All NC optical node platforms and Optical Passives, including OP/NP/DP/DC models.</p>	Hardware Five (5) Years Software Ninety (90) Days
<p>Category G2 Products All CH3 Headend (HEO) Elements</p>	One (1) year
<p>Category G3 Products All EPON and GPON ONUs, RFoG/HPON R-ONUs, including, CP8 models and associated power supplies and accessories</p>	Hardware Three (3) Years Software Ninety (90) Days

LIMITED WARRANTY

<p>Category H Products All ConvergeMedia™ Distribution Platforms and Management Suite, AdManager™ including SkyVision Ad Management and EMP solutions CVEx™, SVA, all Vertasent products including SVOM, SVM and ERM, AdEdge™ COM and AdEdge APS,VMS, Manifest Delivery Controller (MDC), ARRIS Video Content Manager (AVCM) and Next Generation Insertion (NGI) and Multicast ABR.</p>	<p>Hardware One (1) Year Software Ninety (90) Days</p>
<p>Category I Products ServAssure® Advanced, ServAssure® NXT - Alarm Central, ServAssure® NXT - Analyze, ServAssure Domain Manager and EventAssure™. WorkAssure™@ Workforce Management, Mobile TV, SecureMedia and Titanium</p>	<p>Hardware One (1) Year Software Ninety (90) Days</p>
<p>Category J Products Intentionally left blank</p>	
<p>Category K Products Intentionally left blank.</p>	
<p>Category L Products Intentionally left blank</p>	
<p>Category M Products Intentionally left blank.</p>	
<p>Category N Products Intentionally left blank.</p>	
<p>Category O Products All CAS Products including DAC, CASMR (and associated plug-ins), CAST, Advisor, CSS, OLL, CSS-Lite, KLS, DKS, CPMS</p>	<p>DAC, CASMR, CAST, Advisor, CSS Hardware Three (3) Years OLL, CSS-Lite, KLS, DKS, OLES, CPMS Hardware One (1) Year Software Ninety (90) Days</p>
<p>Category P Products Intentionally left blank.</p>	
<p>Category P1 Products Intentionally left blank</p>	
<p>Category Q Products Intentionally left blank</p>	
<p>Category R Products Intentionally left blank</p>	
<p>Category R1 Products Intentionally left blank</p>	
<p>Category S Products Intentionally left blank</p>	
<p>Category S1 Products Intentionally left blank</p>	

LIMITED WARRANTY

<p>Category T Products RUCKUS Wi-Fi</p>	<p>Hardware:</p> <ul style="list-style-type: none"> - Indoor Access Points and Wall Plate Access Points – Limited Lifetime Warranty,** except for access points with an “e” suffix (e.g., R350e), for which the HW warranty period is one (1) year. - Outdoor Access Points – One (1) Year - Controllers – One (1) Year, except ZoneDirector controllers are covered by the Limited Lifetime Warranty** <p style="text-align: center;">Software Ninety (90) Days</p>
<p>Category T1 Products RUCKUS ICX Switches</p>	<ul style="list-style-type: none"> - ICX Switches (including switch modules, PSUs, and Fans, but excluding removable optics/transceivers and LEDs) – Limited Lifetime Warranty,** except for ICX 7150- C08PT, for which the HW warranty period is 13 months. - LEDs – 12 months - Removable Optics/Transceivers – 60 months (13 months if shipped from Seller prior to June 1, 2021) <p>Software: Limited lifetime access to defect repairs, and software maintenance updates through end of support date of product</p>
<p>Category T2 Products Intentionally left blank</p>	
<p>Category U Products</p> <p>Other OSP Cable Products (P3®, Drop Coax, Fiber Cable, Fiber Drop Cable, CIC)</p> <p>NovuX Products</p> <p>Prodigy</p> <p>Products FDH</p> <p>Products</p> <p>Multiservice terminals (MST), Open Terminals (OTE) and Hardened Drop Cable</p> <p>Assemblies OSP “Box” Products</p> <p>Mini-RDTs and RDTs</p> <p>FOSC™, FIST™ and</p> <p>Tenio™</p> <p>OSP Copper Connect and Closure Products</p> <p>HELIAX® FiberFeed® Products, including FiberFeed® hybrid and fiber cables and assemblies, power cables and junction boxes</p> <p>Fiber Optic Panels, including Accessories, Mounting Hardware, Modules</p> <p>Fiber Optic Field Terminated Connectors, Kits, Tools, Consumables,</p> <p>Accessories Indoor Fiber Cable, Patch Cords, Cable Assemblies, Fiber Trunks</p> <p>Passive Optical Components and Value Added Modules (VAMs)</p> <p>FiberGuide® : Fiber cable Management System</p> <p>Optical Distribution Frames, including Modules, Blocks, Accessories and</p> <p>Hardware Cabinets Cable and Apparatus Products</p> <p>Alifabs™ Cabinets & Ancillary Products</p> <p>Alifabs™ Telecommunications Towers and Accessories</p> <p>Metro Cell Products, including Enclosures; Integrated Pole; Standard Poles; Accessories; and Wood Pole Brackets</p>	<p>One (1) year</p>

LIMITED WARRANTY

<p>Category V Products ValuDAS® Passive Products, including Air Directional Couplers, Hybrid Couplers, High Power Splitters, and Cell-Max™ Antennas Standard Tower Mounted Amplifier, Bias Tee and Power Distribution Unit Products Standard Filter & Combiner Products</p> <p>Electronic Enclosure Products (Cabinets)</p> <p>Alifabs™ Free Cooling Products and Accessories and Spare Parts, including Monitor All-In-One FLX (Active Passive Cabines)</p> <p>PowerShift™ & Power Products</p>	<p>Two (2) years</p>
<p>Category W Products ValuSite® Products</p> <p>I-Line Accessory Products</p> <p>Microwave Antennas</p> <p>Terrestrial Microwave System Products (including Microwave System Flex-Twist, Coupler, Filter and Diplexer Products)</p>	<p>Three (3) years</p>
<p>Category X Products Broadband RF Connectivity Products</p> <p>Premium Passive Products, including In-Building Directional Couplers, Hybrid Matrices, Tappers, Power Splitters, Terminations, Attenuators and CMAX Antenna Products</p>	<p>Five (5) years</p>
<p>Category Y Products QR® Coaxial Cable</p>	<p>Five (5) years</p>
<p>Category Z Products Standard RADIAX® Cable, Connector, Accessory and Cable Assembly* Products</p> <p>* RADIAX® Cable Assembly Product means any RADIAX® coaxial cable that has been fitted with Seller’s connectors in accordance with the installation instructions.</p>	<p>One (1) year</p>
<p>Category AA Products Standard CNT® Cable, Connector, Accessory and Cable Assembly* Products</p> <p>* CNT® Cable Assembly Product means any CNT® coaxial cable that has been fitted with Seller’s connectors by Seller or its certified distributor</p>	<p>Five (5) years; except that the Warranty Period for Products purchased for resale purposes shall be one (1) year.</p>
<p>Category BB Products Standard HELIAX® Cable, Connector, Accessory and Cable Assembly* Products</p> <p>* HELIAX® Cable Assembly Product means any HELIAX® coaxial cable or elliptical waveguide that has been fitted with Seller’s connectors by Seller or its certified distributor.</p>	<p>Ten (10) years; except for the following: (i) three (3) years for weatherproofing kits (including SureGuard boots); (ii) one (1) year for cable preparation tools (excluding blades); (iii) one year for single click-on hanger kits; and (iv) two (2) years for surge arrestors.</p>
<p>Category CC Products Standard ERA/ION-E®, ION-M®, ION-U®, MR, CMR, i-POI®, e-POI™, and Node Repeater Products</p>	<p>Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of shipment.</p> <p>Software Ninety (90) Days</p>
<p>Category DD Products In- Building and Fixed Subscriber Antennas</p>	<p>The earlier of: (i) three (3) years from the date of installation or (ii) thirty-nine (39) months from the date of original shipment</p>

LIMITED WARRANTY

<p>Category EE Products OneCell®</p> <p>Powered Fiber Cable Solution: Hybrid Copper and Fiber Cables, Class 2 Power Supplies, Indoor/Outdoor POE Extenders, Field Terminated Outlets, Consolidation Boxes and Related Passive Components</p>	<p>Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of original shipment Software Ninety (90) Days</p>
<p>Category FF Products Small Cell Device Management System (DMS) Software DAS Device Management System (AIMOS) Software</p>	<p>Ninety (90) days</p>
<p>Category GG Products Base Station Antenna, Small Cell Antenna & Mosaic™ Products</p>	<p>Two (2) years for all base station antennas except base station antennas incorporating N-type connectors, which shall have a warranty of one (1) year</p>
<p>Category HH Products DryLine® Dehydrator Systems and Line Monitoring Systems</p>	<p>Three (3) years or 3,000 hours of actual run time, whichever occurs first; except the Warranty Period for the compressor is only one (1) year or 1,000 hours of actual run time, whichever occurs first.</p>
<p>Category II Products SiteRise™ Solutions</p>	<p>One (1) year on workmanship for the Solution.</p>
<p>Category JJ Products Copper Structured Cabling Products</p> <p>Other Enterprise Products (Coax, Automotive Cables, Enterprise Enclosures and miscellaneous items) (excluding software)</p>	<p>One (1) year from the date of Installation</p>
<p>Category KK Products Alifabs™ Services (power upgrades, enablements, installation and decommission work, rigging, and fault management)</p>	<p>One (1) year from the date of completion of the work.</p>
<p>Category LL Products imVision Overlays and Controllers</p>	<p>Three (3) years</p>

** For Category H and Category I Products only, if Seller is engaged by Buyer to provide Services for the implementation of the purchased Products, warranty period for such Products shall commence upon Buyer's acceptance of the Products and Services.*

*** For Category T Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing for as long as the original end user of the Product continues to own and use the Product. For Category T1 Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing (i) for as long as the original end user of the Product continues to own and use the Product or (ii) through the End of Support date, as defined in the RUCKUS End of Life Policy, whichever is earlier.*

RoHS Certificate of Compliance




Product Name: FOA TS MP(f)-MP(f) 12f IPD LSZH
Product Number: FJWMPMPAD

Company Name: CommScope
3642 E US Highway 70
Claremont, NC 28610 USA

Contact: ProductCompliance@Commscope.com

Generated on: May 07, 2024

Certified by: 

Vinatha Viswanathan, Director Product Compliance

Disclaimer

This information is provided based on reasonable inquiry of our suppliers and represents our current actual knowledge based on the information they provided and our analysis and assessment of the risks. This information is subject to change and if a change occurs which affects compliance, then this Statement will be updated. Compliance to EU ROHS 2011/65 amended by EU RoHS 2015/863 means the part numbers have a maximum concentration of no more than 0.1% by weight in homogenous materials for lead, hexavalent chromium, mercury, PBB, PBDE, and 0.01% for cadmium, or qualify for an exemption to these limits as defined in the Annexes of Directive 2011/65/EU (RoHS2). These parts also have a maximum concentration of no more than 0.1% by weight in homogenous materials for DEHP, BBP, DBP and DIBP (substances that are restricted starting from July 22, 2019). Finished electrical and electronic products will be CE marked as required by Directive 2011/65/EU. Components may not be CE marked.

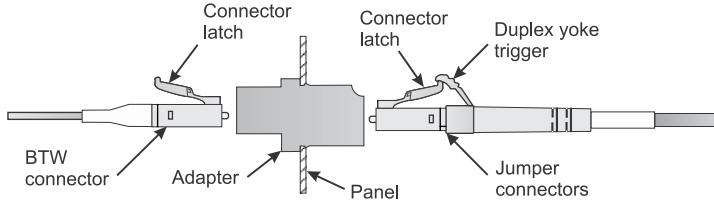
Compliance Status	Regulation	Revision	RoHS exemptions if any
Compliant	ROHS	EU RoHS - 2011/65/EU	

For optimal connectivity performance, invest in a Fiber Optic Inspection and Cleaning Kit for your installation team.

CommScope® Cleaning and Inspection Kit – 760053199 -- Consumable Replacement Kit – 760053207

Install LC Connectors into Adapter

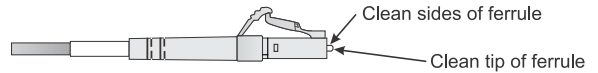
1. Install connectors into the adapter by aligning the latch on the connector with the slot on the adapter and gently push into place. An audible click is heard when the connector snaps into the adapter.
2. If a high-loss condition exists, use the LC cleaning procedures and reinstall the connector as described in Step 1.
3. When doing rearrangements or reinsertions of LC connectors, use the LC cleaning procedures to clean all components and reinstall the connectors as described in Step 1.



Clean LC Connector and Adapter

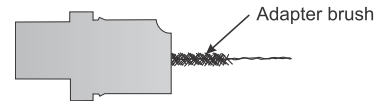
Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face. **Clean connector ferrule** inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.



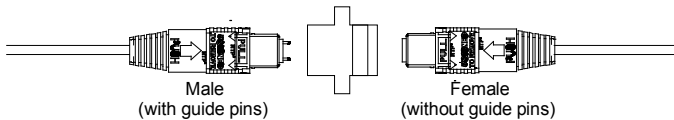
Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.

Caution: Do not try to clean adapter with a standard pipe cleaner. The sleeve inner diameter of LC adapters is too small. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side. Discard cleaning sticks after each use.



Install MPO Connectors into MPO Adapter

1. Before installing, remove the dust cap and refer to the MPO cleaning instructions.
2. Attach an MPO connector end into an MPO adapter by aligning the key on the connector body with the keyway in the adapter. Apply enough pressure till you hear a "click" sound, which signifies that the connector is plugged into the adapter.



3. If a high loss is present, remove the MPO connector, use the MPO cleaning instructions and reinstall the connector.
4. Whenever disconnecting and reconnecting the MPO connector, refer to the MPO cleaning instructions before reinstallation.

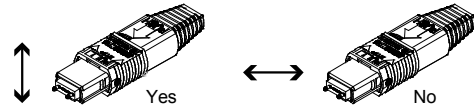
Warning: Do not connect male connector ends to each other. Doing so will damage the connector end face. Do not connect two female ends. If you do connect two female ends together, the test results will present a high insertion loss.



Cleaning the MPO Connector and MPO Adapter

Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face. **Clean connector ferrule** inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Applying medium pressure, wipe the end face in direction perpendicular to fiber array and all the way around each pin. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule is not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. To prevent scratching the end face, always clean the MPO connectors with a cleaning motion from top to bottom. Never clean the MPO connector by rubbing across it from side to side.



Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently wiping inside surface. Repeat process with a dry cleaning stick.

Caution: Do not try to clean the adapter with cleaning stick if a connector is mounted in one side. Discard cleaning sticks after each use.

- For product information and support, visit us on the web at <http://www.commscope.com/SupportCenter>
- For technical assistance:
 - Within the United States, contact your local account representative or technical support at 1-800-344-0223. Outside the United States, contact your local account representative or Authorized Business Partner.
 - Within the United States, report any missing/damaged parts or any other issues to CommScope Customer Claims at 1-866-539-2795. Outside the United States, contact your local account representative or Authorized Business Partner.

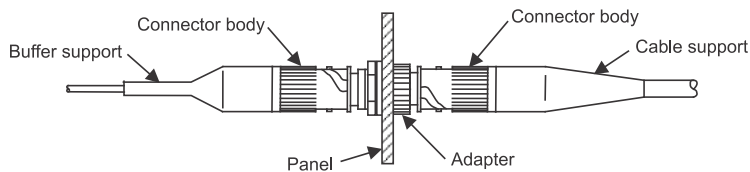
ST[®] and SC Connectors

For optimal connectivity performance, invest in a Fiber Optic Inspection and Cleaning Kit for your installation team.

CommScope[®] Cleaning and Inspection Kit – 760053199
Consumable Replacement Kit – 760053207

Install ST[®] Connectors into Adapter

1. Install the connectors into the adapter by aligning the mark on the rim of the connector body with the slot in the adapter. Complete the connection by pushing the connector into the adapter with a clockwise twist-locking motion.
2. If a high-loss condition exists, use the ST cleaning procedures and reinstall the connectors as described in Step 1.
3. When doing rearrangements or reinsertions of ST connectors, use the ST cleaning procedures to clean all components and reinstall the connectors as described in Step 1.

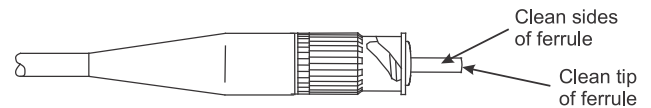


Clean ST Connector and Adapter

Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face.

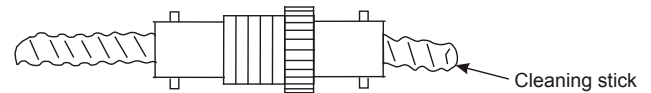
Clean connector ferrule inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.



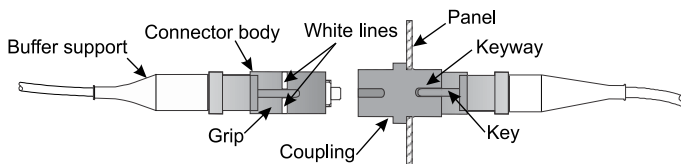
Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.

Caution: Discard cleaning sticks after each use. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side.



Install SC Connectors into Adapter

1. Install each connector into the adapter by aligning the key on the connector body with the keyway on the adapter. The connector is properly installed when the white line in the grip disappears inside the adapter.
2. If a high-loss condition exists, use the SC cleaning procedures and reinstall the connectors as described in Step 1.
3. When doing rearrangements or reinsertions of SC connectors, use the SC cleaning procedures to clean all components and reinstall the connectors as described in Step 1.



Clean SC Connector and Adapter

Clean exposed connector ferrule by lightly moistening lint-free wipe with fiber optic cleaning solution (or >91% isopropyl alcohol), and by applying medium pressure, first wipe against wet area and then onto dry area to clean potential residue from end face.

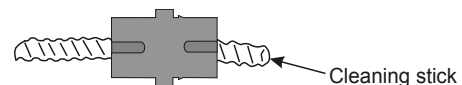
Clean connector ferrule inside adapter by inserting lightly moistened cleaning stick with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter until contact is made with connector on opposite end. Rotate cleaning stick with medium pressure in one circular motion as it is pulled away from the adapter. Repeat process using dry cleaning stick.

Caution: Signal strength will be affected if end and sides of ferrule are not thoroughly cleaned. Discard cleaning sticks after each use. Do not turn cleaning sticks back and forth pressing against connector end face. This may cause scratches if large contamination is present. Always inspect connector end face for contamination after each cleaning.



Clean adapter by inserting adapter cleaning stick (or fiber adapter sleeve brush) moistened with fiber optic cleaning solution (or >91% isopropyl alcohol) inside the adapter and gently pull out with twisting motion. Repeat process with a dry cleaning stick.

Caution: Discard cleaning sticks after each use. Do not try to clean the adapter with cleaning stick if a connector is mounted in one side.



CERTIFICATE

Certificate Number: 111045.000
Including Seven Page Addendum

The Quality Management System and implementation of:

CommScope, Inc.

With Virtual Central Function at:
1100 CommScope Place SE
Hickory, NC 28602
United States

meets the requirements of the standard:

ISO 9001:2015

Scope:

The sales, marketing, design, manufacture, test, repair, support, service, and distribution of telecommunications products, components, and services for the telecommunications, wireless, and broadcast networks industries

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Business Segments	Exceptions
Connectivity and Cable Solutions (CCS)	None
Networking, Intelligent Cellular & Security Solutions (NICS)	None
Outdoor Wireless Networks (OWN)	None
Access Network Solutions (ANS)	None



Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
Atlanta, GA 30339 USA
(215) 997-4519
<https://www.dekra.us/en/audits/>



CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page One of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Activities Legend:	HQ = Headquarters	MFG = Manufacturing	SER = Services (Professional Services and/or Technical Support)
	HW DE= Hardware Development	REP = Repair	SC = Purchasing, Supplier Management, Manufacturing Support, Repair Support
	SW DE= Software Development	SAL = Sales, Marketing	DIST = Distribution

Site Address	Site Activities
CommScope Inc 1100 CommScope Place SE Hickory, NC 28602 United States	HQ (Virtual)
ARRIS Technology, Inc. 3871 Lakefield Drive Suwanee, GA 30024 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 101 Tournament Dr. Horsham, PA, 19044 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 6450 Sequence Drive San Diego, CA 92121 United States	SW DE, SER
ARRIS Technology, Inc. 900 Chelmsford St. Lowell, MA 01851 United States	HW & SW DE, SER, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001



Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
Atlanta, GA 30339 USA
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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
 ADDENDUM Page Two of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
ARRIS Solutions, Inc. 2400 Ogden Ave., Suite 180 Lisle, IL 60532 United States	HW & SW DE, SAL, SER, SC
ARRIS 15 Sterling Drive Wallingford, CT 06492 United States	HW & SW DE, SER, SC
ARRIS Technology, Inc. 2450/2500 Walsh Avenue Santa Clara, CA 95051 United States	HW & SW DE, SAL, SER
Ruckus Wireless International Inc. 350 West Java Dr. Sunnyvale, CA 94089 United States	HW & SW DE, SER
Ruckus Wireless Network Technology (Shenzhen) Co. Ltd. Units C&D, 5th Floor, No. 2 Finance base, 8 KeFa Road, Shenzhen, China	SW DE, SC, HW DE

Certificate Expires: January 04, 2026
 Certificate Issued: January 05, 2023
 Certified Since: January 10, 2001



Dr. Cem O. Onus
 Managing Director

DEKRA Certification, Inc.
 1945 The Exchange SE #300
 Atlanta, GA 30339 USA
 (215) 997-4519
<https://www.dekra.us/en/audits/>



CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Three of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
CommScope Asia (Suzhou) Technologies Co., Ltd. 77 Qiming Road, Suzhou Industrial Park Suzhou, Jiangsu 215121 Peoples Republic of China	MFG, SC
Ruckus Wireless International Inc., Taiwan Branch @ Neihsu District, Taipei City, Rui Road 411, 10th floor, Taipei	SW DE
ARRIS Group India Pvt Limited (AGIPL) Salarpuria Supreme, Ground Floor West Wing & First Floor Munnekolalu Village, Varthur Hobli, Outer Ring Road, Bangalore-560037	SW DE
ARRIS Group de Mexico S.A. de C.V. Av. La Paz 11721 Parque Industrial Pacifico Tijuana, BC 22643 Mexico	MFG, REP, SC
ARRIS Communications Ireland Limited Building 4300, Cork Airport Business Park Kinsale Road Cork County Ireland	HW & SW DE
ARRIS Group India Private Limited "The Senate" No:33/1, Ulsoor Road, Bangalore - 560 042 India	HW & SW DE

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001



Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Four of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
ARRIS Group, Inc. 50 Stranmillis Embankment Belfast, BT95FL Northern Ireland	SW DE
CommScope Czech Republic, s.r.o Turanka 856/98B 627 00 Brno Czech Republic	HW DE,
CommScope CZ, spol. s.r.o. U Morusi 888, 53006 Pardubice Czech Republic Czech Republic	HW DE,
CommScope Connectivity UK Limited Units 1 and 4 Kinmel Park Industrial Estate Bodelwyddan, Denbighshire, LL18 5TZ United Kingdom	HW DE, MFG, SAL
CommScope Design & Integration UK Ltd. Unit 5 & 6 Eden Business Park Eden House Drive Old Malton, Malton, North Yorkshire YO17 6AE United Kingdom	HW DE, MFG, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001



Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Five of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
CommScope Design & Integration UK Limited 412 The Quadrant, Birchwood Park Warrington, WA3 6FW United Kingdom	SER
CommScope EMEA Ltd. Corke Abbey Avenue Bray, Co. Dublin Ireland	MFG, SAL
CommScope EMEA Ltd. Diestsesteenweg 692 3010 Kessel-Lo, Belgium	HW DE, MFG, SAL
CommScope Italy Srl Via Archimede, 22/24 Agrate Brianza (MB) 20864 Italy	HW DE, REP, SW DE
Telecom Networks Americas AV. HIPOLITO YRIGROYEN 2999, DEPOSITO 6 EL TALAR, TIGRE Buenos Aires B1618AXD Argentine Republic	SAL, DIST
CommScope Networks India Private Limited Salarpuria Softzone, A Block, 1st Floor Survey No 80/1, 81/1, 81/2, B Wing, Belandur Village, Varthur Hobli, Outer Ring Bangalore – Karnataka 560103 India	SW DE
ADC India Communications Ltd. No 10 C , 2nd Phase Peenya Industrial Area Bangalore – Karnataka 560058 India	MFG, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001



Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Six of Seven

The Quality Management System and implementation of:

CommScope, Inc.

With site at:

CommScope Asia (Suzhou) Technologies Co.,Ltd.

77 Qiming Road, Suzhou Industrial Park
Suzhou, Jiangsu 215121
Peoples Republic of China

meets the requirements of the standard:

ISO 9001:2015

The validity of this certificate depends on the validity of the main certificate.

Scope:

Production of network cable, fiber cable and communication equipment component (copper patch cords, copper panel, accessories etc.)

Certification Structure: Multi-site

Certificate Expires:	January 04, 2026
Certificate Issued:	January 05, 2023
Certified Since:	January 10, 2001



Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
Atlanta, GA 30339 USA
(215) 997-4519
<https://www.dekra.us/en/audits/>



证书附录

证书编号: 111045.000

附录第7页,共7页

质量管理体系和实施:

CommScope, Inc.

其场所:

康普科技 (苏州) 有限公司

中国江苏省苏州工业园区启明路77号,邮编215121

符合以下标准要求:

ISO 9001:2015

本证书的有效性取决于主证书的有效性。

范围:

网络线、光缆、通信系统设备材料(网络跳线、配线装置等)的生产。

认证结构: 多场所

证书有效期: 2026.01.04

发证日期: 2023.01.05

首次发证日期: 2001.1.10



Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
Atlanta, GA 30339 USA
(215) 997-4519
<https://www.dekra.us/en/audits/>



Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2015

This is to certify that:

CommScope, Inc. of North Carolina
1100 CommScope Place SE
Hickory
North Carolina
28603-0339
USA

Holds Certificate No:

EMS 648387

and operates an Environmental Management System which complies with the requirements of ISO 14001:2015 for the following scope:

The environmental management system to control the risks associated with the manufacture, distribution, field support and central function of telecommunication products and services.

For and on behalf of BSI:

Carlos Pitanga, Chief Operating Officer Assurance – Americas

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

Page: 1 of 5



...making excellence a habit.™

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Telecommunications de Reynosa S. de R.L. de C.V. Av. Industrial Reynosa Lte 2 al 5 Parque Industrial Center Reynosa Tamaulipas 88780 Mexico	Manufacture and distribution of telecommunication products including antenna and cable.
CommScope Asia (Suzhou) Technologies Co., Ltd. EPZ II, 77 Qiming Road Suzhou Industrial Park Suzhou Jiangsu 215121 China	Manufacture and distribution of telecommunication products, including cable.
Andrew Telecommunications India Pvt. Ltd. Plot No. N-2, Phase IV Verna Industrial Estate Verna Salcette Goa 403 722 India	Manufacture and distribution of telecommunication products, including antenna and cable.
CommScope EMEA Ltd. Corke Abbey Avenue Bray County Dublin A98FY03 Ireland	Manufacture and distribution of telecommunication products, including cable and connectors.
CommScope Telecommunications (China) Co., Ltd. 68 West Su Hong Xi Lu Suzhou Industrial Park Suzhou Jiangsu 215021 China	Manufacture and distribution of telecommunication products, including antenna and cables.

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

Page: 2 of 5

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Wireless Systems GmbH Industriering 10 Buchdorf 86675 Germany	Manufacture and distribution of telecommunication products, including amplifiers and antenna systems.
CommScope, Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Corporate headquarters responsible for management system oversight of all locations listed on this certificate.
CommScope Inc. 6519 CommScope Road Catawba North Carolina 28609-0199 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Inc. 3642 US Hwy 70 East Claremont North Carolina 28610-0879 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Czech Republic s.r.o. Turanka 98B Brno 62700 Czech Republic	Manufacture and distribution of telecommunication products, including connectors and terminations.
CommScope Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Customer care, facility maintenance, and administrative functions.
ADC de Delicias, S. de R.L. de C.V. Blvd. Fernando Baeza No. 1301 Sur Delicias Chihuahua 33000 Mexico	Manufacturing and distribution of telecommunication products.

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

Page: 3 of 5

Certificate No: **EMS 648387**

Location	Registered Activities
ADC de Juarez S. de R.L. de C.V. Parque Industrial Antonio J Bermudez Ciudad Juarez Chihuahua 32470 Mexico	Manufacturing and distribution of telecommunication products.
CommScope Connectivity Belgium bvba Diestsesteenweg 692 Kessel-lo 3010 Belgium	Manufacture and distribution of telecommunication products.
CommScope Technologies de Juarez S. de R.L. de C.V. Santiago Troncoso 331 Praderas del Sur, Ciudad Juarez Chihuahua 32575 Mexico	Manufacture of Fiber Optic Splice Closures (FOSC), Fiber Guide Systems (FGS), Hardened Connectivity and Molding-Gel Filling, including: plastic injection molding, plastic extrusion, plastic and metal machining, and assembly operations.
CommScope Connectivity UK Limited Unit 1 Kinmel Park Bodelwyddan Rhyl, Denbighshire LL18 5TZ United Kingdom	Fibre optic cable manufacturing, termination and design of other telecommunication products and services.
CommScope 11312 S. Pipeline Road Eules Texas 76040 USA	Manufacture, distribution, field support and central function of telecommunication products.
ARRIS GROUP DE MEXICO SA DE CV Av. De la Paz, #11721 Parque Industrial Pacifico Tijuana Baja California 22643 Mexico	Manufacture, repair, support, repair service, distribution of products and components for telecommunications that provide integrated solutions for voice, video and data through the processes of SMT, manual and mechanical assembly, soldering (manual, selective, printed, wave) electrical testing and packaging.

Original Registration Date: 2016-03-01

Effective Date: 2022-03-15

Latest Revision Date: 2022-04-21

Expiry Date: 2025-03-14

Page: 4 of 5

Certificate No: **EMS 648387**

Location	Registered Activities
CommScope Design & Integration UK Ltd Unit 5 & 6, Eden Business Park Edenhouse Drive Old Malton Malton YO17 6AE United Kingdom	Manufacture and distribution of telecommunications products including cabinets.
Arris Indústria Eletrônica do Brasil Ltda. CNPJ: 09.154.836/0001-15 Avenida Torquato Tapajós, 9475 Tarumã Manaus Amazonas 69041-025 Brasil	Manufacturer and distribution of Receivers, Television signal Decoders and Modulator/Router.
CommScope Design and Integration UK Ltd. Lovell House, 412 The Quadrant Birchwood Park Warrington WA3 6FW United Kingdom	Telecommunications project management, site surveys, installations commissioning and rigging.

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

Page: 5 of 5

This certificate remains the property of BSI and shall be returned immediately upon request.

An electronic certificate can be authenticated [online](http://www.bsigroup.com/ClientDirectory). Printed copies can be validated at www.bsigroup.com/ClientDirectory To be read in conjunction with the scope above or the attached appendix.

Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowlhill, Milton Keynes MK5 8PP. Tel: + 44 345 080 9000
BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.
A Member of the BSI Group of Companies.

LIMITED WARRANTY



1. **Definitions.** For purposes of this Warranty, (i) “Buyer” shall mean the individual or entity identified on the applicable purchase order or supply agreement (or, if different, on Seller’s quotation, order acknowledgement or statement of work), (ii) “Seller” shall mean the CommsScope entity identified on such entity’s quotation, order acknowledgement, statement of work or supply agreement, (iii) “Hardware” means equipment designed and manufactured by or on behalf of Seller, or any third-party manufacturer’s equipment offered for sale by Seller to Buyer, (iv) “Product” shall mean a product manufactured by or on behalf of Seller pursuant to the applicable supply agreement, quotation or order acknowledgement, and includes any combination of Hardware and Software, (v) “Services” means site engineering, system integration, product installation, implementation, training, maintenance and technical support services for Products, or other professional services provided by Seller to Buyer. Services exclude managed services and hosted cloud services provided by Seller, (vi) “Software” means Seller-licensed software, either embedded or standalone, including any updates provided, and any other enhancements, modifications, and bug fixes provided thereto, in object code form only (unless otherwise specified), and any full or partial copies thereof. Software does not include software created or owned by third parties, including but not limited to MediaKind Software, Google’s Android Software or any third party application software, and (vii) “Warranty Period” means, unless a different time period is set forth in **Exhibit A**, (a) for Hardware, one year from date of original shipment from Seller’s facility, (b) for Software-only Products, ninety (90) days from the date such Software is first made available to Buyer, or for Software embedded in a Hardware Product, ninety (90) days from date of original shipment of the Product from Seller’s facility, and (c) for Services, thirty (30) days from the date the performance of such Services has been rendered.

2. **Limited Warranty.** Seller warrants that, as of the date of delivery, Seller has good title to the Product, free from any lawful security interest or other lien or encumbrance unknown to Buyer. In addition, during the Warranty Period, the Product and Services will be free from defects in materials or workmanship arising under proper and normal use. This Warranty shall apply only to the Products and Services and shall not apply to any other goods or materials, parts or components of a system or any system as a whole. This Warranty does not cover ordinary wear and tear. Seller does not warrant (i) Products not purchased from Seller or its authorized resellers; (ii) that the operation of the Product will be uninterrupted or error-free; (iii) that the Product will operate in combination with other third-party products selected by Buyer; or (iv) any products manufactured by third parties; provided that Seller will, to the extent permitted by the manufacturer, assign third-party warranties to Buyer. Seller gives no warranty for, and shall have no liability with respect to, any defects arising from any software (other than the Software), including, but not limited to MediaKind Software, Android Software or any third-party application software, downloaded to or otherwise used in conjunction with the Product. Seller further warrants to Buyer that during the Warranty Period, all Services performed by Seller for Buyer will be provided in a workmanlike manner.

3. **Disclaimers.** EXCEPT AS EXPRESSLY SET FORTH IN THIS LIMITED WARRANTY OR IN A SEPARATE, APPLICABLE SOFTWARE LICENSE AGREEMENT, ALL SOFTWARE IS LICENSED ON AN “AS IS” BASIS WITHOUT WARRANTY.

4. **Inspection and Return Authorization.** Buyer must promptly notify Seller of any claimed defect in the Product and/or Services. If Buyer claims that a Product is defective in materials or workmanship, Seller shall have the right to either examine the Product where it is located or, in its sole discretion, issue shipping instructions for return of the Product. Seller’s inspection in response to a warranty claim shall not constitute acceptance or acknowledgment of the claim’s validity. Except as otherwise agreed to in writing, Products may not be returned to Seller without prior authorization. Buyer must contact Seller to obtain an authorization number and return the Products to the location designated by Seller. Any Products returned to Seller without proper authorization will be returned to Buyer at Buyer’s expense. Risk of loss, damage and insurance responsibilities for the Products shall not pass from Buyer to Seller until delivery of the Products to Seller’s designated location. Buyer shall prepay all transportation charges for such return.

5. **Remedies.** Seller’s sole and exclusive obligation and Buyer’s exclusive remedy under this Warranty is Seller’s repair or replacement of the defective Product or re-performance of Services or issuance of a credit for the net book value of the purchase price of the defective Product. Seller shall have sole discretion as to which of these remedies Seller will provide. Seller is not liable for any repair or maintenance costs incurred by Buyer, unless Seller authorizes such charges in writing in advance of the commencement of the work. If Seller elects to replace or repair the defective Product, the replaced or repaired Product will be warranted for the remainder of the Warranty Period applicable to the originally shipped Product, but the Warranty shall not be extended beyond the original Warranty Period. Replacement Products may be new, refurbished or contain refurbished materials.

6. **Notice and Waiver.** If Buyer discovers any defect in the Product, Buyer must provide prompt (and in no case later than thirty (30) days after discovery) written notice to Seller of the claimed defect. Such notice shall describe, in reasonable detail, the symptoms of such defect. The notice must be received by Seller during the Warranty Period for such Product. Failure to give timely notice of a claim shall result in Buyer’s waiver of such claim.

7. **Transfer of Ownership.** This Warranty is not transferable unless Buyer is expressly authorized by Seller in writing to resell the Product. In addition, Buyer must notify Seller on or before the fifteenth (15th) day after the date on which it transfers ownership of the warranted Product. Any transfers in violation of this Section shall invalidate this Warranty. Notice of the transfer of ownership must be in writing and shall include the name and address of the new owner.

8. **Exclusions from Warranty.** This Warranty shall not apply to problems attributable to, or as a result of:

- (a) improper installation or misapplication of parts;
- (b) chain or system failures induced by other products or components;
- (c) lack of proper inspection or maintenance or failure to provide a suitable operating environment;
- (d) any consumables provided with the Product, including but not limited to batteries and other accessories, and any other materials, components or products manufactured by a third party;
- (e) power surges, fire, unusual mechanical, physical or electrical stress, severe weather conditions or acts of nature, including but not limited to, lightning or floods;
- (f) usage or operation not in accordance with published ratings, specifications or instructions, including but not limited to environmental specifications identified by Seller;
- (g) any adjustment, modification, alteration, removal or repair of any part of the Product, including but not limited to removal or alteration of serial numbers or other identifying marks not expressly authorized by Seller in writing;
- (h) accidental damage, misuse, abuse, neglect or unauthorized access of the Product or of any system of which the warranted Product is a part;
- (i) any type of aesthetic changes due to oxidation or corrosion occurring on stainless steel or galvanized steel parts installed in unusually corrosive marine and industrial atmospheres (in which case Seller’s only obligation shall be to ensure that Product complies with Seller’s published material specifications);
- (j) use of the Product for purposes other than that for which it was designed; or
- (k) mishandling during shipment of the Product.

LIMITED WARRANTY

This Warranty is for Products installed and used in accordance with Seller's design, installation and operating parameters. Buyer's failure to ensure conformity with such parameters will void all warranties. Under no circumstance shall Seller have any liability or obligation with respect to expenses, liabilities or losses associated with the installation or removal of any Product or the installation or removal of any components for inspection, testing or redesign occasioned by any defect or by any repair or replacement of a Product.

9. **Limitation on Liability.** THE WARRANTIES SET FORTH IN SECTION 2 HEREOF ARE EXCLUSIVE AND ARE MADE ONLY TO BUYER. SELLER MAKES NO OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY DISCLAIMS AND EXCLUDES ANY REPRESENTATION OR WARRANTY OF MERCHANTABILITY, NONINFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE AND ANY REPRESENTATION OR WARRANTY ARISING BY USAGE OF TRADE, COURSE OF DEALING OR COURSE OR PERFORMANCE. No person is authorized to give any additional warranties on Seller's behalf or to assume for Seller any other liability, except in a writing signed by an authorized officer of Seller. SELLER'S TOTAL LIABILITY FOR ANY CLAIM OR DAMAGE ARISING OUT OF AND/OR IN CONNECTION WITH THE MANUFACTURE, SALE, DELIVERY OR USE OF THE PRODUCTS OR SERVICES WILL BE LIMITED TO PROVEN DIRECT DAMAGES, NOT TO EXCEED (I) FOR PRODUCTS, THE DEPRECIATED VALUE OF THE PURCHASE PRICE OF SUCH PRODUCTS OR (II) FOR SERVICES, THE ACTUAL AMOUNT PAID TO SELLER FOR SERVICES DURING THE 12 MONTH PERIOD IMMEDIATELY PRIOR TO THE EVENT (OR SERIES OF EVENTS) GIVING RISE TO THE LIABILITY. IN NO EVENT WILL SELLER BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY CLAIM FOR LOSS OF ACTUAL OR ANTICIPATED DATA, USE, REVENUES OR PROFITS. The Products are not specifically designed, tested, manufactured or intended for operation or use in any inherently dangerous, life endangering or life support applications where any failure of the Products could lead to death, personal injury or significant physical or environmental damage (High Risk Activities). If Buyer uses the Products in High Risk Activities, including but not limited to nuclear facilities or the flight, navigation or communication of aircraft, Buyer agrees that neither Seller nor its third party licensors are liable in whole or in part, for any claims or damages arising from such use, and that Buyer shall indemnify and hold Seller and its third party licensors harmless from any and all claims for loss, cost, damage, expense or liability arising out of or in connection with any use of the Products in High Risk Activities. These limitations on liability will apply regardless of the form of action, whether in contract, tort, strict liability or otherwise, and whether damages were foreseeable and will survive failure of any exclusive remedies provided in Section 4 hereof.

10. **Choice of Law.** The terms and conditions contained herein and the rights of the parties to any transaction to which they relate shall be governed by and construed in accordance with the laws of the State of North Carolina, U.S.A. The United Nations Convention on Contracts for the International Sale of Goods shall not apply.

LIMITED WARRANTY

Exhibit A

Product Categories	Warranty Period from Original Shipment Date*
<p>Category A Products E6000® Converged Edge Router (CER); E6000n™ Remote PHY Devices (RPDs); E6000r™ Remote PHY Shelves; E6000n™ Remote MACPHY Devices (RMDs); vManager; Remote OLT (R-OLT); associated power supplies and accessories. FLX PON OLT portfolio including vOLT. CherryPicker products, Encoder products including ME-7000, SE-6000; DSR-4xxx, DSR-6xxx and DSR-7xxx series IRD products, and Uplink systems including TME-2020, VDP-1000, BNC, DEM, and SEM; All APEX Universal EQAM including APEX1000 and APEX3000; All Aloha interactive products including OM2000, ARPD, ADM4000 and NC1500 4.0. All SDM products. All VUE and VTM Software Products. All STDC products.</p>	Hardware One (1) Year Software Ninety (90) Days
<p>Category B Products All High and Standard Definition Transport Adapter MS4000™ Media Streamer</p>	Hardware One (1) Year Software Ninety (90) days ** For certain CPE, option for 1% overship in lieu of Hardware warranty is standard
<p>Category C Products Intentionally left blank.</p>	
<p>Category D Products All Third Party OEM Products: power meters; All VUE and VTM hardware platforms; NC1500 4.0 hardware platform; LQA256 Legacy QAM Adapter; Elemental Products including Live, Server, Delta, Conductor and StatMux; DC2180 Cabinet Node, Cooling Systems</p>	Pass Through from OEM: Hardware One (1) Year Software Ninety (90) Days
<p>Category E Products Intentionally left blank</p>	
<p>Category F Products All OM and SG optical node platforms, Flex Max® and Starline® amplifier platforms, RF Taps & Passives, and Optical Passives</p>	Hardware Five (5) Years within the United States and Canada Hardware Three (3) Years outside United States and Canada Software Ninety (90) Days
<p>Category F1 Products All CHP Headend Optical (HEO) Elements</p>	Hardware Three (3) Years Software Ninety (90) Days
<p>Category G1 Products All NC optical node platforms and Optical Passives, including OP/NP/DP/DC models.</p>	Hardware Five (5) Years Software Ninety (90) Days
<p>Category G2 Products All CH3 Headend (HEO) Elements</p>	One (1) year
<p>Category G3 Products All EPON and GPON ONUs, RFoG/HPON R-ONUs, including, CP8 models and associated power supplies and accessories</p>	Hardware Three (3) Years Software Ninety (90) Days

LIMITED WARRANTY

<p>Category H Products All ConvergeMedia™ Distribution Platforms and Management Suite, AdManager™ including SkyVision Ad Management and EMP solutions CVEx™, SVA, all Vertasent products including SVOM, SVM and ERM, AdEdge™ COM and AdEdge APS,VMS, Manifest Delivery Controller (MDC), ARRIS Video Content Manager (AVCM) and Next Generation Insertion (NGI) and Multicast ABR.</p>	<p>Hardware One (1) Year Software Ninety (90) Days</p>
<p>Category I Products ServAssure® Advanced, ServAssure® NXT - Alarm Central, ServAssure® NXT - Analyze, ServAssure Domain Manager and EventAssure™. WorkAssure™@ Workforce Management, Mobile TV, SecureMedia and Titanium</p>	<p>Hardware One (1) Year Software Ninety (90) Days</p>
<p>Category J Products Intentionally left blank</p>	
<p>Category K Products Intentionally left blank.</p>	
<p>Category L Products Intentionally left blank</p>	
<p>Category M Products Intentionally left blank.</p>	
<p>Category N Products Intentionally left blank.</p>	
<p>Category O Products All CAS Products including DAC, CASMR (and associated plug-ins), CAST, Advisor, CSS, OLL, CSS-Lite, KLS, DKS, CPMS</p>	<p>DAC, CASMR, CAST, Advisor, CSS Hardware Three (3) Years OLL, CSS-Lite, KLS, DKS, OLES, CPMS Hardware One (1) Year Software Ninety (90) Days</p>
<p>Category P Products Intentionally left blank.</p>	
<p>Category P1 Products Intentionally left blank</p>	
<p>Category Q Products Intentionally left blank</p>	
<p>Category R Products Intentionally left blank</p>	
<p>Category R1 Products Intentionally left blank</p>	
<p>Category S Products Intentionally left blank</p>	
<p>Category S1 Products Intentionally left blank</p>	

LIMITED WARRANTY

<p>Category T Products RUCKUS Wi-Fi</p>	<p>Hardware:</p> <ul style="list-style-type: none"> - Indoor Access Points and Wall Plate Access Points – Limited Lifetime Warranty,** except for access points with an “e” suffix (e.g., R350e), for which the HW warranty period is one (1) year. - Outdoor Access Points – One (1) Year - Controllers – One (1) Year, except ZoneDirector controllers are covered by the Limited Lifetime Warranty** <p style="text-align: center;">Software Ninety (90) Days</p>
<p>Category T1 Products RUCKUS ICX Switches</p>	<ul style="list-style-type: none"> - ICX Switches (including switch modules, PSUs, and Fans, but excluding removable optics/transceivers and LEDs) – Limited Lifetime Warranty,** except for ICX 7150- C08PT, for which the HW warranty period is 13 months. - LEDs – 12 months - Removable Optics/Transceivers – 60 months (13 months if shipped from Seller prior to June 1, 2021) <p>Software: Limited lifetime access to defect repairs, and software maintenance updates through end of support date of product</p>
<p>Category T2 Products Intentionally left blank</p>	
<p>Category U Products</p> <p>Other OSP Cable Products (P3®, Drop Coax, Fiber Cable, Fiber Drop Cable, CIC)</p> <p>NovuX Products</p> <p>Prodigy</p> <p>Products FDH</p> <p>Products</p> <p>Multiservice terminals (MST), Open Terminals (OTE) and Hardened Drop Cable</p> <p>Assemblies OSP “Box” Products</p> <p>Mini-RDTs and RDTs</p> <p>FOSC™, FIST™ and</p> <p>Tenio™</p> <p>OSP Copper Connect and Closure Products</p> <p>HELIAX® FiberFeed® Products, including FiberFeed® hybrid and fiber cables and assemblies, power cables and junction boxes</p> <p>Fiber Optic Panels, including Accessories, Mounting Hardware, Modules</p> <p>Fiber Optic Field Terminated Connectors, Kits, Tools, Consumables,</p> <p>Accessories Indoor Fiber Cable, Patch Cords, Cable Assemblies, Fiber Trunks</p> <p>Passive Optical Components and Value Added Modules (VAMs)</p> <p>FiberGuide® : Fiber cable Management System</p> <p>Optical Distribution Frames, including Modules, Blocks, Accessories and</p> <p>Hardware Cabinets Cable and Apparatus Products</p> <p>Alifabs™ Cabinets & Ancillary Products</p> <p>Alifabs™ Telecommunications Towers and Accessories</p> <p>Metro Cell Products, including Enclosures; Integrated Pole; Standard Poles; Accessories; and Wood Pole Brackets</p>	<p>One (1) year</p>

LIMITED WARRANTY

<p>Category V Products ValuDAS® Passive Products, including Air Directional Couplers, Hybrid Couplers, High Power Splitters, and Cell-Max™ Antennas Standard Tower Mounted Amplifier, Bias Tee and Power Distribution Unit Products Standard Filter & Combiner Products</p> <p>Electronic Enclosure Products (Cabinets)</p> <p>Alifabs™ Free Cooling Products and Accessories and Spare Parts, including</p> <p>Monitor All-In-One FLX (Active Passive Cabines)</p> <p>PowerShift™ & Power Products</p>	<p>Two (2) years</p>
<p>Category W Products ValuSite® Products</p> <p>I-Line Accessory Products</p> <p>Microwave Antennas</p> <p>Terrestrial Microwave System Products (including Microwave System Flex-Twist, Coupler, Filter and Diplexer Products)</p>	<p>Three (3) years</p>
<p>Category X Products Broadband RF Connectivity Products</p> <p>Premium Passive Products, including In-Building Directional Couplers, Hybrid Matrices, Tappers, Power Splitters, Terminations, Attenuators and CMAX Antenna Products</p>	<p>Five (5) years</p>
<p>Category Y Products QR® Coaxial Cable</p>	<p>Five (5) years</p>
<p>Category Z Products Standard RADIAX® Cable, Connector, Accessory and Cable Assembly* Products</p> <p>* RADIAX® Cable Assembly Product means any RADIAX® coaxial cable that has been fitted with Seller’s connectors in accordance with the installation instructions.</p>	<p>One (1) year</p>
<p>Category AA Products Standard CNT® Cable, Connector, Accessory and Cable Assembly* Products</p> <p>* CNT® Cable Assembly Product means any CNT® coaxial cable that has been fitted with Seller’s connectors by Seller or its certified distributor</p>	<p>Five (5) years; except that the Warranty Period for Products purchased for resale purposes shall be one (1) year.</p>
<p>Category BB Products Standard HELIAX® Cable, Connector, Accessory and Cable Assembly* Products</p> <p>* HELIAX® Cable Assembly Product means any HELIAX® coaxial cable or elliptical waveguide that has been fitted with Seller’s connectors by Seller or its certified distributor.</p>	<p>Ten (10) years; except for the following: (i) three (3) years for weatherproofing kits (including SureGuard boots); (ii) one (1) year for cable preparation tools (excluding blades); (iii) one year for single click-on hanger kits; and (iv) two (2) years for surge arrestors.</p>
<p>Category CC Products Standard ERA/ION-E®, ION-M®, ION-U®, MR, CMR, i-POI®, e-POI™, and Node Repeater Products</p>	<p>Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of shipment.</p> <p>Software Ninety (90) Days</p>
<p>Category DD Products In- Building and Fixed Subscriber Antennas</p>	<p>The earlier of: (i) three (3) years from the date of installation or (ii) thirty-nine (39) months from the date of original shipment</p>

LIMITED WARRANTY

<p>Category EE Products OneCell®</p> <p>Powered Fiber Cable Solution: Hybrid Copper and Fiber Cables, Class 2 Power Supplies, Indoor/Outdoor POE Extenders, Field Terminated Outlets, Consolidation Boxes and Related Passive Components</p>	<p>Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of original shipment Software Ninety (90) Days</p>
<p>Category FF Products Small Cell Device Management System (DMS) Software DAS Device Management System (AIMOS) Software</p>	<p>Ninety (90) days</p>
<p>Category GG Products Base Station Antenna, Small Cell Antenna & Mosaic™ Products</p>	<p>Two (2) years for all base station antennas except base station antennas incorporating N-type connectors, which shall have a warranty of one (1) year</p>
<p>Category HH Products DryLine® Dehydrator Systems and Line Monitoring Systems</p>	<p>Three (3) years or 3,000 hours of actual run time, whichever occurs first; except the Warranty Period for the compressor is only one (1) year or 1,000 hours of actual run time, whichever occurs first.</p>
<p>Category II Products SiteRise™ Solutions</p>	<p>One (1) year on workmanship for the Solution.</p>
<p>Category JJ Products Copper Structured Cabling Products</p> <p>Other Enterprise Products (Coax, Automotive Cables, Enterprise Enclosures and miscellaneous items) (excluding software)</p>	<p>One (1) year from the date of Installation</p>
<p>Category KK Products Alifabs™ Services (power upgrades, enablements, installation and decommission work, rigging, and fault management)</p>	<p>One (1) year from the date of completion of the work.</p>
<p>Category LL Products imVision Overlays and Controllers</p>	<p>Three (3) years</p>

** For Category H and Category I Products only, if Seller is engaged by Buyer to provide Services for the implementation of the purchased Products, warranty period for such Products shall commence upon Buyer's acceptance of the Products and Services.*

*** For Category T Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing for as long as the original end user of the Product continues to own and use the Product. For Category T1 Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing (i) for as long as the original end user of the Product continues to own and use the Product or (ii) through the End of Support date, as defined in the RUCKUS End of Life Policy, whichever is earlier.*

CommScope provides this information as a courtesy to its customers and potential customers. Customers should review the information to ensure conformity to the project specifications and current industry standards. CommScope reserves the right to change the programs or products mentioned at any time without notice.

Powered Fiber Cable System

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CommScope Powered Fiber Cable System Template using the Master Format Template

The intent of this document is to aid in completing the Construction Specifications Institute (CSI) Master Format template for a CommScope telecommunication powered fiber cabling system.

Product part numbers, minimum performance criteria for the components, general design considerations, and installation guidelines are included in this document.

This document provides pertinent information to allow the contractor to bid the labor, supervision, tooling, and miscellaneous mounting hardware and consumables to install a complete Powered Fiber Cable System. It is the responsibility of the contractor to propose any and all items required for a complete system if not identified in this specification.

[Any text appearing in blue and within brackets requires input or a choice in options or features]

SECTION 27 15 00

Data Communications Horizontal Cabling Powered Fiber Cable System

PART 1 GENERAL

1.01 SUMMARY

A. Introduction

1. Provide a powered cabling solution that combines power and optical fiber communications into one complete system.
2. The cable must combine electrical power conductors and optical fiber into one package to speed up installations and simplify power and communications delivery to devices.

B. Powered Fiber Cable System

1. System must be a complete “rack to device” solution capable of powering and communicating with small cells, Wi-Fi hotspots, HD cameras, and variety of devices requiring optical communications and DC power in one system.
2. The hybrid cable shall allow for “standalone” use in delivering of power and fiber data communications.
3. When used along with the PoE extender, the powered fiber optic cable shall supply optical fiber communications and PoE+ power for network access and other low voltage DC devices.

See Table [1] for cable distances by gauge and input power.

PSU Output Voltage	Cable Gauge (AWG)	Lmax (m) Pout = 60W (PoE+/PoE+)	Lmax (m) Pout = 45.4W (PoE/PoE+)	Lmax (m) Pout = 30.8W (PoE/PoE)	Lmax (m) Pout = 30W (PoE+)	Lmax (m) Pout = 15.4W (PoE)
<i>Maximum (57V)</i>	12	650	1120	1570	1595	2630
	16	255	445	620	630	1040
<i>Nominal (48V)</i>	12	460	795	1100	1120	1840
	16	180	315	435	440	725
<i>Minimum (40.5V)</i>	12	330	555	770	780	1285
	16	130	220	305	310	510

TABLE [1]

PoE EXTENDER ELECTRIC TRANSMISSION AND RECOMMENDED CABLE LENGTH DISTANCES

Must be compatible with commercially available NEC Class 2 and/or SELV compliant 48-57VDC power supply

4. System shall comply with the following standards:
 - a. RoHS (2002/95/EC)
 - b. REACH SVHC, 53 6/20/11
 - c. California Prop 65 for safe drinking water and toxic enforcement act
 - d. Telcordia GR-20-CORE Issue 3 May 2008, EIA/TIA FOTPS
 - e. TIA-568-C
 - f. Deca-BDE free
 - g. Power limited circuit cable UL 13 (CL2R-OF AND CL3R-OF)
 - h. Communication cable per UL 444 (CMR-OF)

- i. UL 1666 standard for test for flame propagation - Edition 5 - Revision date 2012/06/27
 - j. IEC 60332-1-1, -2, 60332-3-24 Cat. C, 61034 60745-2
 - k. ITU.T K21,
 - l. GR-1089
 - m. IEC 60793-2-50 type B.1.3 and B.6.A&B
 - n. ITU-T G.657.A1 or A2/B2 optical fiber, backwards compatible with G.652.D
 - o. PoE (IEEE 802.3af-2003) and PoE+ (IEEE 802.3at-2009)
 - p. Must comply with Canadian code ICES-003
5. Equipment must comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules
6. Standard system consists of five (5) components:
- a. Hybrid fiber/copper cabling
 - b. PoE Extender
 - i. 1-port
 - ii. 2-port
 - c. Power and fiber distribution element
 - d. Cable and fiber management
 - e. SFP connector

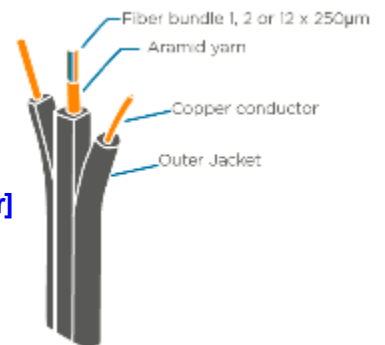
PART 2 PRODUCTS

2.01 OWNER FURNISHED

- A. **[Include information about systems, products, and accessories that are provided by the owner]**
- 1. **[DC Power supply, SFP connector, LC connector, LC patch cords and fiber patch panels, outdoor rated Cat 6 patch cord]**
 - 2. **[For copper based switch: fiber to copper media converters]**

2.02 MANUFACTURED COMPONENTS

- A. Manufacturer List
- 1. CommScope
 - 2. Approved equivalent
- B. System Components
- 1. Hybrid fiber/copper cable
 - a. **[12 AWG (2mm) or 16 AWG (1.2mm)]** conductor size
 - b. **[02, 04 or 12]** optical fibers
 - c. **[Singlemode or OM3 Multimode]** fiber type
 - d. **[Outdoor rated polyethylene (PE) or Riser/LSZH indoor/outdoor]** jacket type
 - e. **[1 Km, 2 Km or 4 Km]** cable length
 - f. Compatible with FOSC 450A splice closure



g. Cable must meet specifications in Table [1] and Table [2].

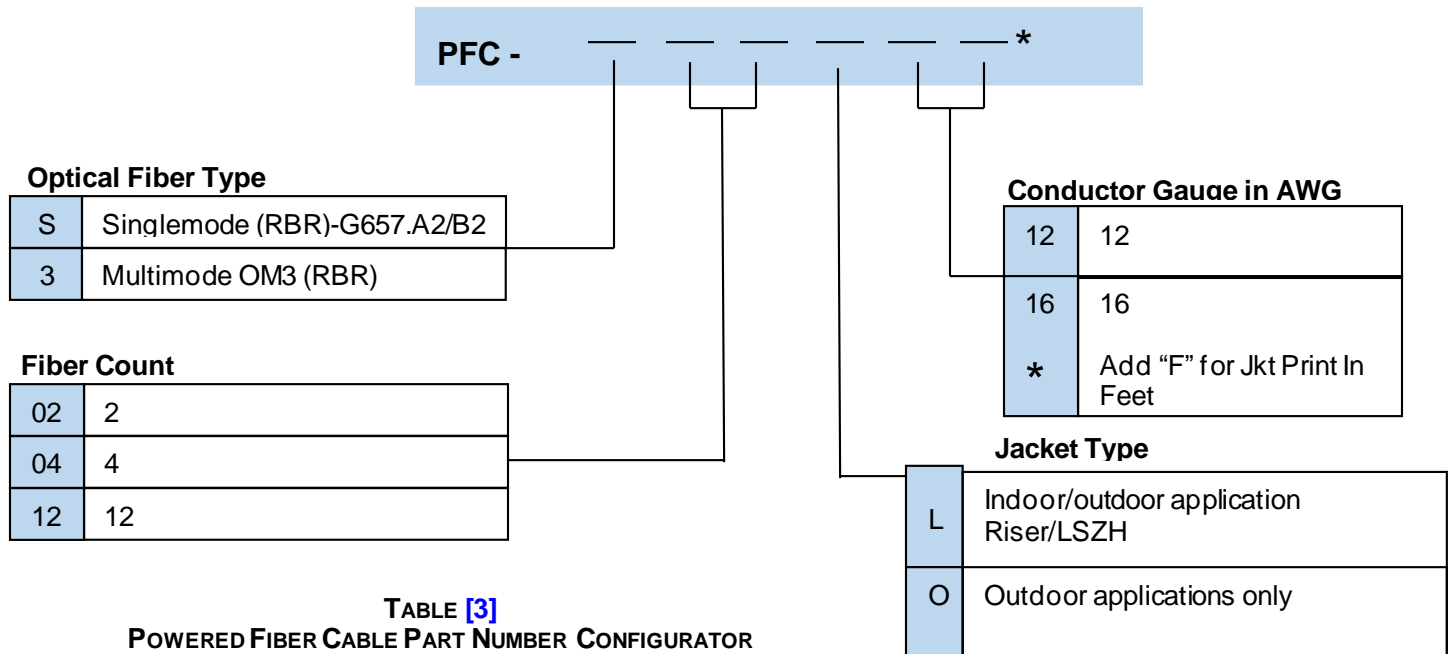
Environmental Characteristics	
Storage Temperature:	-40°C to +70°C
Operating Temperature:	-40°C to +70°C
Installation Temperature:	-10°C to +60°C
Tensile Load	
Short Term:	440 N
Long Term:	132 N
Preferred Axis Bend Radius mm (in.)	
Installed:	30 mm (1.18 in.)
Loaded:	50 mm (1.97 in.)
Impact (N-m)	
EIA/FOTP-25C	4.4 N-m
Crush(N-m)	
EIA/FOTP-41A	2200 N-m
Optical Performance (dB/Km)	
Singlemode Reduce Bend Radius Fiber	0.35/0.25 dB/km (1310/1550 nm)
Multimode OM3	0.35/0.25 dB/km (1310/1550 nm)

**TABLE [1]
POWERED FIBER CABLE SPECIFICATIONS**

Conductor Size (AWG)	Dimensions (Nominal, mm)		Weight (Nominal)
	Width	Height	
16	10.9	4	70.0 kg/km
12	12	4.5	110.0 kg/km

**TABLE [2]
POWERED FIBER CABLE DIMENSIONS AND WEIGHT SPECIFICATIONS**

h. Cable shall be CommScope product part number (see Table [3]) or approved equivalent.



**TABLE [3]
POWERED FIBER CABLE PART NUMBER CONFIGURATOR**

2. PoE Extender
 - a. Provides termination for hybrid cable input and automatically corrects voltage drop over distance
 - b. Optical signal and power in must be converted to RJ45 PoE+ compliant jack(s)
 - c. Shall be available in [1] or [2] port configurations
 - 1) 2-port configuration must allow for two (2) PoE or PoE+ devices to be connected via one hybrid cable
 - 2) 2-port must provide option to share the bandwidth of a single 1 Gb/s SFP or utilize two (2) SFPs for 1 Gb/s per port operation
 - d. Must use outdoor rated patch cord
 - e. Must be Earth grounded via a 12AWG conductor connected to the chassis ground lug.
 - f. Shall be available in pole or wall mount options
 - g. Extender shall have three (3) levels of electrical protection
 - 1) Primary - GDT component rated to 40kA surge protection
 - 2) Secondary - MOV components rated to 4.5kA
 - 3) Tertiary - TVS prevents the voltage from rising above 80-100V
 - h. Termination block shall support a minimum of 200 re-terminations while maintaining a contact resistance of less than one (1) milliohm.
 - i. Environmentally sealed closure rated to IP67
 - j. Must provide electrical power transmission management
 - k. Must be aesthetically appealing for Wi-Fi access point or camera deployment
 - l. SFP module in the POE extender should match module in existing switch
 - m. Must include sunshade for harsh temperature installation
 - n. PoE extender must meet specifications in Tables [4] and [5].

Item	
Storage Temperature:	-40°C to +70°C
Operating Temperature:	-40°C to +65°C
Installation Temperature:	-5°C to +45°C
<i>65°C assumes 45°C ambient air temperature, plus 20°C sun loading</i>	

**TABLE [4]
PoE EXTENDER CLIMATIC PERFORMANCE**

Item	Dimensions	Weight
PoE Extender 1-port version	238mm x 225mm x 77mm	3.8 kg
PoE Extender 2-port version	283mm x 225mm x 77mm	3.8 kg

**TABLE [5]
PoE EXTENDER PHYSICAL DIMENSIONS**



1-PORT PoE EXTENDER



2-PORT PoE EXTENDER

3. Power and Fiber Distribution Element

- a. Must be compatible with GE Critical Power Express Class II shelf, DC Rectifier Shelf and Modules.
- b. Shall comply with NEC Class II and SELV
- c. Each GE Modules shall accommodate eight (8) cable outputs; each GE chassis shall contain up to four (4) modules total per power supply for a total of 32 cables per power supply;



POWER SUPPLY



Slimline SPS DC rectifier Module

PART 3 EXECUTION

3.03 INSTALLATION

- A. Install all systems in accordance with manufacturer's printed instructions, as well as all [State [Municipality] of [] codes and standards].
- B. The power supply shall be installed in a safe location with access to the fiber optic network into which small cells or other network access devices are desired to be connected, and either 120VAC, 240VAC.
- C. Parameters to be considered prior to system deployment:
 - 1. Distance from power supply to the network devices
 - 2. Maximum power consumption of the network devices
 - 3. Number of devices to be deployed
 - 4. Type of cable (jacket, support)
 - 5. Fiber Management options
- D. For outdoor direct burial installations, the PE-jacketed "outdoor-only" rated cable is recommended.
 - 1. When installing in ducts, care should be given to avoid cable twisting.
 - 2. Standard cable lubricants may be used to assist with conduit or duct installations.
 - 3. If it is not practical to bring a reel of cable to the installation site, then utilize a standard figure 8 procedure to lay the cable out prior to pulling in duct. This helps avoid cable twisting.
- E. The PE-jacketed outdoor cable is rated for direct burial but for long-term reliability is recommended installing below-ground cables in conduit/ducts.
- F. Powered Fiber Cable is not rated for aerial self-support thus cable lashing is recommended.
- G. Use only a typical pair of wire strippers to access the powered fiber cable and, optionally, a wire cutter or snip.
- H. In cases where it becomes necessary to prevent shrink back and enhance coupling the additional buffer tube coupling can be achieved by placing slack or coupling coils at each splice closure or optical tap.
 - 1. The size of the loop should be based on the unloaded minimum bend radius of the cable.
 - 2. Laboratories testing and aerial installation test site demonstrate that a total of 5 loops on the input and 5-½ loops on the output adequately enhances the coupling to prevent buffer tube movement and provide proper entry into and out of the tap per Figure 1 below.
- I. The LSZH/riser rated indoor/outdoor cable may also be installed in conduits or ducts, however, frictional forces are greater for the indoor/outdoor cable and, therefore, achievable distances may be less.
- J. Standard cable lubricants may be used to assist with the indoor/outdoor cable for duct installation.
- K. PoE Extender port openings must be properly sealed at all times (prior, during and after installation) against weather, moisture, dust/debris. Any exposure could result in catastrophic damage to electronic components.
- L. PoE Extenders and Power Shelves must be properly grounded per manufacturer's instructions.

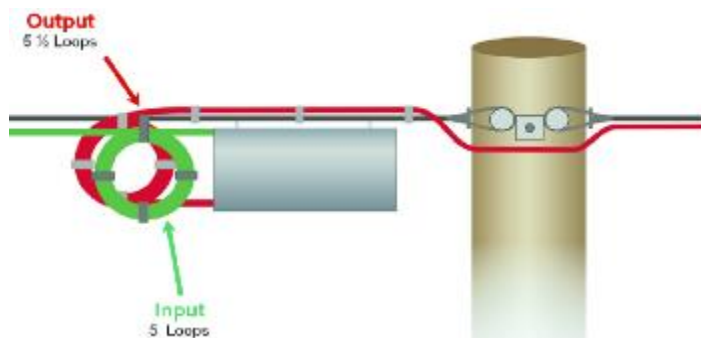
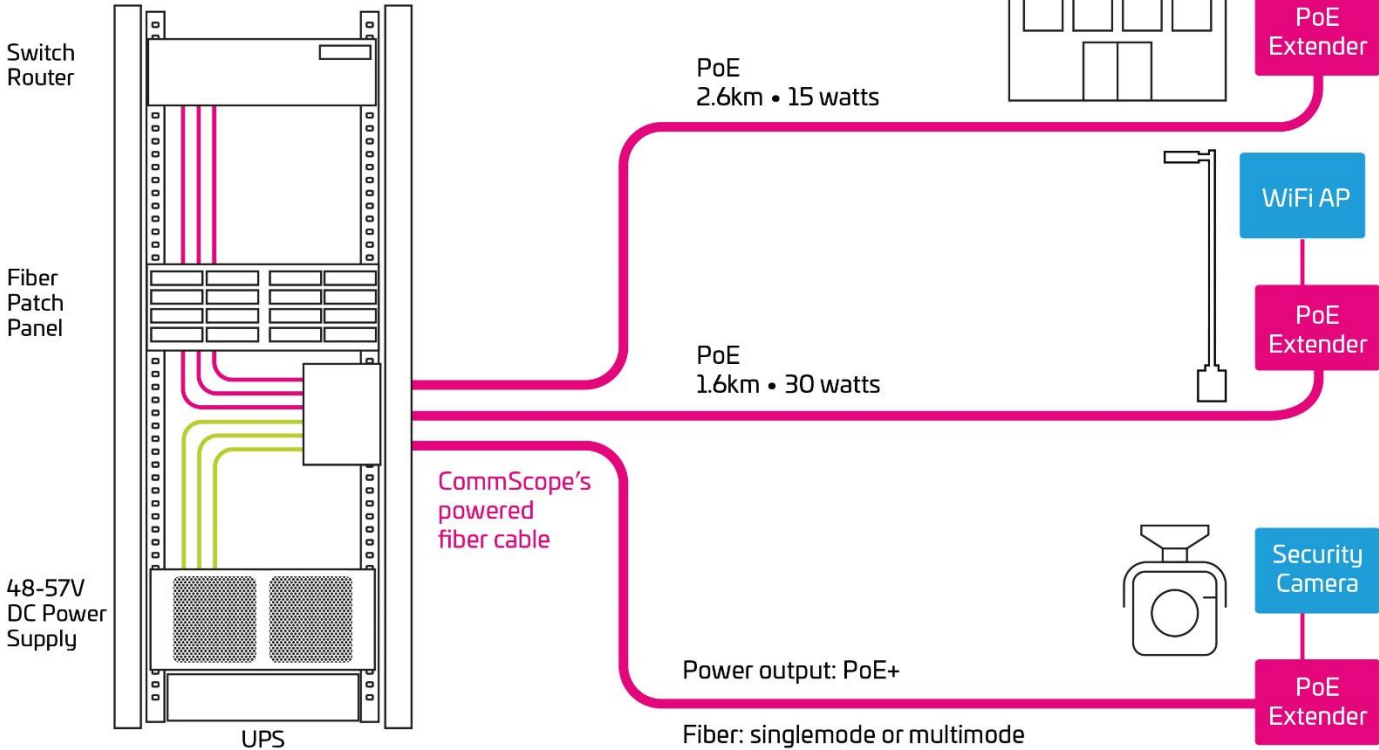
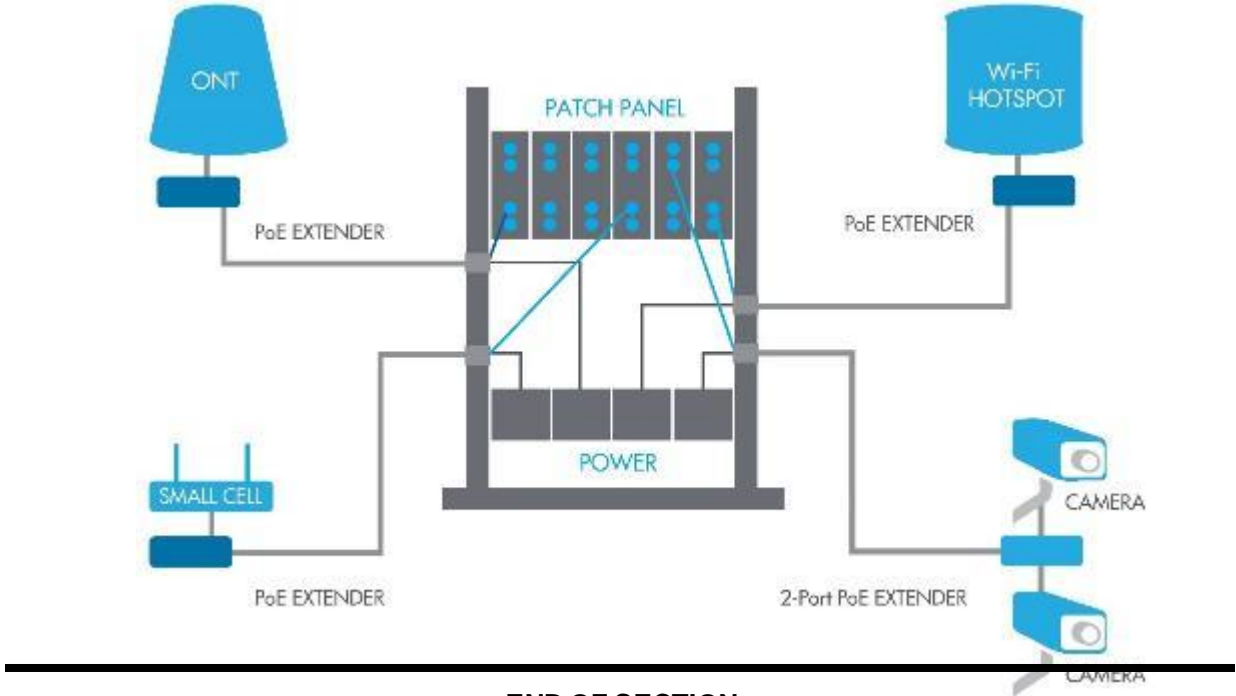


FIGURE 1 – EXAMPLE OF COUPLING COILS

SYSTEM OVERVIEW



APPLICATION DIAGRAM



END OF SECTION



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Rev. 16June-2020

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PFU-P-C-0-060-02



PoE Extender, 2 Port Universal Mount, Outdoor, 2-Port

- Environmentally sealed and tested
- Electrical power management
- Circuit protection electronics
- Optical to electrical Media Conversion
- Automatically conditions electrical voltage to the correct level
- 2 independent PoE ports

Product Classification

Regional Availability	Asia Australia/New Zealand EMEA Latin America North America
Product Type	PoE unit

General Specifications

Data Transfer Rate, maximum	1 Gb
Interface, Input	1GBASE-X (2)
Interface, Output	10/100/1000 BASE-T
Mounting	Universal pole mount Universal wall mount
Total Ports, quantity	5
Transmission Standards	10/100/1000 BASE-T 1GBASE-X
Input/Output Interface	3 input / 2 output

Dimensions

Height	224.71 mm 8.847 in
Width	283 mm 11.142 in
Depth	77.02 mm 3.032 in

Electrical Specifications

Input Voltage Range	-25 to -57 Vdc
----------------------------	----------------

Electrical Performance

PFU-P-C-O-060-02

Notes:

- This table provides a partial listing of the maximum supported hybrid cable distances for a range of NEC Class 2 power supply output voltages, hybrid cable copper gauges and extender output power levels.
- NEC Class 2 requires a power supply unit (PSU) limited to less than 60V dc. In practice, some commercial 48V power supplies may be configured to output from 40V up to about 57V.
- P_{out} is the maximum total PoE extender output power.
- The 1 port and 2 port PoE extenders each provide up to 60W of total output power. **The 2 port PoE extender is limited to 30W per port; whereas the 1 port PoE extender can output the full 60W on its single port.**

PSU Output Voltage	Cable Gauge (AWG)	Max Cable Length (m) Pout = 60W	Max Cable Length (m) Pout = 45W	Max Cable Length (m) Pout = 30W	Max Cable Length (m) Pout = 15.4W	Max Cable Length (m) Pout = 7W
Maximum (57V)	12	888	1301	1886	3131	4633
	16	351	514	746	1238	1833
Nominal (48V)	12	630	922	1335	2217	3280
	16	249	365	528	877	1297
Minimum (40.5V)	12	448	630	900	1494	2211
	16	177	249	356	591	874

Assumptions:

- Hybrid cable ambient temperature: 20°C (Underground/Ducted)
- CommScope Cat 6/6A outdoor patch cord length: 50m
- Patch cord ambient temperature: 55°C (Sunlight Exposed)

Material Specifications

Finish	Powder coated, off-white
Material Type	Aluminum

Environmental Specifications

Installation temperature	-5 °C to +45 °C (+23 °F to +113 °F)
Operating Temperature	-40 °C to +65 °C (-40 °F to +149 °F)
Storage Temperature	-40 °C to +70 °C (-40 °F to +158 °F)
Environmental Note	Not suitable for installation in locations where submersion in water or other liquids is possible (e.g. below grade hand hole or manhole)
Environmental Space	Outdoor
Qualification Standards	CISPR 22/FCC CFR 47 EN300386 ETSI EN 300 019-1-4 IEC 60529, IP68 IEC 60950-1 IEC 60950-22 IEC 62368 IEEE 802.3at Type 2 NEC Class 2
Safety Standard	CE CSA FCC RCM SELV WEEE

Packaging and Weights

Weight, net	5.08 kg 11.199 lb
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Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Below maximum concentration value
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance

PFU-P-C-0-060-02

ROHS

Compliant



RoHS Certificate of Compliance




Product Name: 2-PORT POE EXTENDER

Product Number: PFU-P-C-O-060-02

Company Name: CommScope
3642 E US Highway 70
Claremont, NC 28610 USA

Contact: ProductCompliance@Commscope.com

Generated on: May 07, 2024

Certified by: 

Vinatha Viswanathan, Director Product Compliance

Disclaimer

This information is provided based on reasonable inquiry of our suppliers and represents our current actual knowledge based on the information they provided and our analysis and assessment of the risks. This information is subject to change and if a change occurs which affects compliance, then this Statement will be updated. Compliance to EU ROHS 2011/65 amended by EU RoHS 2015/863 means the part numbers have a maximum concentration of no more than 0.1% by weight in homogenous materials for lead, hexavalent chromium, mercury, PBB, PBDE, and 0.01% for cadmium, or qualify for an exemption to these limits as defined in the Annexes of Directive 2011/65/EU (RoHS2). These parts also have a maximum concentration of no more than 0.1% by weight in homogenous materials for DEHP, BBP, DBP and DIBP (substances that are restricted starting from July 22, 2019). Finished electrical and electronic products will be CE marked as required by Directive 2011/65/EU. Components may not be CE marked.

Compliance Status	Regulation	Revision	RoHS exemptions if any
Compliant	ROHS	EU RoHS - 2011/65/EU	



1 and 2 Port 60W POE Extenders and Power Extender

Hardware Manual
TC-96231-IP Rev F

February 2021



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Safety Notice

In support of the EC directive 2006/95/EC, this notice contains safety information important for the correct installation and operation of this equipment.

Note, the term SELV (Safety Extra Low Voltage) used in this addendum is defined strictly in accordance with EN 60950

Electrical Safety

1. This equipment is intended for installation by trained service personnel only.
2. The safety requirements for Information Technology equipment is only valid if the building installation is in compliance with relevant national or international safety standards and in accordance with good engineering practice.
3. Remove the DC supply from the supply cable at source before changing supply connections to this product.
4. For safety requirements it is necessary to connect the earth point on the product to a reliable earth. This is a discharge path in the event of surges or lightning events on the supply or Ethernet cables.
5. Unless otherwise specifically stated in the equipment installation manual, all data and control ports are connected to ES1/SELV/NEC Class 2 conformant circuits inside the enclosure. To maintain all the ports on the equipment at SELV/NEC Class 2, it is essential that if any connection is made to any of these ports by other equipment, the other equipment must maintain its relevant port at ES1/SELV/NEC Class 2.

For products that are rack mounted:

6. For a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Ensure that the equipment environmental temperature does not exceed the maximum ambient temperature specified by the manufacturer. Ensure that air flow required for safe operation of the equipment is not compromised.
7. Mounting of the equipment in the rack must not cause it to topple or other mechanical hazard.
8. Ensure that the accumulative power requirements of equipment installed in the rack do not exceed the power supply wiring capacity of the rack. Use the equipment nameplate ratings to establish total requirements.
9. Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

General

10. Unless otherwise stated in the equipment manual, there are no user serviceable parts inside this equipment.
11. If this equipment has a laser, observe the precautions stated in the installation manual.
12. Ultimate disposal of this equipment must be carried out according to relevant national laws.
13. The equipment should be installed by suitably trained personnel, and installation should follow good working practice.

Consigne de sécurité

À l'appui de la directive de la Commission européenne n° 2006/95.EC, cet avis comporte des informations capitales pour procéder à une installation et à exploitation en bonne et due forme de cet équipement de sécurité.

À noter, le terme SELV (Safety Extra Low Voltage) utilisé dans le présent additif est défini le strict respect des exigences de la norme EN 60950.

Sécurité Electrique

1. Cet équipement doit être installé par du personnel d'entretien formé à la tâche.
2. Les exigences de sécurité équipements de technologies de l'information sont uniquement valables si l'installation du bâtiment est conforme aux normes de sécurité nationales ou internationales pertinentes et aux bonnes pratiques d'ingénierie.
3. Veuillez débrancher l'alimentation en c.c. du câble d'alimentation à la source avant de changer les raccordements d'alimentation à ce produit.
4. Pour les exigences de sécurité, il est nécessaire de connecter le point de mise à la terre au produit via une terre fiable. Il s'agit d'un trajet de décharge prévu en cas de surtensions ou de phénomènes de foudre sur l'alimentation ou les câbles Ethernet.
5. Sauf indication contraire figurant dans le guide d'installation de l'équipement, l'ensemble des données et ports de contrôle sont raccordés à des circuits conformes à la de classe 2 SELV/NEC/ES1 à l'intérieur de l'enceinte. Pour maintenir tous les ports de l'équipement en classe 2 SELV/NEC/ES1, il est indispensable qu'en cas de raccordement établi vers l'un quelconque de ces ports par tout autre équipement, ce dernier puisse maintenir son port correspondant en classe 2 SELV/NEC/ES1.

Pour Les Produits Montés en Rack:

6. Pour un rack fermé ou dispositif à plusieurs racks, la température ambiante de fonctionnement de l'environnement du rack peut être supérieure à celle ce la température ambiante. Assurez-vous que la température de l'environnement de l'équipement ne soit pas supérieure à la température ambiante maximale indiquée par le fabricant. Veiller à ce que le débit d'air nécessaire au bon fonctionnement de l'équipement ne soit pas compromis.
7. Le montage du matériel dans le rack ne doit pas provoquer de basculement ni aucun autre danger mécanique.
8. Veiller à ce que les exigences d'alimentation cumulées de l'équipement installé dans le rack ne soient pas supérieures à la capacité de câblage d'alimentation du rack. Utilisez les cotes de la plaque signalétique de l'équipement pour mettre en place toutes les exigences.
9. Il convient de maintenir une mise à la terre fiable d'équipement monté en rack. Il convient de faire particulièrement attention aux raccordements d'alimentation autres que ceux directement en contact avec le circuit de dérivation (p. ex., utiliser des bars d'alimentation).

Dispositions Générales

10. Sauf indication contraire figurant dans le manuel de l'équipement, ce dernier ne comporte aucune pièce susceptible de réparation par l'utilisateur de l'équipement.
11. Si cet équipement comporte un dispositif laser, veuillez respecter les précautions indiquées à cet égard dans le guide d'installation.
12. La suppression définitive de cet équipement devra être effectuée conformément aux lois nationales pertinentes.
13. L'équipement doit être installé par du personnel parfaitement qualifié, et l'installation devra être conforme aux bonnes pratiques.

Sicherheitshinweis

Im Rahmen der EU-Richtlinie 2006/95.EC enthält dieser Hinweis wichtige Sicherheitsinformationen für die korrekte Installation und den Betrieb dieser Geräte.

Beachten Sie, dass der hier verwendete Begriff SELV (Safety Extra Low Voltage - Schutzkleinspannung) streng nach EN 60950 definiert ist.

Elektrische Sicherheit

1. Dieses Gerät ist ausschließlich für den Einbau durch geschultes Servicepersonal vorgesehen.
2. Diese Sicherheitsanforderungen für IT-Ausrüstung sind nur dann gültig, wenn die Gebäudeinstallation den einschlägigen nationalen und internationalen Sicherheitsstandards sowie den allgemein anerkannten Regeln der Technik entspricht.
3. Vor Änderung der Versorgungsanschlüsse dieses Geräts muss die DC-Stromversorgung zu den Versorgungskabeln getrennt werden.
4. Aus Sicherheitsgründen muss der Erdungspunkt des Produktes mit einer zuverlässigen Erde verbunden werden. Diese dient als Entladungsweg bei Überspannungen oder Blitzereignissen, die sich auf Versorgungs- oder Ethernet-Kabel auswirken.
5. Sofern im Installationshandbuch nicht ausdrücklich anders vermerkt, sind alle Datenschnittstellen und Steueranschlüsse mit ES1/SELV/NEC Class 2 konformen Schaltkreisen im Inneren des Gehäuses verbunden. Damit alle Ports des Geräts mit ES1/SELV/NEC Class 2 konform bleiben, ist es wichtig, dass die Ports verbundener Geräte ebenfalls ES1/SELV/NEC Class 2 entsprechen.

Für Geräte, die in einem Rack montiert werden:

6. Bei Einbau in eine geschlossene oder aus mehreren Geräten bestehende Rack-Einheit kann die Betriebsumgebungstemperatur im Rack höher als die Raumtemperatur sein. Stellen Sie sicher, dass die Umgebungstemperatur der Geräte die vom Hersteller angegebene maximale Umgebungstemperatur nicht überschreitet. Achten Sie darauf, dass der für den sicheren Betrieb des Geräts erforderliche Luftstrom nicht beeinträchtigt wird.
7. Bei Montage der Geräte in einem Rack darf keine Gefahr durch Kippen oder andere mechanische Einflüsse entstehen.
8. Stellen Sie sicher, dass der Gesamtleistungsbedarf der im Rack installierten Geräte die Stromversorgungskapazität des Racks nicht überschreitet. Nutzen Sie die Angaben auf den Typenschildern, um die Gesamtlast zu ermitteln.
9. Es muss eine zuverlässige Erdung der Rack-Geräte gegeben sein. Besondere Aufmerksamkeit gilt dabei der indirekten Anbindung an Zweigstromkreise (z. B. Verwendung von Mehrfachsteckerleisten).

Allgemeines

10. Sofern nicht anders im Gerätehandbuch angegeben, enthält dieses Gerät keine zu wartenden Teile.
11. Wenn dieses Gerät mit einem Laser ausgestattet ist, beachten Sie die in der Installationsanleitung angegebenen Vorsichtsmaßnahmen.
12. Die Entsorgung dieses Geräts muss nach den einschlägigen nationalen Rechtsvorschriften erfolgen.
13. Das Gerät muss durch entsprechend geschultes Personal installiert werden. Bei der Installation ist auf gute Arbeitspraxis zu achten.

CE NOTICE

Note: This is a class B product.

FCC NOTICE

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment under FCC rules.

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la class B est conforme a la norme ICES-003 du Canada

Return Product Procedure

If the unit is found to be defective, please contact Technical Support via <http://www.commscope.com/SupportCenter>

WEEE

Instructions for recycling of items at end of life can be found at www.CommScope.com by searching for

'WEEE'. At time of printing this is

<http://www.commscope.com/About-Us/Corporate-Responsibilityand-Sustainability/Environment/Recycling/> where information for customers and recyclers is available.

Product User Guide

This document details the physical features of the following 60W PoE/Power Extenders:

- Two-port PoE Extender
- Single-port PoE Extender
- 48V Power Extender
- 12V Power Extender

1. Introduction

The PoE/Power Extenders are components of CommScope's® powered fiber cable system, a hybrid optical fiber/copper cable system for remote powering of network access devices. It is designed to simply and easily function with the powered fiber cable system to extend the distance of PoE (Power over Ethernet) enabled devices as well as devices requiring 12VDC or 48VDC power. The extenders encompass four primary elements:

1. Environmentally sealed closure
2. Electrical power management
3. Circuit protection electronics
4. Optical to electrical Media Conversion

When coupled with any standard NEC Class 2 48V DC power supply, CommScope's Powered Fiber Cable system can power and communicate with PoE standard devices at far greater distances than "category style" copper cabling systems (typically limited to 90 meters) while still meeting NEC Class 2 and SELV standards, eliminating the need for qualified electricians during installation.

The extenders contain circuit protection and DC/DC conversion electronics which automatically condition electrical voltage to the correct level needed for PoE/DC powered end devices such as small cells, high definition security cameras, Wi-Fi hot spots, etc...



Why Protect Remotely Powered Circuits?

Long length DC low voltage electrical systems are at increased risk of:

- Noise from high voltage cables
- Higher current in the event of a short circuit
- Strong electrical surges due to lightning strikes or other EM events in close vicinity

The PoE Extender provides multiple levels of electrical protection:

- Primary Protection:
 - 4.5kA Metal oxide varistors - operate for slower surges as well as fast surges
 - Protects both differential and common mode
- Secondary Protection:
 - MOV and Inductors - reduce surge voltage down to ~100-150
- Tertiary Protection:
 - Transient voltage suppressors - work at relatively low/slow surges, adds an extra layer of protection against voltage spikes
 - Protects differential mode only
 - Clamps voltage spikes to 80-100V

Additional protection elements include:

- Cross-polarity protection to simplify installation - the circuit will work regardless of the input polarity
- AC cross protection:
- 4A non replaceable fuses
- No exposed high voltage pads
- High power inductors used as coordinating elements to maximize energy efficiency
- Enhanced PoE port protection compliant with more stringent ITU K.45 2016 requirements
- Sealed enclosure for environmental protection

2. Package Contents

One of the following 60W PoE/Power Extenders

- PFU-P-C-O-060-01, One-port PoE Extender
- PFU-P-C-O-060-02, Two-port PoE Extender
- PFU-48-C-O-060-01, 48V Power Extender
- PFU-12-C-O-060-01, 12V Power Extender



The PoE/Power Extender is supplied ready for cable installation with the solar shield attached..

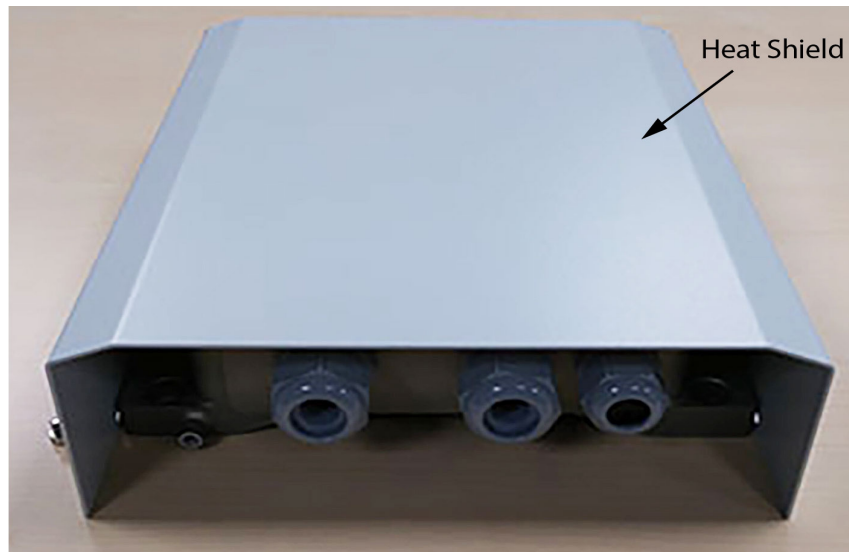
Also Required (Not Included)

- 3mm and 4mm Allen wrench
- 1 or 2, 100Base-X or 1000Base-X SFP transceiver(s), Single-mode or Multi-mode
- 25mm Torque or adjustable spanner/wrench
- 30mm Torque or adjustable spanner/wrench
- Phillips or Pozidriv screwdriver
- Silicone grease
- Loctite 222
- Sharp knife for initial separation of the hybrid cable component parts
- 12 AWG or 2mm diameter wire stripper for 12 AWG cable
- 16 AWG or 1.2mm wire diameter stripper for the 16 AWG cable
- Fastenings for wall or pole mounting

3. Installation

Installation of the PoE Extender should be completed in the following order.

Remove Heat Shield



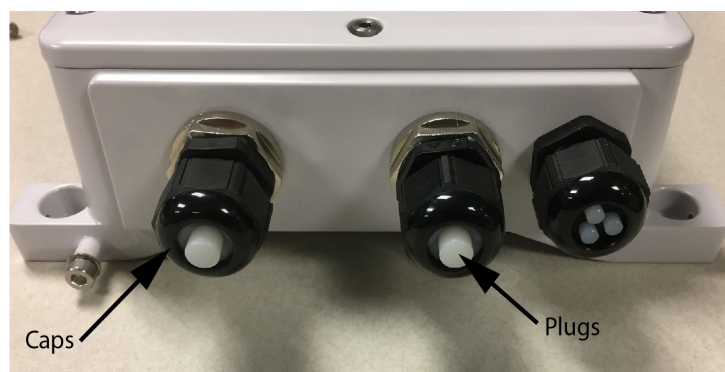
Remove the 4 bolts attaching the heat shield to the PoE Extender with a 3mm Allen key. Slide the heat shield off the retaining lugs and put to one side.

Remove Seal Caps and Grommets

The Two-port PoE Extender has 2 x M25 and 1 x M20 cable glands 60W

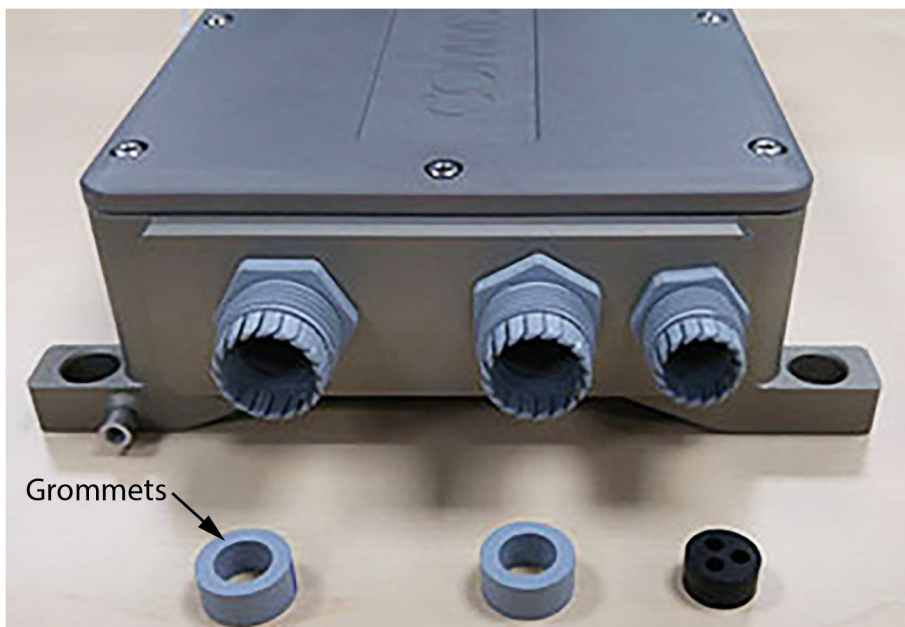
The Single-port PoE Extender has 1 x M25 and 1 x M20 cable gland

Power Extenders have 3 x M20 cable glands.



Unscrew the caps and then remove the plugs and grommets from all of the needed pass-through connectors.

Note 1: Do not unscrew the pass-throughs from metal body of the extender. These have been factory fitted and sealed to the correct torque setting.



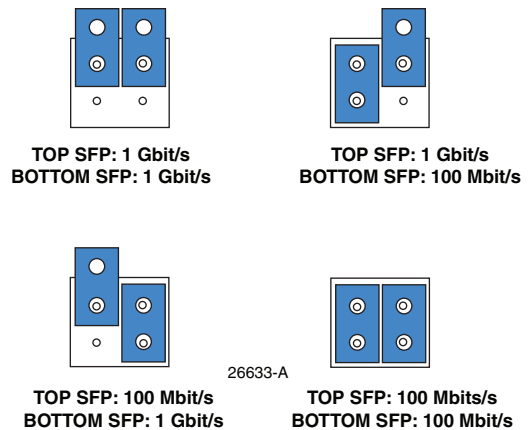
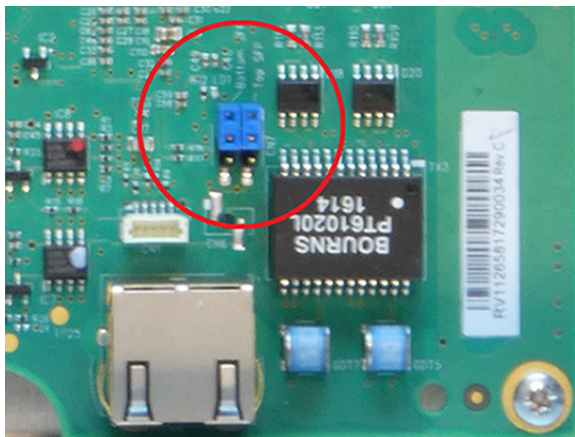
SFP Configuration

Using a 3mm Allen key, unscrew the 8 captive screws on the enclosure lid until they are clear of the base. Do not remove the screws from the lid. A pre-installed cable tie-lanyard is provided to keep the lid attached the base. This may be cut and removed if desired.

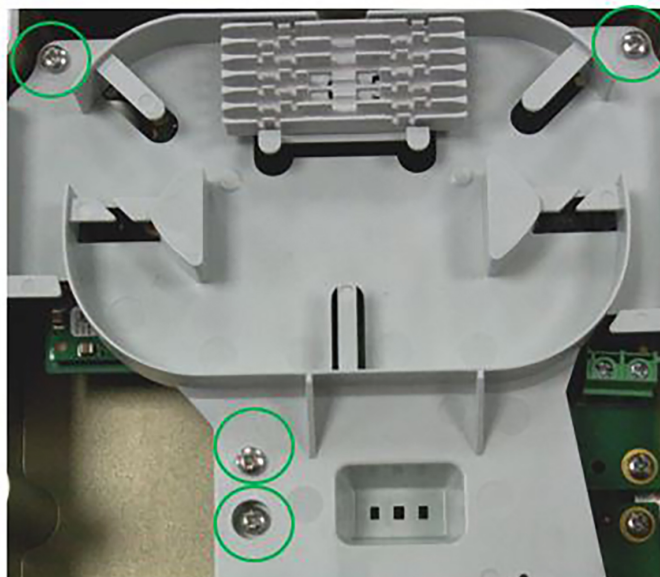
Note: The delivered unit is preconfigured for 1Gb/s use.

To configure for 100Mb/s use only

Using a Phillips screwdriver, remove the fiber splice tray. Identify the pin-header and reposition the link as shown below.



Replace the fiber splice tray, apply Locite 222 to all screws before fitting. Ensure all screws are filled (see below).



Ethernet Cables Installation

Cat5e or better shielded patch cords are recommended for the PoE connection(s). It is generally easiest to install the cables in order from left to right, starting with the leftmost PoE or DC power connection and ending with the hybrid cable:

1. Thread the seal cap and grommet on to the cable as shown below.

Note: If using a pre-terminated Ethernet cable, it may be necessary to remove the boot. In some cases, it may also be necessary to cut the cable and re-terminate a new plug after threading the cable through the grommet.



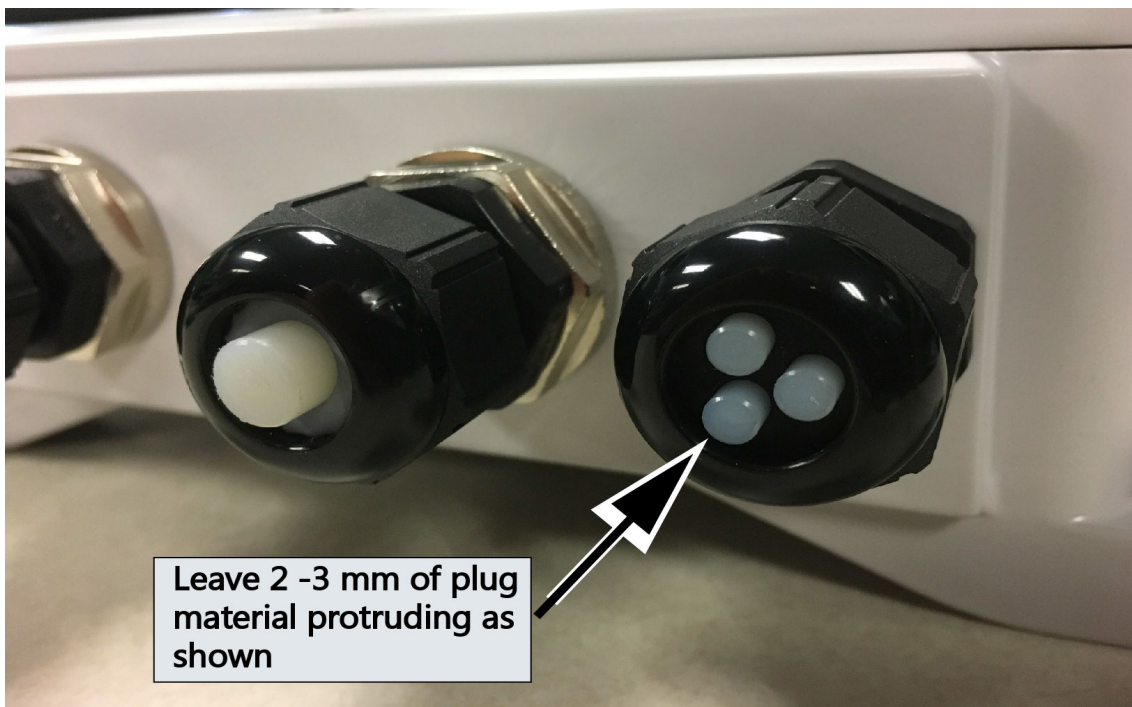
2. Before tightening the seal cap, insert the RJ45 plug into the jack with the lock tab facing up.



3. Tighten the cap against the pass through. The recommended torque is 2.50Nm (22.1 in lbf).



4. If applicable, repeat steps 1-3 for the second PoE connection.
5. For unused glands, verify that the plugs have been properly inserted leaving 2 - 3 mm of plug material protruding from the gland. Gland nuts should be tightened to 4 Nm



ATTENTION: TO PREVENT MOISTURE AND DUST FROM ENTERING THE UNIT, ALL UNUSED PORTS SHOULD HAVE PLUGS INSTALLED AT ALL TIMES.

FAILURE TO DO SO COULD RESULT IN UNIT FAILURE

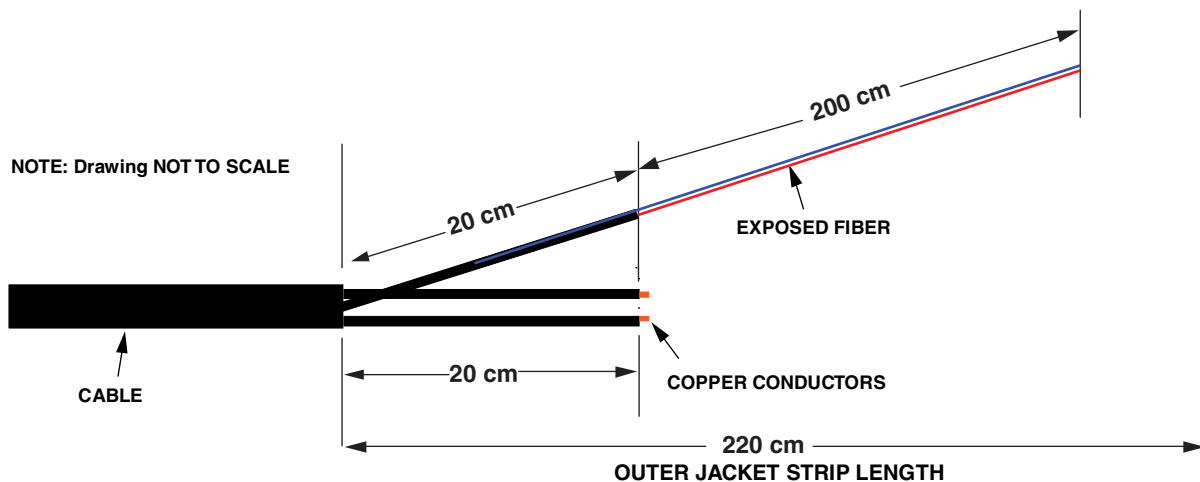
Powered Fiber Cable Installation

The CommScope Powered Fiber Cable consists of 2 insulated copper power conductors and a central tube containing the optical fiber. Separate the three cores to allow the power to be connected to the screw terminals, and the fiber thread to be connected to a fiber terminal, which is then inserted into the SFP.

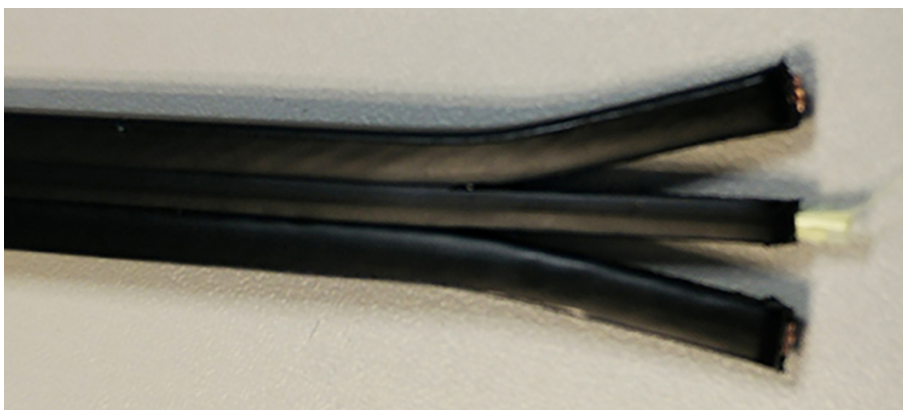
The Powered Fiber Cable is designed to be prepared for use with only a knife, a typical pair of wire strippers and, optionally, a wire cutter or snip. To split the cable successfully, follow this process.

As detailed below, only use the knife to separate the parts for the first 20mm or so. It is important that subsequent stripping is performed by simply pulling the conductors away from the fiber tube so that the edges are clean and smooth. The dimensions of the strip lengths are shown below.

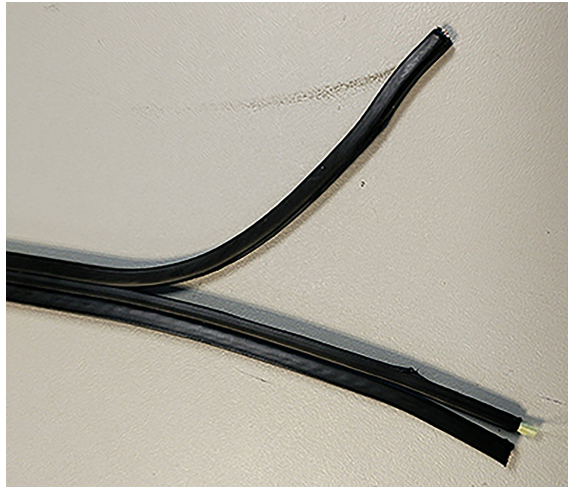
Cable Split Dimensions



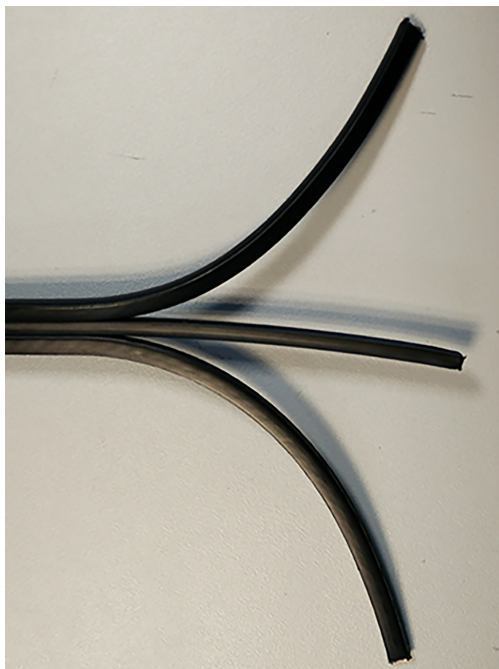
1. Snip the cable end at the indentations in the cable jacket between the center fiber element and the two outer conductor elements



2. Peel one conductor side away to the desired length by hand.



3. While holding the center fiber element in as straight a line as possible, peel the second conductor element away to the desired length.



4. For the 12 AWG cable, use a proper 12 AWG or 2MM diameter wire stripper. For the 16AWG, use a 16 AWG or 1.2mm wire diameter stripper.
5. Use tape or heat shrink to prevent the cables splitting further than the required length.
6. Ensure the cables are smooth to prevent water ingress issues through the grommet.
7. Strip the two copper elements to an appropriate length, just as accessing any copper cable.

8. For the center fiber element, simply place the strippers at the desired strip location, close the wire strippers fully once, then open. Now, by hand you may pull the center element jacket off, revealing the aramid and optical fibers.
9. Remove excess aramid as desired for termination.

Connecting the Powered Fiber Cable

1. Thread the strands through the cap, then thread the strands through the supplied grommet; the grommet should be positioned approximately 5cm from where the cable component parts are split out. Use some silicone grease on the grommet, which helps pulling the strands through the grommet, and provides a seal against water ingress.

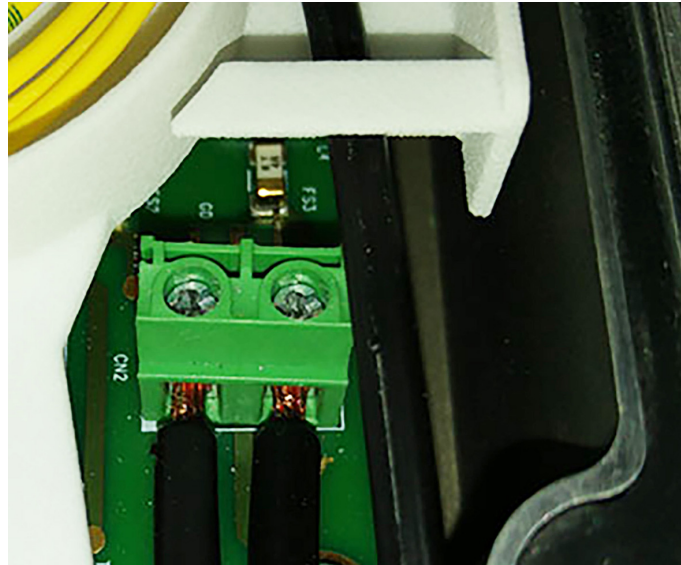


2. When threading the cable through the pass through, ensure the fiber strand is uppermost when pushing the grommet in to the pass through.
3. Use tape or heat shrink to prevent the cables splitting further than the required length.
4. Using the Torque wrench, tighten the screw cap on the pass through. Tighten to torque 5Nm (3.69 ft-lb).

Connecting the Power Strands

1. Cut the two power strands to length. Remove 5mm of sheath from the two cables.
2. For the 12 AWG cable, use a proper 12 AWG or 2MM diameter wire stripper. For the 16AWG, use a 16 AWG or 1.2mm wire diameter stripper.
3. Use tape or heat shrink to prevent the cables splitting further than the required length. Thread the two cables in to the power connectors and tighten the screws.

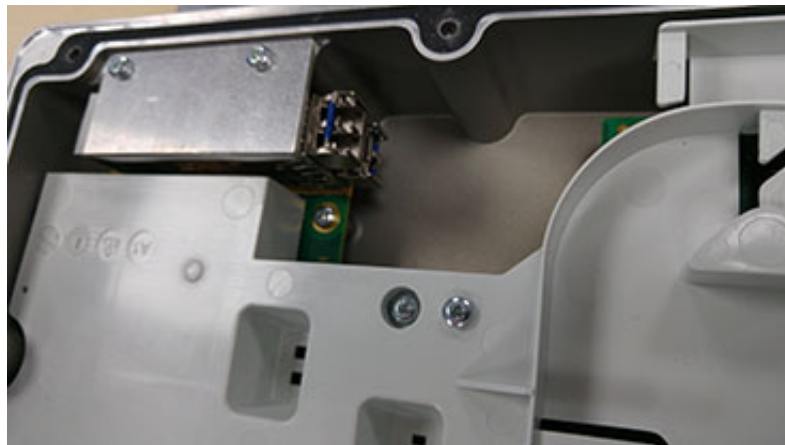
Note: Due to the cross-polarity protection, the circuit will work regardless of the input polarity.



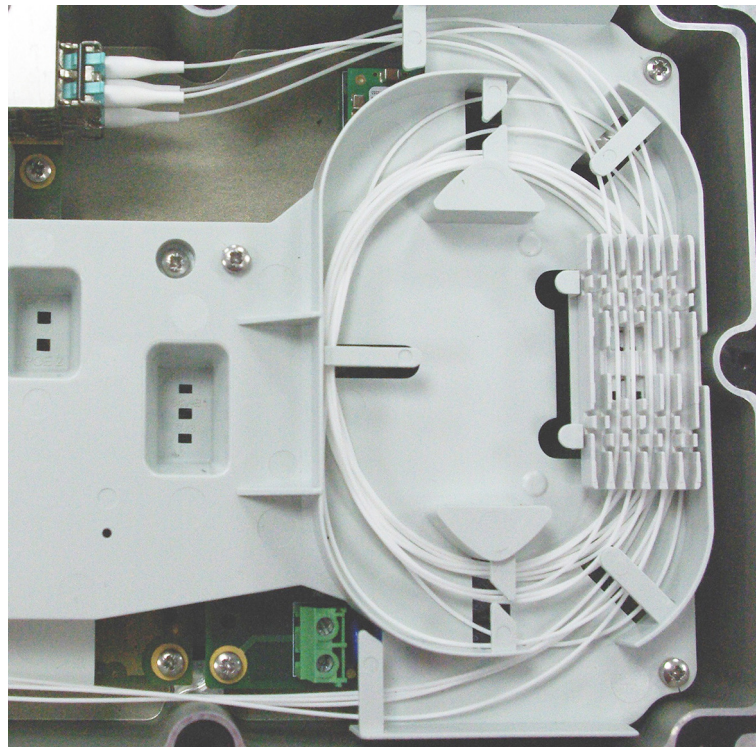
Connecting the fiber

1. Insert the SFPs in place.

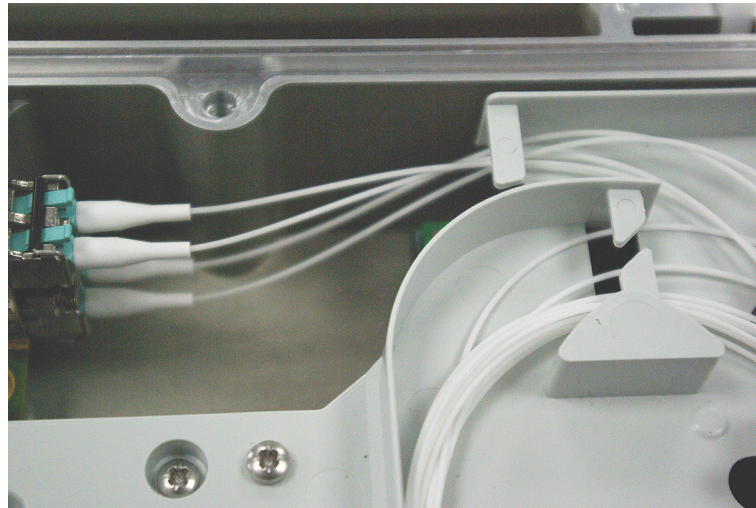
Note: Insert the bottom SFP in place first. This SFP is inserted upside down. The SFPs should only be inserted or removed with the power off.



2. Remove the sheath from the fibers, allowing 14cm of sheath from the initial cable split, as in Figure . Place the strippers at the desired strip location, close the wire strippers fully once, then open. Now, by hand you may pull the center element jacket off, revealing the aramid and optical fibers.
3. Remove excess aramid as desired for termination. This allows the sheath to rest on the beginning of the splice tray.
4. The fibers should wrap around the splice tray several times to allow for future resplicing.
5. The splice to the fiber connectors should sit in the splice island in the tray as below.



6. The fiber LC/UPC pigtails should wrap around the splice tray once, then connect to the SFPs as below.



Note: Field installable connectors such as LightCrimp Plus can be used. A clip to connect two LC simplex to one LC duplex is recommended.

DC Power Cable Installation

The Power Extender option provide a 12V/48V output with fiber pass through for powering devices which do not support PoE.

The output power connection is provided through the center pass through. A round jacketed 2 core cable with external diameter between 3mm and 10 mm is required.

1. Feed the cable through the pass through.
2. Remove 5mm of sheath from the 2 cables and insert into the lever arm connectors. Ensure the correct polarity of the connections.
3. Tighten the cap against the pass through. The recommended torque is 2.50Nm (22.1 in lbf).

The output fiber cable is provided through the left pass through.

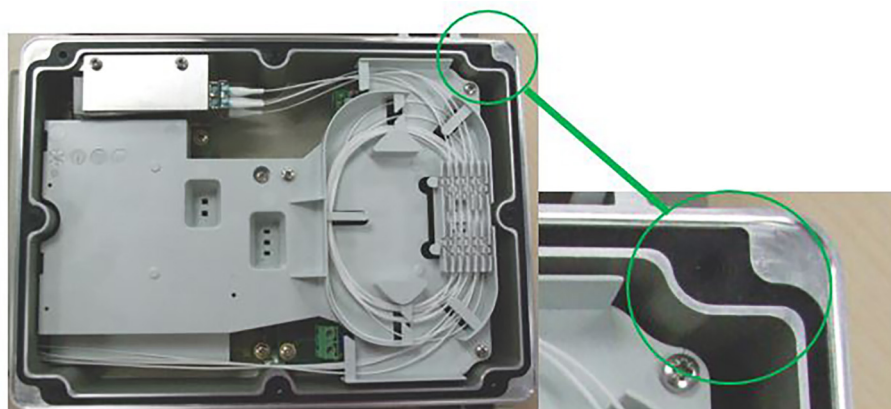
The fiber cable must be round and have an external diameter between 3mm and 10mm.

Feed the fiber through the gland and then strip and splice using the splice tray.

Tighten the cap against the pass through. The recommended torque is 2.50Nm (22.1 in lbf).

Sealing the Unit

1. Ensure the supplied seal ring is properly seated in its channel (it only fits in one orientation) and that all cables are secured.



2. Apply Loctite 222 to all lid bolts.
3. Put the lid back in place.

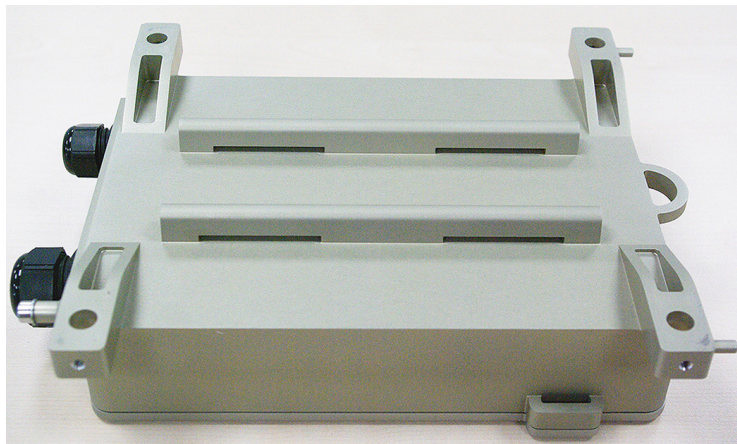


4. Tighten the screws to torque 2.5Nm (22.1 in-lb). It is recommended that the center screws on each side be tightened first, followed by the corner screws.

Mounting the Unit

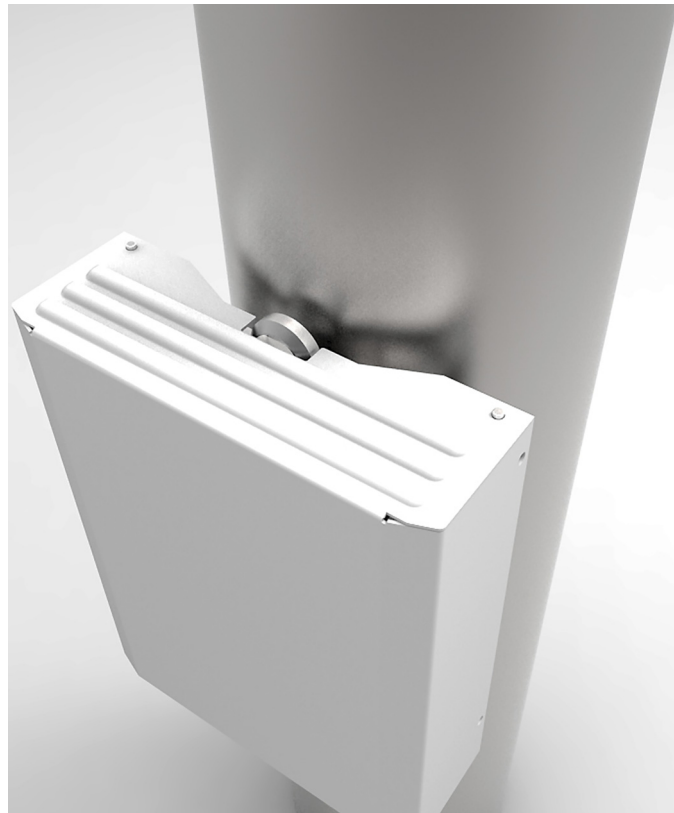
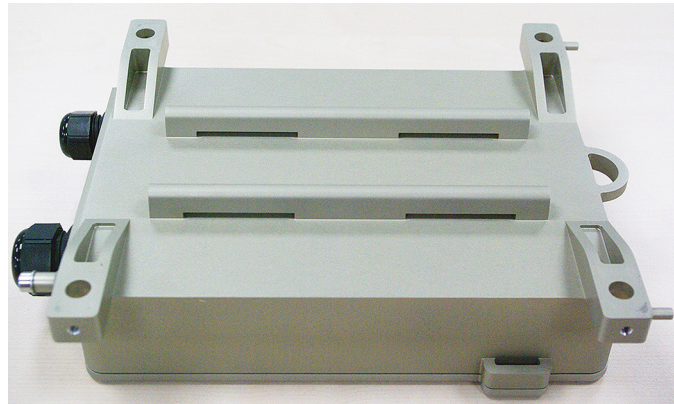
Wall Mount

The PoE extender has 4 holes on the exterior of the device for attaching to a wall or flat surface



Pole Mount

The four slots in the raised sections on the bottom of the device may be used for pole attachment using band clamps (jubilee clips).



PoE pole mounted with solar shield

Grounding

To ensure protection from lightning strikes and other electrical surges, the PoE extender must be earthed. Any end device connected to the PoE extender must also be bonded to earth. Make connections from the enclosure earth point using the M5 bolt and washer provided:

1. A minimum 16AWG bonding connection from the Customer's equipment earth terminal to a reliable earth (ground) point.
2. A minimum 16AWG bonding connection from the PoE Extender to a reliable earth (ground) point, at or close to the earth (ground) point of the Customer's equipment.



PoE Extender Earth Point

Solar Shield

At the top of the Two Port PoE Extender's operating temperature range, the physical temperature of the PoE Extender may exceed 70°C. Ensure the supplied solar shield is in place for protection. See Table 4.2 on page 27 for operating temperature details.

4. Detailed Specifications

Table 4.1: Part Numbers

Version	Catalogue Number
Two Port PoE Extender	PFU-P-C-O-060-02
60W Single Port PoE Extender	PFU-P-C-O-060-01
48V Power Extender	PFU-48-C-O-060-01
12V Power Extender	PFU-12-C-O-060-01

Table 4.2: Climatic Performance

Item	Specification
Storage Temperature	-40°C to +70°C
Installation Temperature	-5°C to +45°C
Operating Temperature	-40°C to +65°C
65°C assumes 45°C ambient air temperature, plus 20°C sun loading.	

Table 4.3: Physical Dimensions

Item	Specification
Dimensions including solar shield	283mm x 225mm x 77mm
Weight	3.8kg

Notes:

- Table 4.4a provides a partial listing of the maximum supported hybrid cable distances for a range of NEC Class 2 power supply output voltages, hybrid cable copper gauges, and extender output power levels.
- NEC Class 2 requires a power supply unit (PSU) limited to less than 60V dc. In practice, some commercial 48V power supplies may be configured to output from 48V up to about 57V.
- Pout is the maximum total PoE Extender output power.

Table 4.4a: Maximum Hybrid Cable Lengths

PSU Output Voltage	Cable Gauge (AWG)	Max Cable Length (m) Pout = 60W	Max Cable Length (m) Pout = 45W	Max Cable Length (m) Pout = 30W	Max Cable Length (m) Pout = 15.4W	Max Cable Length (m) Pout = 7W
Maximum (57V)	12	888	1301	1886	3131	4633
	16	351	514	746	1238	1833
Nominal (48V)	12	630	922	1335	2217	3280
	16	249	365	528	877	1297
Minimum (40.5V)	12	448	630	900	1494	2211
	16	177	249	356	591	874

Assumptions:

- Hybrid cable ambient temperature: 20 C (Underground/Ducted)
- CommScope Cat6/6a outdoor patch cord length: 50 m
- Patch cord ambient temperature: 55 C (Sunlight Exposed)

Table 4.4b: Maximum Extender Output Power vs. Powered Device Type

Maximum Extender Output Power		Powered Device A	Power Device B
Port A	Port B		
30W	30W	PoE+ (CLASS 4)	PoE+ (CLASS 4)
15.4W	30W	PoE (CLASS 0 OR 3)	PoE+ (CLASS 4)
15.4W	15.4W	PoE (CLASS 0 OR 3)	PoE (CLASS 0 OR 3)
15.4W		PoE (CLASS 0 OR 3)	
60W ¹		High PoE (Dual Class 4)	

Note 1: Single-port PoE Extender only

Table 4.5: EMI/C, & Safety and Regulatory

Item	Specification
EMC Emissions	CISPR 22/FCC CFR 47 Part 15/ICES-003 EN 55032:2015
Immunity	EN300386/ICES-003 EN 55024:2010 + A1:2015 ITU-T K.45
Safety	IEC 60950-22:2006 IEC 62368-1:2014
Compliance	CE/FCC/CSA/RCM
	SELV
	NEC Class 2 input.
Environmental	ETSI EN 300 019-1-4 V2.3.1 (2013-08) Class 4.1E
	EN 60068-2-52:1996
	REACH SVHC
	RoHS2 2011/65/EU
	EN 60529:1992 + A2:2013 (IP68/3 meters)

Table 4.6: Communications

Item	Specification
Optical Input	Accepts all MSA compliant 100Base-X and 1000Base-X SFP transceivers
Optical Input Singlemode	ITU-T G657.A2
Optical Input 50um Multimode	OM3 or OM4
RJ45 Connector Output	Half and Full Duplex Modes Supported. 10/100/1000Mb Ethernet

Table 4.7: Supported Fiber Cable Types

Catalogue Number	Cable
PFC-S02L12	PFC,Singlemode,2F,I/O,12AWG
PFC-S02L16	PFC,Singlemode,2F,I/O,16AWG
PFC-S02O12	PFC,Singlemode,2F,Outdoor,12AWG
PFC-S02O16	PFC,Singlemode,2F,Outdoor,16AWG
PFC-S04L12	PFC,Singlemode,4F,I/O,12AWG
PFC-S04L16	PFC,Singlemode,4F,I/O,16AWG
PFC-S04O12	PFC,Singlemode,4F,Outdoor,12AWG
PFC-S04O16	PFC,Singlemode,4F,Outdoor,16AWG
PFC-S12L12	PFC,Singlemode,12F,I/O,12AWG
PFC-S12L16	PFC,Singlemode,12F,I/O,16AWG
PFC-S12O12	PFC,Singlemode,12F,Outdoor,12AWG
PFC-S12O16	PFC,Singlemode,12F,Outdoor,16AWG
PFC-302L12	PFC,OM3,2F,I/O,12AWG
PFC-302L16	PFC,OM3,2F,I/O,16AWG
PFC-302O12	PFC,OM3,2F,Outdoor,12AWG
PFC-302O16	PFC,OM3,2F,Outdoor,16AWG
PFC-304L12	PFC,OM3,4F,I/O,12AWG
PFC-304L16	PFC,OM3,4F,I/O,16AWG
PFC-304O12	PFC,OM3,4F,Outdoor,12AWG
PFC-304O16	PFC,OM3,4F,Outdoor,16AWG

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This product is covered by one or more U.S. patents or their foreign equivalents. For patents, see: www.commscope.com/ProductPatent/ProductPatent.aspx

For technical assistance, customer service or to report any missing/damaged parts, visit us at: <http://www.commscope.com/SupportCenter>

CERTIFICATE

Certificate Number: 111045.000
Including Seven Page Addendum

The Quality Management System and implementation of:

CommScope, Inc.

With Virtual Central Function at:
1100 CommScope Place SE
Hickory, NC 28602
United States

meets the requirements of the standard:

ISO 9001:2015

Scope:

The sales, marketing, design, manufacture, test, repair, support, service, and distribution of telecommunications products, components, and services for the telecommunications, wireless, and broadcast networks industries

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Business Segments	Exceptions
Connectivity and Cable Solutions (CCS)	None
Networking, Intelligent Cellular & Security Solutions (NICS)	None
Outdoor Wireless Networks (OWN)	None
Access Network Solutions (ANS)	None



Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
Atlanta, GA 30339 USA
(215) 997-4519
<https://www.dekra.us/en/audits/>



CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page One of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Activities Legend:	HQ = Headquarters	MFG = Manufacturing	SER = Services (Professional Services and/or Technical Support)
	HW DE= Hardware Development	REP = Repair	SC = Purchasing, Supplier Management, Manufacturing Support, Repair Support
	SW DE= Software Development	SAL = Sales, Marketing	DIST = Distribution

Site Address	Site Activities
CommScope Inc 1100 CommScope Place SE Hickory, NC 28602 United States	HQ (Virtual)
ARRIS Technology, Inc. 3871 Lakefield Drive Suwanee, GA 30024 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 101 Tournament Dr. Horsham, PA, 19044 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 6450 Sequence Drive San Diego, CA 92121 United States	SW DE, SER
ARRIS Technology, Inc. 900 Chelmsford St. Lowell, MA 01851 United States	HW & SW DE, SER, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001



Dr. Cem O. Onus
Managing Director

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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Two of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
ARRIS Solutions, Inc. 2400 Ogden Ave., Suite 180 Lisle, IL 60532 United States	HW & SW DE, SAL, SER, SC
ARRIS 15 Sterling Drive Wallingford, CT 06492 United States	HW & SW DE, SER, SC
ARRIS Technology, Inc. 2450/2500 Walsh Avenue Santa Clara, CA 95051 United States	HW & SW DE, SAL, SER
Ruckus Wireless International Inc. 350 West Java Dr. Sunnyvale, CA 94089 United States	HW & SW DE, SER
Ruckus Wireless Network Technology (Shenzhen) Co. Ltd. Units C&D, 5th Floor, No. 2 Finance base, 8 KeFa Road, Shenzhen, China	SW DE, SC, HW DE

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001



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Managing Director

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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Three of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
CommScope Asia (Suzhou) Technologies Co., Ltd. 77 Qiming Road, Suzhou Industrial Park Suzhou, Jiangsu 215121 Peoples Republic of China	MFG, SC
Ruckus Wireless International Inc., Taiwan Branch @ Neihsu District, Taipei City, Rui Road 411, 10th floor, Taipei	SW DE
ARRIS Group India Pvt Limited (AGIPL) Salarpuria Supreme, Ground Floor West Wing & First Floor Munnekolalu Village, Varthur Hobli, Outer Ring Road, Bangalore-560037	SW DE
ARRIS Group de Mexico S.A. de C.V. Av. La Paz 11721 Parque Industrial Pacifico Tijuana, BC 22643 Mexico	MFG, REP, SC
ARRIS Communications Ireland Limited Building 4300, Cork Airport Business Park Kinsale Road Cork County Ireland	HW & SW DE
ARRIS Group India Private Limited "The Senate" No:33/1, Ulsoor Road, Bangalore - 560 042 India	HW & SW DE

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001



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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Four of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
ARRIS Group, Inc. 50 Stranmillis Embankment Belfast, BT95FL Northern Ireland	SW DE
CommScope Czech Republic, s.r.o Turanka 856/98B 627 00 Brno Czech Republic	HW DE,
CommScope CZ, spol. s.r.o. U Morusi 888, 53006 Pardubice Czech Republic Czech Republic	HW DE,
CommScope Connectivity UK Limited Units 1 and 4 Kinmel Park Industrial Estate Bodelwyddan, Denbighshire, LL18 5TZ United Kingdom	HW DE, MFG, SAL
CommScope Design & Integration UK Ltd. Unit 5 & 6 Eden Business Park Eden House Drive Old Malton, Malton, North Yorkshire YO17 6AE United Kingdom	HW DE, MFG, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001



Dr. Cem O. Onus
Managing Director

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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Five of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
CommScope Design & Integration UK Limited 412 The Quadrant, Birchwood Park Warrington, WA3 6FW United Kingdom	SER
CommScope EMEA Ltd. Corke Abbey Avenue Bray, Co. Dublin Ireland	MFG, SAL
CommScope EMEA Ltd. Diestsesteenweg 692 3010 Kessel-Lo, Belgium	HW DE, MFG, SAL
CommScope Italy Srl Via Archimede, 22/24 Agrate Brianza (MB) 20864 Italy	HW DE, REP, SW DE
Telecom Networks Americas AV. HIPOLITO YRIGOYEN 2999, DEPOSITO 6 EL TALAR, TIGRE Buenos Aires B1618AXD Argentine Republic	SAL, DIST
CommScope Networks India Private Limited Salarpuria Softzone, A Block, 1st Floor Survey No 80/1, 81/1, 81/2, B Wing, Belandur Village, Varthur Hobli, Outer Ring Bangalore – Karnataka 560103 India	SW DE
ADC India Communications Ltd. No 10 C , 2nd Phase Peenya Industrial Area Bangalore – Karnataka 560058 India	MFG, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001



Dr. Cem O. Onus
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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Six of Seven

The Quality Management System and implementation of:

CommScope, Inc.

With site at:

CommScope Asia (Suzhou) Technologies Co.,Ltd.

77 Qiming Road, Suzhou Industrial Park
Suzhou, Jiangsu 215121
Peoples Republic of China

meets the requirements of the standard:

ISO 9001:2015

The validity of this certificate depends on the validity of the main certificate.

Scope:

Production of network cable, fiber cable and communication equipment component (copper patch cords, copper panel, accessories etc.)

Certification Structure: Multi-site

Certificate Expires:	January 04, 2026
Certificate Issued:	January 05, 2023
Certified Since:	January 10, 2001



Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
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Atlanta, GA 30339 USA
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证书附录

证书编号: 111045.000

附录第7页,共7页

质量管理体系和实施:

CommScope, Inc.

其场所:

康普科技 (苏州) 有限公司

中国江苏省苏州工业园区启明路77号,邮编215121

符合以下标准要求:

ISO 9001:2015

本证书的有效性取决于主证书的有效性。

范围:

网络线、光缆、通信系统设备材料(网络跳线、配线装置等)的生产。

认证结构: 多场所

证书有效期: 2026.01.04

发证日期: 2023.01.05

首次发证日期: 2001.1.10



Dr. Cem O. Onus
Managing Director

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Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2015

This is to certify that:

CommScope, Inc. of North Carolina
1100 CommScope Place SE
Hickory
North Carolina
28603-0339
USA

Holds Certificate No:

EMS 648387

and operates an Environmental Management System which complies with the requirements of ISO 14001:2015 for the following scope:

The environmental management system to control the risks associated with the manufacture, distribution, field support and central function of telecommunication products and services.

For and on behalf of BSI:

Carlos Pitanga, Chief Operating Officer Assurance – Americas

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

Page: 1 of 5



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Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Telecommunications de Reynosa S. de R.L. de C.V. Av. Industrial Reynosa Lte 2 al 5 Parque Industrial Center Reynosa Tamaulipas 88780 Mexico	Manufacture and distribution of telecommunication products including antenna and cable.
CommScope Asia (Suzhou) Technologies Co., Ltd. EPZ II, 77 Qiming Road Suzhou Industrial Park Suzhou Jiangsu 215121 China	Manufacture and distribution of telecommunication products, including cable.
Andrew Telecommunications India Pvt. Ltd. Plot No. N-2, Phase IV Verna Industrial Estate Verna Salcette Goa 403 722 India	Manufacture and distribution of telecommunication products, including antenna and cable.
CommScope EMEA Ltd. Corke Abbey Avenue Bray County Dublin A98FY03 Ireland	Manufacture and distribution of telecommunication products, including cable and connectors.
CommScope Telecommunications (China) Co., Ltd. 68 West Su Hong Xi Lu Suzhou Industrial Park Suzhou Jiangsu 215021 China	Manufacture and distribution of telecommunication products, including antenna and cables.

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

Page: 2 of 5

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Wireless Systems GmbH Industriering 10 Buchdorf 86675 Germany	Manufacture and distribution of telecommunication products, including amplifiers and antenna systems.
CommScope, Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Corporate headquarters responsible for management system oversight of all locations listed on this certificate.
CommScope Inc. 6519 CommScope Road Catawba North Carolina 28609-0199 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Inc. 3642 US Hwy 70 East Claremont North Carolina 28610-0879 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Czech Republic s.r.o. Turanka 98B Brno 62700 Czech Republic	Manufacture and distribution of telecommunication products, including connectors and terminations.
CommScope Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Customer care, facility maintenance, and administrative functions.
ADC de Delicias, S. de R.L. de C.V. Blvd. Fernando Baeza No. 1301 Sur Delicias Chihuahua 33000 Mexico	Manufacturing and distribution of telecommunication products.

Original Registration Date: 2016-03-01

Effective Date: 2022-03-15

Latest Revision Date: 2022-04-21

Expiry Date: 2025-03-14

Page: 3 of 5

Certificate No: **EMS 648387**

Location	Registered Activities
ADC de Juarez S. de R.L. de C.V. Parque Industrial Antonio J Bermudez Ciudad Juarez Chihuahua 32470 Mexico	Manufacturing and distribution of telecommunication products.
CommScope Connectivity Belgium bvba Diestsesteenweg 692 Kessel-lo 3010 Belgium	Manufacture and distribution of telecommunication products.
CommScope Technologies de Juarez S. de R.L. de C.V. Santiago Troncoso 331 Praderas del Sur, Ciudad Juarez Chihuahua 32575 Mexico	Manufacture of Fiber Optic Splice Closures (FOSC), Fiber Guide Systems (FGS), Hardened Connectivity and Molding-Gel Filling, including: plastic injection molding, plastic extrusion, plastic and metal machining, and assembly operations.
CommScope Connectivity UK Limited Unit 1 Kinmel Park Bodelwyddan Rhyl, Denbighshire LL18 5TZ United Kingdom	Fibre optic cable manufacturing, termination and design of other telecommunication products and services.
CommScope 11312 S. Pipeline Road Eules Texas 76040 USA	Manufacture, distribution, field support and central function of telecommunication products.
ARRIS GROUP DE MEXICO SA DE CV Av. De la Paz, #11721 Parque Industrial Pacifico Tijuana Baja California 22643 Mexico	Manufacture, repair, support, repair service, distribution of products and components for telecommunications that provide integrated solutions for voice, video and data through the processes of SMT, manual and mechanical assembly, soldering (manual, selective, printed, wave) electrical testing and packaging.

Original Registration Date: 2016-03-01

Effective Date: 2022-03-15

Latest Revision Date: 2022-04-21

Expiry Date: 2025-03-14

Page: 4 of 5

Certificate No: **EMS 648387**

Location	Registered Activities
CommScope Design & Integration UK Ltd Unit 5 & 6, Eden Business Park Edenhouse Drive Old Malton Malton YO17 6AE United Kingdom	Manufacture and distribution of telecommunications products including cabinets.
Arris Indústria Eletrônica do Brasil Ltda. CNPJ: 09.154.836/0001-15 Avenida Torquato Tapajós, 9475 Tarumã Manaus Amazonas 69041-025 Brasil	Manufacturer and distribution of Receivers, Television signal Decoders and Modulator/Router.
CommScope Design and Integration UK Ltd. Lovell House, 412 The Quadrant Birchwood Park Warrington WA3 6FW United Kingdom	Telecommunications project management, site surveys, installations commissioning and rigging.

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

Page: 5 of 5

LIMITED WARRANTY



1. **Definitions.** For purposes of this Warranty, (i) "Buyer" shall mean the individual or entity identified on the applicable purchase order or supply agreement (or, if different, on Seller's quotation, order acknowledgement or statement of work), (ii) "Seller" shall mean the CommsScope entity identified on such entity's quotation, order acknowledgement, statement of work or supply agreement, (iii) "Hardware" means equipment designed and manufactured by or on behalf of Seller, or any third-party manufacturer's equipment offered for sale by Seller to Buyer, (iv) "Product" shall mean a product manufactured by or on behalf of Seller pursuant to the applicable supply agreement, quotation or order acknowledgement, and includes any combination of Hardware and Software, (v) "Services" means site engineering, system integration, product installation, implementation, training, maintenance and technical support services for Products, or other professional services provided by Seller to Buyer. Services exclude managed services and hosted cloud services provided by Seller, (vi) "Software" means Seller-licensed software, either embedded or standalone, including any updates provided, and any other enhancements, modifications, and bug fixes provided thereto, in object code form only (unless otherwise specified), and any full or partial copies thereof. Software does not include software created or owned by third parties, including but not limited to MediaKind Software, Google's Android Software or any third party application software, and (vii) "Warranty Period" means, unless a different time period is set forth in **Exhibit A**, (a) for Hardware, one year from date of original shipment from Seller's facility, (b) for Software-only Products, ninety (90) days from the date such Software is first made available to Buyer, or for Software embedded in a Hardware Product, ninety (90) days from date of original shipment of the Product from Seller's facility, and (c) for Services, thirty (30) days from the date the performance of such Services has been rendered.

2. **Limited Warranty.** Seller warrants that, as of the date of delivery, Seller has good title to the Product, free from any lawful security interest or other lien or encumbrance unknown to Buyer. In addition, during the Warranty Period, the Product and Services will be free from defects in materials or workmanship arising under proper and normal use. This Warranty shall apply only to the Products and Services and shall not apply to any other goods or materials, parts or components of a system or any system as a whole. This Warranty does not cover ordinary wear and tear. Seller does not warrant (i) Products not purchased from Seller or its authorized resellers; (ii) that the operation of the Product will be uninterrupted or error-free; (iii) that the Product will operate in combination with other third-party products selected by Buyer; or (iv) any products manufactured by third parties; provided that Seller will, to the extent permitted by the manufacturer, assign third-party warranties to Buyer. Seller gives no warranty for, and shall have no liability with respect to, any defects arising from any software (other than the Software), including, but not limited to MediaKind Software, Android Software or any third-party application software, downloaded to or otherwise used in conjunction with the Product. Seller further warrants to Buyer that during the Warranty Period, all Services performed by Seller for Buyer will be provided in a workmanlike manner.

3. **Disclaimers.** EXCEPT AS EXPRESSLY SET FORTH IN THIS LIMITED WARRANTY OR IN A SEPARATE, APPLICABLE SOFTWARE LICENSE AGREEMENT, ALL SOFTWARE IS LICENSED ON AN "AS IS" BASIS WITHOUT WARRANTY.

4. **Inspection and Return Authorization.** Buyer must promptly notify Seller of any claimed defect in the Product and/or Services. If Buyer claims that a Product is defective in materials or workmanship, Seller shall have the right to either examine the Product where it is located or, in its sole discretion, issue shipping instructions for return of the Product. Seller's inspection in response to a warranty claim shall not constitute acceptance or acknowledgment of the claim's validity. Except as otherwise agreed to in writing, Products may not be returned to Seller without prior authorization. Buyer must contact Seller to obtain an authorization number and return the Products to the location designated by Seller. Any Products returned to Seller without proper authorization will be returned to Buyer at Buyer's expense. Risk of loss, damage and insurance responsibilities for the Products shall not pass from Buyer to Seller until delivery of the Products to Seller's designated location. Buyer shall prepay all transportation charges for such return.

5. **Remedies.** Seller's sole and exclusive obligation and Buyer's exclusive remedy under this Warranty is Seller's repair or replacement of the defective Product or re-performance of Services or issuance of a credit for the net book value of the purchase price of the defective Product. Seller shall have sole discretion as to which of these remedies Seller will provide. Seller is not liable for any repair or maintenance costs incurred by Buyer, unless Seller authorizes such charges in writing in advance of the commencement of the work. If Seller elects to replace or repair the defective Product, the replaced or repaired Product will be warranted for the remainder of the Warranty Period applicable to the originally shipped Product, but the Warranty shall not be extended beyond the original Warranty Period. Replacement Products may be new, refurbished or contain refurbished materials.

6. **Notice and Waiver.** If Buyer discovers any defect in the Product, Buyer must provide prompt (and in no case later than thirty (30) days after discovery) written notice to Seller of the claimed defect. Such notice shall describe, in reasonable detail, the symptoms of such defect. The notice must be received by Seller during the Warranty Period for such Product. Failure to give timely notice of a claim shall result in Buyer's waiver of such claim.

7. **Transfer of Ownership.** This Warranty is not transferable unless Buyer is expressly authorized by Seller in writing to resell the Product. In addition, Buyer must notify Seller on or before the fifteenth (15th) day after the date on which it transfers ownership of the warranted Product. Any transfers in violation of this Section shall invalidate this Warranty. Notice of the transfer of ownership must be in writing and shall include the name and address of the new owner.

8. **Exclusions from Warranty.** This Warranty shall not apply to problems attributable to, or as a result of:

- (a) improper installation or misapplication of parts;
- (b) chain or system failures induced by other products or components;
- (c) lack of proper inspection or maintenance or failure to provide a suitable operating environment;
- (d) any consumables provided with the Product, including but not limited to batteries and other accessories, and any other materials, components or products manufactured by a third party;
- (e) power surges, fire, unusual mechanical, physical or electrical stress, severe weather conditions or acts of nature, including but not limited to, lightning or floods;
- (f) usage or operation not in accordance with published ratings, specifications or instructions, including but not limited to environmental specifications identified by Seller;
- (g) any adjustment, modification, alteration, removal or repair of any part of the Product, including but not limited to removal or alteration of serial numbers or other identifying marks not expressly authorized by Seller in writing;
- (h) accidental damage, misuse, abuse, neglect or unauthorized access of the Product or of any system of which the warranted Product is a part;
- (i) any type of aesthetic changes due to oxidation or corrosion occurring on stainless steel or galvanized steel parts installed in unusually corrosive marine and industrial atmospheres (in which case Seller's only obligation shall be to ensure that Product complies with Seller's published material specifications);
- (j) use of the Product for purposes other than that for which it was designed; or
- (k) mishandling during shipment of the Product.

LIMITED WARRANTY

This Warranty is for Products installed and used in accordance with Seller's design, installation and operating parameters. Buyer's failure to ensure conformity with such parameters will void all warranties. Under no circumstance shall Seller have any liability or obligation with respect to expenses, liabilities or losses associated with the installation or removal of any Product or the installation or removal of any components for inspection, testing or redesign occasioned by any defect or by any repair or replacement of a Product.

9. **Limitation on Liability.** THE WARRANTIES SET FORTH IN SECTION 2 HEREOF ARE EXCLUSIVE AND ARE MADE ONLY TO BUYER. SELLER MAKES NO OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY DISCLAIMS AND EXCLUDES ANY REPRESENTATION OR WARRANTY OF MERCHANTABILITY, NONINFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE AND ANY REPRESENTATION OR WARRANTY ARISING BY USAGE OF TRADE, COURSE OF DEALING OR COURSE OR PERFORMANCE. No person is authorized to give any additional warranties on Seller's behalf or to assume for Seller any other liability, except in a writing signed by an authorized officer of Seller. SELLER'S TOTAL LIABILITY FOR ANY CLAIM OR DAMAGE ARISING OUT OF AND/OR IN CONNECTION WITH THE MANUFACTURE, SALE, DELIVERY OR USE OF THE PRODUCTS OR SERVICES WILL BE LIMITED TO PROVEN DIRECT DAMAGES, NOT TO EXCEED (I) FOR PRODUCTS, THE DEPRECIATED VALUE OF THE PURCHASE PRICE OF SUCH PRODUCTS OR (II) FOR SERVICES, THE ACTUAL AMOUNT PAID TO SELLER FOR SERVICES DURING THE 12 MONTH PERIOD IMMEDIATELY PRIOR TO THE EVENT (OR SERIES OF EVENTS) GIVING RISE TO THE LIABILITY. IN NO EVENT WILL SELLER BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY CLAIM FOR LOSS OF ACTUAL OR ANTICIPATED DATA, USE, REVENUES OR PROFITS. The Products are not specifically designed, tested, manufactured or intended for operation or use in any inherently dangerous, life endangering or life support applications where any failure of the Products could lead to death, personal injury or significant physical or environmental damage (High Risk Activities). If Buyer uses the Products in High Risk Activities, including but not limited to nuclear facilities or the flight, navigation or communication of aircraft, Buyer agrees that neither Seller nor its third party licensors are liable in whole or in part, for any claims or damages arising from such use, and that Buyer shall indemnify and hold Seller and its third party licensors harmless from any and all claims for loss, cost, damage, expense or liability arising out of or in connection with any use of the Products in High Risk Activities. These limitations on liability will apply regardless of the form of action, whether in contract, tort, strict liability or otherwise, and whether damages were foreseeable and will survive failure of any exclusive remedies provided in Section 4 hereof.

10. **Choice of Law.** The terms and conditions contained herein and the rights of the parties to any transaction to which they relate shall be governed by and construed in accordance with the laws of the State of North Carolina, U.S.A. The United Nations Convention on Contracts for the International Sale of Goods shall not apply.

LIMITED WARRANTY

Exhibit A

Product Categories	Warranty Period from Original Shipment Date*
Category A Products E6000® Converged Edge Router (CER); E6000n™ Remote PHY Devices (RPDs); E6000r™ Remote PHY Shelves; E6000n™ Remote MACPHY Devices (RMDs); vManager; Remote OLT (R-OLT); associated power supplies and accessories. FLX PON OLT portfolio including vOLT. CherryPicker products, Encoder products including ME-7000, SE-6000; DSR-4xxx, DSR-6xxx and DSR-7xxx series IRD products, and Uplink systems including TME-2020, VDP-1000, BNC, DEM, and SEM; All APEX Universal EQAM including APEX1000 and APEX3000; All Aloha interactive products including OM2000, ARPD, ADM4000 and NC1500 4.0. All SDM products. All VUE and VTM Software Products. All STDC products.	Hardware One (1) Year Software Ninety (90) Days
Category B Products All High and Standard Definition Transport Adapter MS4000™ Media Streamer	Hardware One (1) Year Software Ninety (90) days ** For certain CPE, option for 1% overship in lieu of Hardware warranty is standard
Category C Products Intentionally left blank.	
Category D Products All Third Party OEM Products: power meters; All VUE and VTM hardware platforms; NC1500 4.0 hardware platform; LQA256 Legacy QAM Adapter; Elemental Products including Live, Server, Delta, Conductor and StatMux; DC2180 Cabinet Node. Cooling Systems	Pass Through from OEM: Hardware One (1) Year Software Ninety (90) Days
Category E Products Intentionally left blank	
Category F Products All OM and SG optical node platforms, Flex Max® and Starline® amplifier platforms, RF Taps & Passives, and Optical Passives	Hardware Five (5) Years within the United States and Canada Hardware Three (3) Years outside United States and Canada Software Ninety (90) Days
Category F1 Products All CHP Headend Optical (HEO) Elements	Hardware Three (3) Years Software Ninety (90) Days
Category G1 Products All NC optical node platforms and Optical Passives, including OP/NP/DP/DC models.	Hardware Five (5) Years Software Ninety (90) Days
Category G2 Products All CH3 Headend (HEO) Elements	One (1) year
Category G3 Products All EPON and GPON ONUs, RFoG/HPON R-ONUs, including, CP8 models and associated power supplies and accessories	Hardware Three (3) Years Software Ninety (90) Days

LIMITED WARRANTY

<p>Category H Products All ConvergeMedia™ Distribution Platforms and Management Suite, AdManager™ including SkyVision Ad Management and EMP solutions CVEx™, SVA, all Vertasent products including SVOM, SVM and ERM, AdEdge™ COM and AdEdge APS,VMS, Manifest Delivery Controller (MDC), ARRIS Video Content Manager (AVCM) and Next Generation Insertion (NGI) and Multicast ABR.</p>	<p>Hardware One (1) Year Software Ninety (90) Days</p>
<p>Category I Products ServAssure® Advanced, ServAssure® NXT - Alarm Central, ServAssure® NXT - Analyze, ServAssure Domain Manager and EventAssure™. WorkAssure™@ Workforce Management, Mobile TV, SecureMedia and Titanium</p>	<p>Hardware One (1) Year Software Ninety (90) Days</p>
<p>Category J Products Intentionally left blank</p>	
<p>Category K Products Intentionally left blank.</p>	
<p>Category L Products Intentionally left blank</p>	
<p>Category M Products Intentionally left blank.</p>	
<p>Category N Products Intentionally left blank.</p>	
<p>Category O Products All CAS Products including DAC, CASMR (and associated plug-ins), CAST, Advisor, CSS, OLL, CSS-Lite, KLS, DKS, CPMS</p>	<p>DAC, CASMR, CAST, Advisor, CSS Hardware Three (3) Years OLL, CSS-Lite, KLS, DKS, OLES, CPMS Hardware One (1) Year Software Ninety (90) Days</p>
<p>Category P Products Intentionally left blank.</p>	
<p>Category P1 Products Intentionally left blank</p>	
<p>Category Q Products Intentionally left blank</p>	
<p>Category R Products Intentionally left blank</p>	
<p>Category R1 Products Intentionally left blank</p>	
<p>Category S Products Intentionally left blank</p>	
<p>Category S1 Products Intentionally left blank</p>	

LIMITED WARRANTY

<p>Category T Products RUCKUS Wi-Fi</p>	<p>Hardware:</p> <ul style="list-style-type: none"> - Indoor Access Points and Wall Plate Access Points – Limited Lifetime Warranty,** except for access points with an “e” suffix (e.g., R350e), for which the HW warranty period is one (1) year. - Outdoor Access Points – One (1) Year - Controllers – One (1) Year, except ZoneDirector controllers are covered by the Limited Lifetime Warranty** <p style="text-align: center;">Software Ninety (90) Days</p>
<p>Category T1 Products RUCKUS ICX Switches</p>	<ul style="list-style-type: none"> - ICX Switches (including switch modules, PSUs, and Fans, but excluding removable optics/transceivers and LEDs) – Limited Lifetime Warranty,** except for ICX 7150- C08PT, for which the HW warranty period is 13 months. - LEDs – 12 months - Removable Optics/Transceivers – 60 months (13 months if shipped from Seller prior to June 1, 2021) <p>Software: Limited lifetime access to defect repairs, and software maintenance updates through end of support date of product</p>
<p>Category T2 Products Intentionally left blank</p>	
<p>Category U Products</p> <p>Other OSP Cable Products (P3®, Drop Coax, Fiber Cable, Fiber Drop Cable, CIC)</p> <p>NovuX Products</p> <p>Prodigy</p> <p>Products FDH</p> <p>Products</p> <p>Multiservice terminals (MST), Open Terminals (OTE) and Hardened Drop Cable</p> <p>Assemblies OSP “Box” Products</p> <p>Mini-RDTs and RDTs</p> <p>FOSC™, FIST™ and</p> <p>Tenio™</p> <p>OSP Copper Connect and Closure Products</p> <p>HELIAX® FiberFeed® Products, including FiberFeed® hybrid and fiber cables and assemblies, power cables and junction boxes</p> <p>Fiber Optic Panels, including Accessories, Mounting Hardware, Modules</p> <p>Fiber Optic Field Terminated Connectors, Kits, Tools, Consumables,</p> <p>Accessories Indoor Fiber Cable, Patch Cords, Cable Assemblies, Fiber Trunks</p> <p>Passive Optical Components and Value Added Modules (VAMs)</p> <p>FiberGuide® : Fiber cable Management System</p> <p>Optical Distribution Frames, including Modules, Blocks, Accessories and</p> <p>Hardware Cabinets Cable and Apparatus Products</p> <p>Alifabs™ Cabinets & Ancillary Products</p> <p>Alifabs™ Telecommunications Towers and Accessories</p> <p>Metro Cell Products, including Enclosures; Integrated Pole; Standard Poles; Accessories; and Wood Pole Brackets</p>	<p>One (1) year</p>

LIMITED WARRANTY

<p>Category V Products ValuDAS® Passive Products, including Air Directional Couplers, Hybrid Couplers, High Power Splitters, and Cell-Max™ Antennas Standard Tower Mounted Amplifier, Bias Tee and Power Distribution Unit Products Standard Filter & Combiner Products</p> <p>Electronic Enclosure Products (Cabinets)</p> <p>Alifabs™ Free Cooling Products and Accessories and Spare Parts, including</p> <p>Monitor All-In-One FLX (Active Passive Cabines)</p> <p>PowerShift™ & Power Products</p>	<p>Two (2) years</p>
<p>Category W Products ValuSite® Products</p> <p>I-Line Accessory Products</p> <p>Microwave Antennas</p> <p>Terrestrial Microwave System Products (including Microwave System Flex-Twist, Coupler, Filter and Diplexer Products)</p>	<p>Three (3) years</p>
<p>Category X Products Broadband RF Connectivity Products</p> <p>Premium Passive Products, including In-Building Directional Couplers, Hybrid Matrices, Tappers, Power Splitters, Terminations, Attenuators and CMAX Antenna Products</p>	<p>Five (5) years</p>
<p>Category Y Products QR® Coaxial Cable</p>	<p>Five (5) years</p>
<p>Category Z Products Standard RADIAX® Cable, Connector, Accessory and Cable Assembly* Products</p> <p>* RADIAX® Cable Assembly Product means any RADIAX® coaxial cable that has been fitted with Seller’s connectors in accordance with the installation instructions.</p>	<p>One (1) year</p>
<p>Category AA Products Standard CNT® Cable, Connector, Accessory and Cable Assembly* Products</p> <p>* CNT® Cable Assembly Product means any CNT® coaxial cable that has been fitted with Seller’s connectors by Seller or its certified distributor</p>	<p>Five (5) years; except that the Warranty Period for Products purchased for resale purposes shall be one (1) year.</p>
<p>Category BB Products Standard HELIAX® Cable, Connector, Accessory and Cable Assembly* Products</p> <p>* HELIAX® Cable Assembly Product means any HELIAX® coaxial cable or elliptical waveguide that has been fitted with Seller’s connectors by Seller or its certified distributor.</p>	<p>Ten (10) years; except for the following: (i) three (3) years for weatherproofing kits (including SureGuard boots); (ii) one (1) year for cable preparation tools (excluding blades); (iii) one year for single click-on hanger kits; and (iv) two (2) years for surge arrestors.</p>
<p>Category CC Products Standard ERA/ION-E®, ION-M®, ION-U®, MR, CMR, i-POI®, e-POI™, and Node Repeater Products</p>	<p>Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of shipment.</p> <p>Software Ninety (90) Days</p>
<p>Category DD Products In- Building and Fixed Subscriber Antennas</p>	<p>The earlier of: (i) three (3) years from the date of installation or (ii) thirty-nine (39) months from the date of original shipment</p>

LIMITED WARRANTY

<p>Category EE Products OneCell®</p> <p>Powered Fiber Cable Solution: Hybrid Copper and Fiber Cables, Class 2 Power Supplies, Indoor/Outdoor POE Extenders, Field Terminated Outlets, Consolidation Boxes and Related Passive Components</p>	<p>Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of original shipment Software Ninety (90) Days</p>
<p>Category FF Products Small Cell Device Management System (DMS) Software DAS Device Management System (AIMOS) Software</p>	<p>Ninety (90) days</p>
<p>Category GG Products Base Station Antenna, Small Cell Antenna & Mosaic™ Products</p>	<p>Two (2) years for all base station antennas except base station antennas incorporating N-type connectors, which shall have a warranty of one (1) year</p>
<p>Category HH Products DryLine® Dehydrator Systems and Line Monitoring Systems</p>	<p>Three (3) years or 3,000 hours of actual run time, whichever occurs first; except the Warranty Period for the compressor is only one (1) year or 1,000 hours of actual run time, whichever occurs first.</p>
<p>Category II Products SiteRise™ Solutions</p>	<p>One (1) year on workmanship for the Solution.</p>
<p>Category JJ Products Copper Structured Cabling Products</p> <p>Other Enterprise Products (Coax, Automotive Cables, Enterprise Enclosures and miscellaneous items) (excluding software)</p>	<p>One (1) year from the date of Installation</p>
<p>Category KK Products Alifabs™ Services (power upgrades, enablements, installation and decommission work, rigging, and fault management)</p>	<p>One (1) year from the date of completion of the work.</p>
<p>Category LL Products imVision Overlays and Controllers</p>	<p>Three (3) years</p>

** For Category H and Category I Products only, if Seller is engaged by Buyer to provide Services for the implementation of the purchased Products, warranty period for such Products shall commence upon Buyer's acceptance of the Products and Services.*

*** For Category T Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing for as long as the original end user of the Product continues to own and use the Product. For Category T1 Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing (i) for as long as the original end user of the Product continues to own and use the Product or (ii) through the End of Support date, as defined in the RUCKUS End of Life Policy, whichever is earlier.*



Powered Fiber Cable, OS2, 4 Fibers, Outdoor, 12AWG Conductor

- Easy peel, stranded conductors for maximum cable flexibility and rapid access
- Polarization indentation along one side of the cable for polarity identification
- No special tools or mounting hardware required - usage of a standard "FTTH" pressure clamp for aerial installation
- Easy split of cable into three separate sections for separate routing in closures, as needed for installation
- Polyethylene jacket for outdoor duct or direct buried applications

Product Classification

Product Series	PFC
Product Type	Hybrid cable
Regional Availability	Asia Australia/New Zealand EMEA Latin America North America

Standards And Qualifications

Cable Qualification Standards	Telcordia GR-20-CORE Issue 4
--------------------------------------	------------------------------

General Specifications

Cable Type	Stranded outdoor
Conductor Gauge	12 AWG
Ordering Note	Minimum order quantity is 500 meter

Construction Materials

Total Fiber Count	4
Fiber Type	G.657.A2 OS2
Jacket Color	Black
Jacket UV Resistance	UV stabilized

Dimensions

Cable Weight	110.0 kg/km
Height Over Jacket	4.30 mm 0.17 in
Width Over Jacket	11.50 mm 0.45 in

Physical Specifications

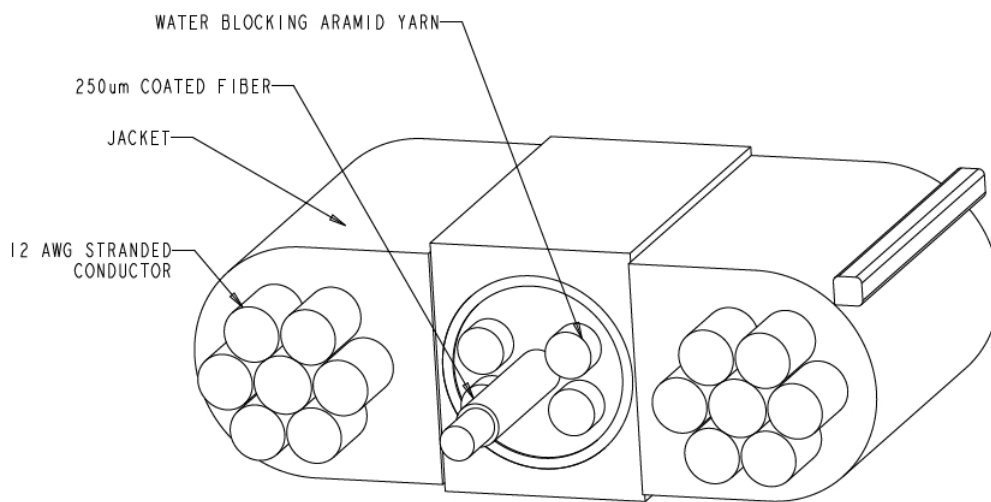
Minimum Bend Radius, loaded	50.0 mm 2.0 in
Minimum Bend Radius, unloaded	30.0 mm 1.2 in
Tensile Load, long term, maximum	132 N 30 lbf
Tensile Load, short term, maximum	440 N 99 lbf

Vertical Rise, maximum 122.0 m | 400.3 ft

Environmental Specifications

Environmental Space Low Smoke Zero Halogen (LSZH) | Riser
Installation Temperature -10 °C to +60 °C (+14 °F to +140 °F)
Operating Temperature -40 °C to +70 °C (-40 °F to +158 °F)
Storage Temperature -40 °C to +70 °C (-40 °F to +158 °F)

Outline Drawing



Regulatory Compliance/Certifications

Agency
RoHS 2011/65/EU

Classification
Compliant

Included Products

CS-8G-PFC (Product Component—not orderable) — Enhanced Low Macrobending, Zero Water Peak, Dispersion-Unshifted Singlemode Fiber (ITU-T G.657.A2, B2)

* Footnotes

Operating Temperature Specification applicable to non-terminated bulk fiber cable

YOUR NETWORK RUNS ON COMMScope™

Recommended Installation Method for Powered Fiber



Jan 2017

Separate the fibre from the copper at the rack tie off point.



Take cables 8 ports past target port to obtain correct length.

Start from outside and work in.

Flat cable allows neat storage in bundles of 8



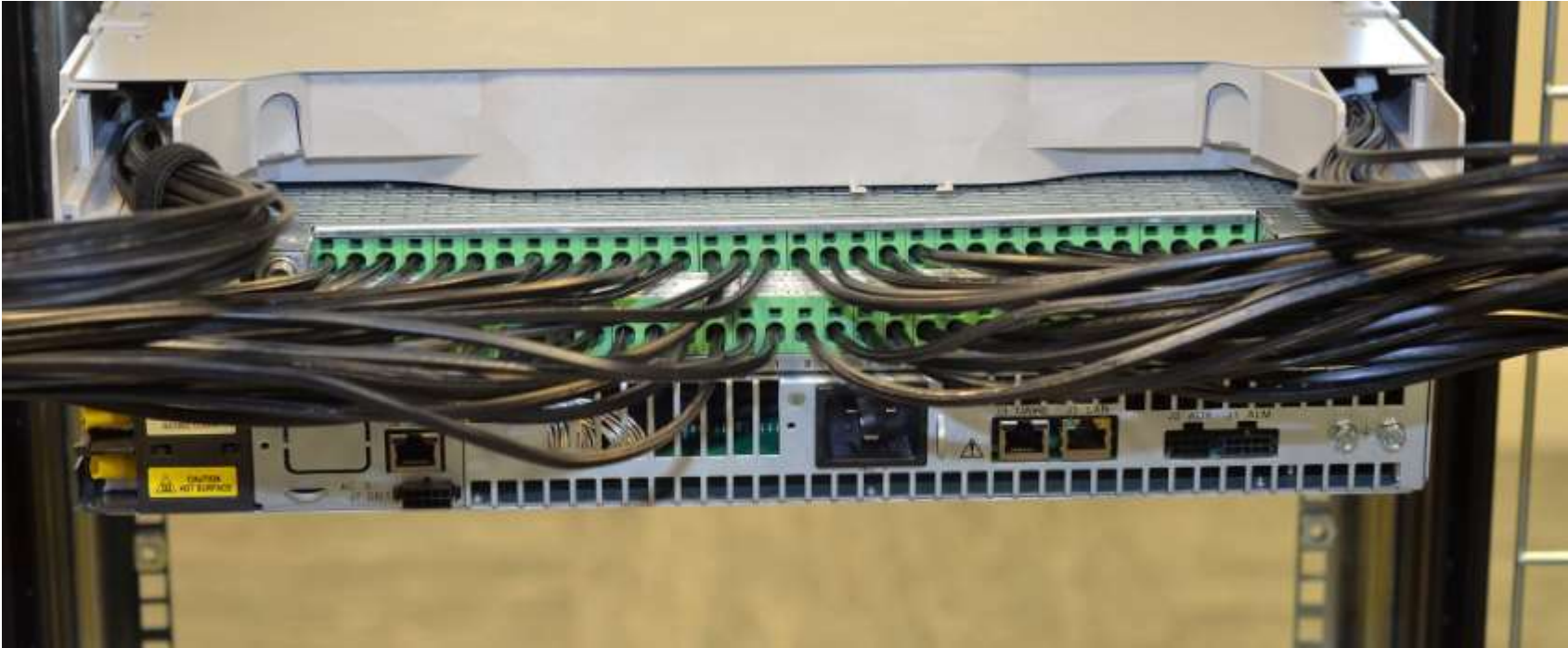
Bundle all 8 cables together up to a point 6 inches to side of PSU before allowing fibre to run upwards to fibre tray





When installing fibre always allow sufficient service loop for fibre tray removal.

For ease of install feed cable from both sides of rack



CommScope provides this information as a courtesy to its customers and potential customers. Customers should review the information to ensure conformity to the project specifications and current industry standards. CommScope reserves the right to change the programs or products mentioned at any time without notice.

Powered Fiber Cable System

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CommScope Powered Fiber Cable System Template using the Master Format Template

The intent of this document is to aid in completing the Construction Specifications Institute (CSI) Master Format template for a CommScope telecommunication powered fiber cabling system.

Product part numbers, minimum performance criteria for the components, general design considerations, and installation guidelines are included in this document.

This document provides pertinent information to allow the contractor to bid the labor, supervision, tooling, and miscellaneous mounting hardware and consumables to install a complete Powered Fiber Cable System. It is the responsibility of the contractor to propose any and all items required for a complete system if not identified in this specification.

[Any text appearing in blue and within brackets requires input or a choice in options or features]

SECTION 27 15 00

Data Communications Horizontal Cabling Powered Fiber Cable System

PART 1 GENERAL

1.01 SUMMARY

A. Introduction

1. Provide a powered cabling solution that combines power and optical fiber communications into one complete system.
2. The cable must combine electrical power conductors and optical fiber into one package to speed up installations and simplify power and communications delivery to devices.

B. Powered Fiber Cable System

1. System must be a complete “rack to device” solution capable of powering and communicating with small cells, Wi-Fi hotspots, HD cameras, and variety of devices requiring optical communications and DC power in one system.
2. The hybrid cable shall allow for “standalone” use in delivering of power and fiber data communications.
3. When used along with the PoE extender, the powered fiber optic cable shall supply optical fiber communications and PoE+ power for network access and other low voltage DC devices.

See Table [1] for cable distances by gauge and input power.

PSU Output Voltage	Cable Gauge (AWG)	Lmax (m) Pout = 60W (PoE+/PoE+)	Lmax (m) Pout = 45.4W (PoE/PoE+)	Lmax (m) Pout = 30.8W (PoE/PoE)	Lmax (m) Pout = 30W (PoE+)	Lmax (m) Pout = 15.4W (PoE)
<i>Maximum (57V)</i>	12	650	1120	1570	1595	2630
	16	255	445	620	630	1040
<i>Nominal (48V)</i>	12	460	795	1100	1120	1840
	16	180	315	435	440	725
<i>Minimum (40.5V)</i>	12	330	555	770	780	1285
	16	130	220	305	310	510

TABLE [1]

PoE EXTENDER ELECTRIC TRANSMISSION AND RECOMMENDED CABLE LENGTH DISTANCES

Must be compatible with commercially available NEC Class 2 and/or SELV compliant 48-57VDC power supply

4. System shall comply with the following standards:
 - a. RoHS (2002/95/EC)
 - b. REACH SVHC, 53 6/20/11
 - c. California Prop 65 for safe drinking water and toxic enforcement act
 - d. Telcordia GR-20-CORE Issue 3 May 2008, EIA/TIA FOTPS
 - e. TIA-568-C
 - f. Deca-BDE free
 - g. Power limited circuit cable UL 13 (CL2R-OF AND CL3R-OF)
 - h. Communication cable per UL 444 (CMR-OF)

- i. UL 1666 standard for test for flame propagation - Edition 5 - Revision date 2012/06/27
 - j. IEC 60332-1-1, -2, 60332-3-24 Cat. C, 61034 60745-2
 - k. ITU.T K21,
 - l. GR-1089
 - m. IEC 60793-2-50 type B.1.3 and B.6.A&B
 - n. ITU-T G.657.A1 or A2/B2 optical fiber, backwards compatible with G.652.D
 - o. PoE (IEEE 802.3af-2003) and PoE+ (IEEE 802.3at-2009)
 - p. Must comply with Canadian code ICES-003
5. Equipment must comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules
 6. Standard system consists of five (5) components:
 - a. Hybrid fiber/copper cabling
 - b. PoE Extender
 - i. 1-port
 - ii. 2-port
 - c. Power and fiber distribution element
 - d. Cable and fiber management
 - e. SFP connector

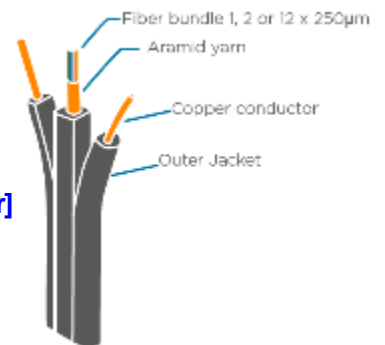
PART 2 PRODUCTS

2.01 OWNER FURNISHED

- A. **[Include information about systems, products, and accessories that are provided by the owner]**
 1. **[DC Power supply, SFP connector, LC connector, LC patch cords and fiber patch panels, outdoor rated Cat 6 patch cord]**
 2. **[For copper based switch: fiber to copper media converters]**

2.02 MANUFACTURED COMPONENTS

- A. Manufacturer List
 1. CommScope
 2. Approved equivalent
- B. System Components
 1. Hybrid fiber/copper cable
 - a. **[12 AWG (2mm) or 16 AWG (1.2mm)]** conductor size
 - b. **[02, 04 or 12]** optical fibers
 - c. **[Singlemode or OM3 Multimode]** fiber type
 - d. **[Outdoor rated polyethylene (PE) or Riser/LSZH indoor/outdoor]** jacket type
 - e. **[1 Km, 2 Km or 4 Km]** cable length
 - f. Compatible with FOSC 450A splice closure



g. Cable must meet specifications in Table [1] and Table [2].

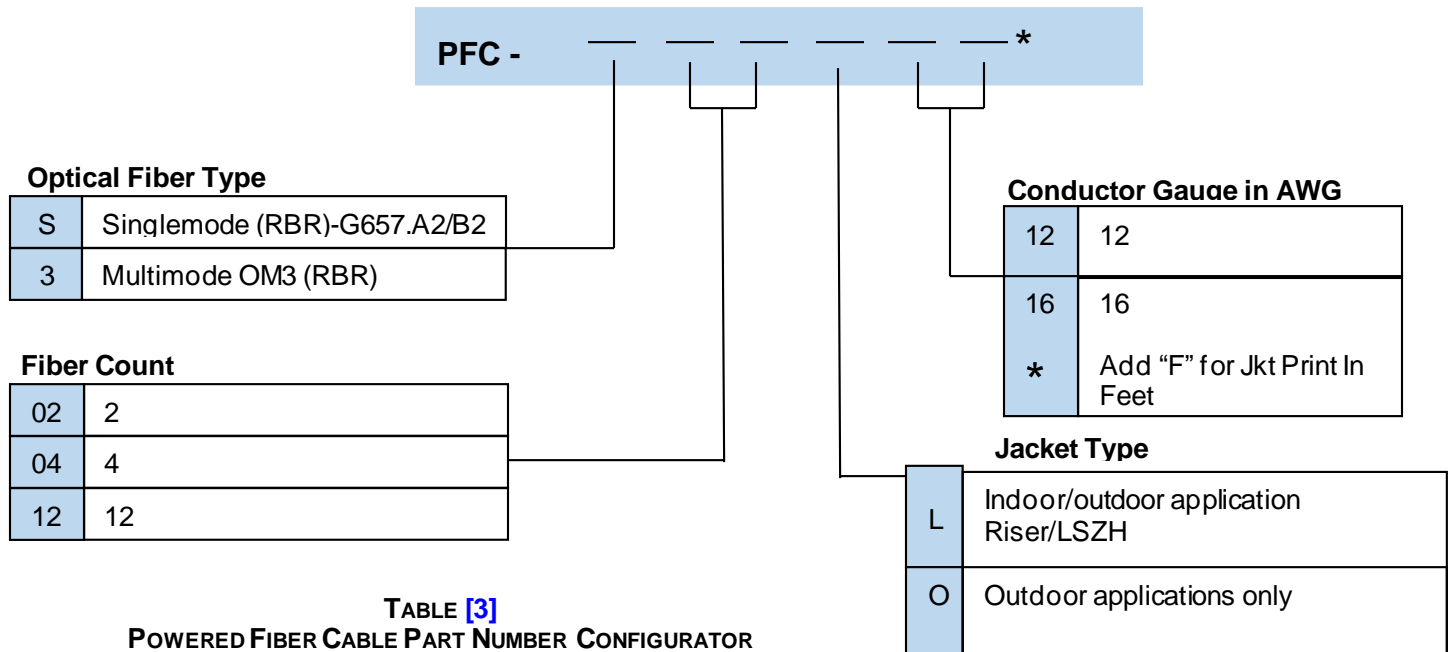
Environmental Characteristics	
Storage Temperature:	-40°C to +70°C
Operating Temperature:	-40°C to +70°C
Installation Temperature:	-10°C to +60°C
Tensile Load	
Short Term:	440 N
Long Term:	132 N
Preferred Axis Bend Radius mm (in.)	
Installed:	30 mm (1.18 in.)
Loaded:	50 mm (1.97 in.)
Impact (N-m)	
EIA/FOTP-25C	4.4 N-m
Crush(N-m)	
EIA/FOTP-41A	2200 N-m
Optical Performance (dB/Km)	
Singlemode Reduce Bend Radius Fiber	0.35/0.25 dB/km (1310/1550 nm)
Multimode OM3	0.35/0.25 dB/km (1310/1550 nm)

**TABLE [1]
POWERED FIBER CABLE SPECIFICATIONS**

Conductor Size (AWG)	Dimensions (Nominal, mm)		Weight (Nominal)
	Width	Height	
16	10.9	4	70.0 kg/km
12	12	4.5	110.0 kg/km

**TABLE [2]
POWERED FIBER CABLE DIMENSIONS AND WEIGHT SPECIFICATIONS**

h. Cable shall be CommScope product part number (see Table [3]) or approved equivalent.



**TABLE [3]
POWERED FIBER CABLE PART NUMBER CONFIGURATOR**

2. PoE Extender
 - a. Provides termination for hybrid cable input and automatically corrects voltage drop over distance
 - b. Optical signal and power in must be converted to RJ45 PoE+ compliant jack(s)
 - c. Shall be available in [1] or [2] port configurations
 - 1) 2-port configuration must allow for two (2) PoE or PoE+ devices to be connected via one hybrid cable
 - 2) 2-port must provide option to share the bandwidth of a single 1 Gb/s SFP or utilize two (2) SFPs for 1 Gb/s per port operation
 - d. Must use outdoor rated patch cord
 - e. Must be Earth grounded via a 12AWG conductor connected to the chassis ground lug.
 - f. Shall be available in pole or wall mount options
 - g. Extender shall have three (3) levels of electrical protection
 - 1) Primary - GDT component rated to 40kA surge protection
 - 2) Secondary - MOV components rated to 4.5kA
 - 3) Tertiary - TVS prevents the voltage from rising above 80-100V
 - h. Termination block shall support a minimum of 200 re-terminations while maintaining a contact resistance of less than one (1) milliohm.
 - i. Environmentally sealed closure rated to IP67
 - j. Must provide electrical power transmission management
 - k. Must be aesthetically appealing for Wi-Fi access point or camera deployment
 - l. SFP module in the POE extender should match module in existing switch
 - m. Must include sunshade for harsh temperature installation
 - n. PoE extender must meet specifications in Tables [4] and [5].

Item	
Storage Temperature:	-40°C to +70°C
Operating Temperature:	-40°C to +65°C
Installation Temperature:	-5°C to +45°C
<i>65°C assumes 45°C ambient air temperature, plus 20°C sun loading</i>	

**TABLE [4]
PoE EXTENDER CLIMATIC PERFORMANCE**

Item	Dimensions	Weight
PoE Extender 1-port version	238mm x 225mm x 77mm	3.8 kg
PoE Extender 2-port version	283mm x 225mm x 77mm	3.8 kg

**TABLE [5]
PoE EXTENDER PHYSICAL DIMENSIONS**



1-PORT PoE EXTENDER



2-PORT PoE EXTENDER

3. Power and Fiber Distribution Element

- a. Must be compatible with GE Critical Power Express Class II shelf, DC Rectifier Shelf and Modules.
- b. Shall comply with NEC Class II and SELV
- c. Each GE Modules shall accommodate eight (8) cable outputs; each GE chassis shall contain up to four (4) modules total per power supply for a total of 32 cables per power supply;



POWER SUPPLY



Slimline SPS DC rectifier Module

PART 3 EXECUTION

3.03 INSTALLATION

- A. Install all systems in accordance with manufacturer's printed instructions, as well as all [State [Municipality] of [] codes and standards].
- B. The power supply shall be installed in a safe location with access to the fiber optic network into which small cells or other network access devices are desired to be connected, and either 120VAC, 240VAC.
- C. Parameters to be considered prior to system deployment:
 - 1. Distance from power supply to the network devices
 - 2. Maximum power consumption of the network devices
 - 3. Number of devices to be deployed
 - 4. Type of cable (jacket, support)
 - 5. Fiber Management options
- D. For outdoor direct burial installations, the PE-jacketed "outdoor-only" rated cable is recommended.
 - 1. When installing in ducts, care should be given to avoid cable twisting.
 - 2. Standard cable lubricants may be used to assist with conduit or duct installations.
 - 3. If it is not practical to bring a reel of cable to the installation site, then utilize a standard figure 8 procedure to lay the cable out prior to pulling in duct. This helps avoid cable twisting.
- E. The PE-jacketed outdoor cable is rated for direct burial but for long-term reliability is recommended installing below-ground cables in conduit/ducts.
- F. Powered Fiber Cable is not rated for aerial self-support thus cable lashing is recommended.
- G. Use only a typical pair of wire strippers to access the powered fiber cable and, optionally, a wire cutter or snip.
- H. In cases where it becomes necessary to prevent shrink back and enhance coupling the additional buffer tube coupling can be achieved by placing slack or coupling coils at each splice closure or optical tap.
 - 1. The size of the loop should be based on the unloaded minimum bend radius of the cable.
 - 2. Laboratories testing and aerial installation test site demonstrate that a total of 5 loops on the input and 5-½ loops on the output adequately enhances the coupling to prevent buffer tube movement and provide proper entry into and out of the tap per Figure 1 below.
- I. The LSZH/riser rated indoor/outdoor cable may also be installed in conduits or ducts, however, frictional forces are greater for the indoor/outdoor cable and, therefore, achievable distances may be less.
- J. Standard cable lubricants may be used to assist with the indoor/outdoor cable for duct installation.
- K. PoE Extender port openings must be properly sealed at all times (prior, during and after installation) against weather, moisture, dust/debris. Any exposure could result in catastrophic damage to electronic components.
- L. PoE Extenders and Power Shelves must be properly grounded per manufacturer's instructions.

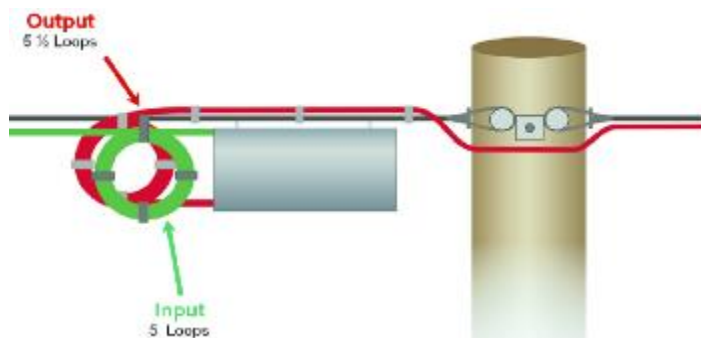
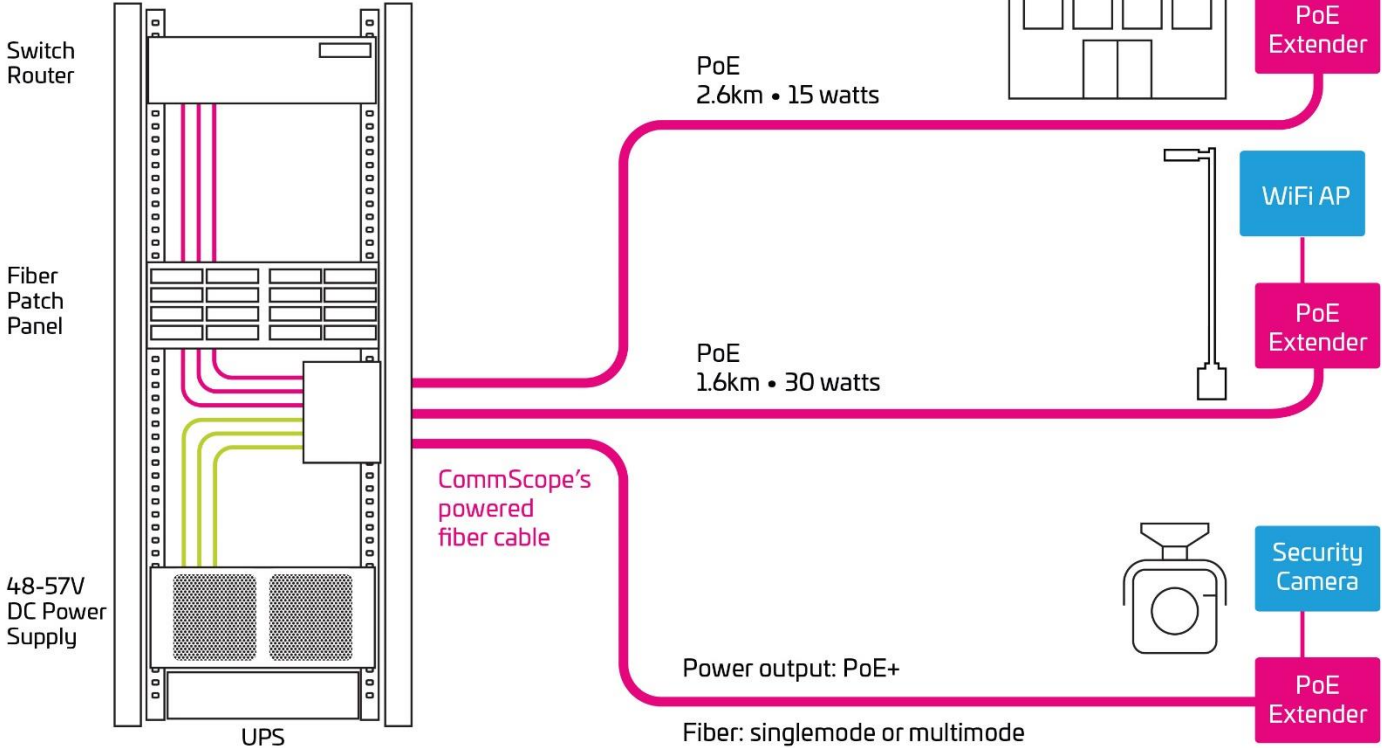
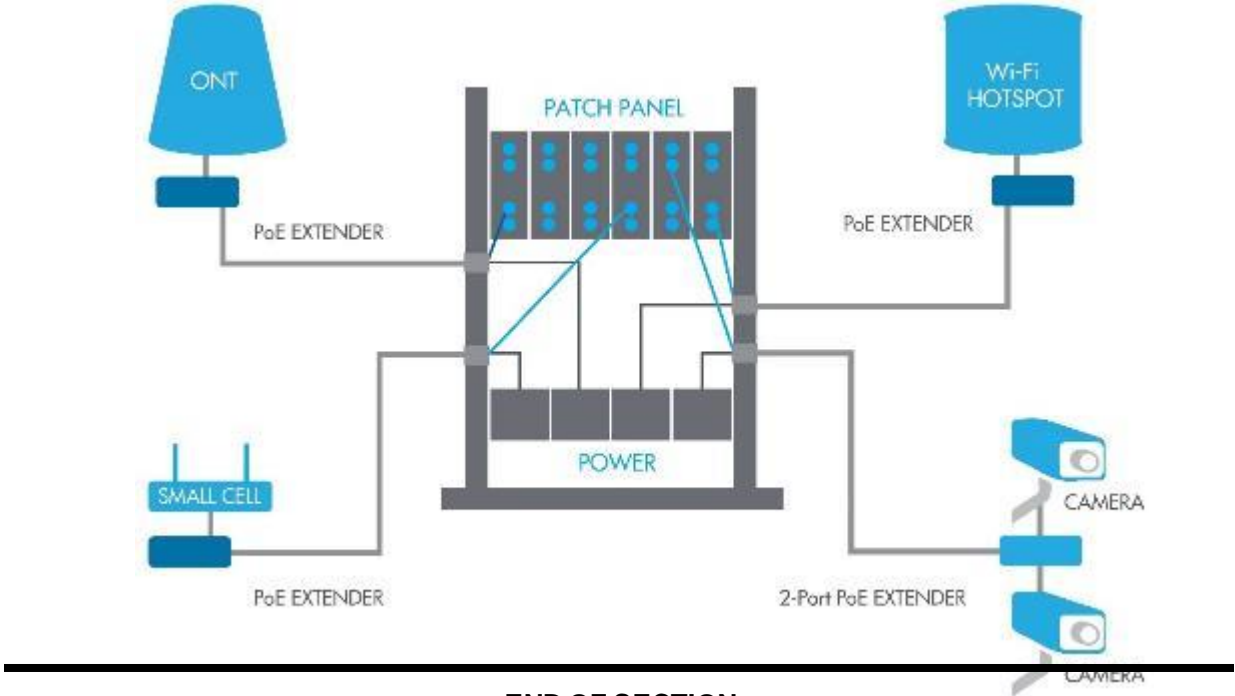


FIGURE 1 – EXAMPLE OF COUPLING COILS

SYSTEM OVERVIEW



APPLICATION DIAGRAM



END OF SECTION



www.commscope.com

Visit our website or contact your local CommScope representative for more information.

This document is for planning purposes only and is not intended to modify or supplement any specifications or warranties relating to CommScope products or services. The information given herein, including drawings, illustrations and schematics which are intended for illustration purposes only, is believed to be reliable. However, CommScope makes no warranties as to its accuracy or completeness and disclaims any liability in connection with its use. CommScope's obligations shall only be as set forth in CommScope's Standard Terms and Conditions of Sale for this product and in no case will CommScope be liable for any incidental, indirect or consequential damages arising out of the sale, resale, use or misuse of the product. Users of CommScope products should make their own evaluation to determine the suitability of each such product for the specific application.

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Rev. 16June-2020

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RoHS Certificate of Compliance




Product Name: PFC,SINGLEMODE,4F,OUTDOOR,12AWG,METER
Product Number: PFC-S04O12

Company Name: CommScope
3642 E US Highway 70
Claremont, NC 28610 USA

Contact: ProductCompliance@Commscope.com

Generated on: May 07, 2024

Certified by: 

Vinatha Viswanathan, Director Product Compliance

Disclaimer

This information is provided based on reasonable inquiry of our suppliers and represents our current actual knowledge based on the information they provided and our analysis and assessment of the risks. This information is subject to change and if a change occurs which affects compliance, then this Statement will be updated. Compliance to EU ROHS 2011/65 amended by EU RoHS 2015/863 means the part numbers have a maximum concentration of no more than 0.1% by weight in homogenous materials for lead, hexavalent chromium, mercury, PBB, PBDE, and 0.01% for cadmium, or qualify for an exemption to these limits as defined in the Annexes of Directive 2011/65/EU (RoHS2). These parts also have a maximum concentration of no more than 0.1% by weight in homogenous materials for DEHP, BBP, DBP and DIBP (substances that are restricted starting from July 22, 2019). Finished electrical and electronic products will be CE marked as required by Directive 2011/65/EU. Components may not be CE marked.

Compliance Status	Regulation	Revision	RoHS exemptions if any
Compliant	ROHS	EU RoHS - 2011/65/EU	

CERTIFICATE

Certificate Number: 111045.000
Including Seven Page Addendum

The Quality Management System and implementation of:

CommScope, Inc.

With Virtual Central Function at:
1100 CommScope Place SE
Hickory, NC 28602
United States

meets the requirements of the standard:

ISO 9001:2015

Scope:

The sales, marketing, design, manufacture, test, repair, support, service, and distribution of telecommunications products, components, and services for the telecommunications, wireless, and broadcast networks industries

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Business Segments	Exceptions
Connectivity and Cable Solutions (CCS)	None
Networking, Intelligent Cellular & Security Solutions (NICS)	None
Outdoor Wireless Networks (OWN)	None
Access Network Solutions (ANS)	None



Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
Atlanta, GA 30339 USA
(215) 997-4519
<https://www.dekra.us/en/audits/>



CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page One of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Activities Legend:	HQ = Headquarters	MFG = Manufacturing	SER = Services (Professional Services and/or Technical Support)
	HW DE= Hardware Development	REP = Repair	SC = Purchasing, Supplier Management, Manufacturing Support, Repair Support
	SW DE= Software Development	SAL = Sales, Marketing	DIST = Distribution

Site Address	Site Activities
CommScope Inc 1100 CommScope Place SE Hickory, NC 28602 United States	HQ (Virtual)
ARRIS Technology, Inc. 3871 Lakefield Drive Suwanee, GA 30024 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 101 Tournament Dr. Horsham, PA, 19044 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 6450 Sequence Drive San Diego, CA 92121 United States	SW DE, SER
ARRIS Technology, Inc. 900 Chelmsford St. Lowell, MA 01851 United States	HW & SW DE, SER, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001



Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
 ADDENDUM Page Two of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
ARRIS Solutions, Inc. 2400 Ogden Ave., Suite 180 Lisle, IL 60532 United States	HW & SW DE, SAL, SER, SC
ARRIS 15 Sterling Drive Wallingford, CT 06492 United States	HW & SW DE, SER, SC
ARRIS Technology, Inc. 2450/2500 Walsh Avenue Santa Clara, CA 95051 United States	HW & SW DE, SAL, SER
Ruckus Wireless International Inc. 350 West Java Dr. Sunnyvale, CA 94089 United States	HW & SW DE, SER
Ruckus Wireless Network Technology (Shenzhen) Co. Ltd. Units C&D, 5th Floor, No. 2 Finance base, 8 KeFa Road, Shenzhen, China	SW DE, SC, HW DE

Certificate Expires: January 04, 2026
 Certificate Issued: January 05, 2023
 Certified Since: January 10, 2001



Dr. Cem O. Onus
 Managing Director

DEKRA Certification, Inc.
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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Three of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
CommScope Asia (Suzhou) Technologies Co., Ltd. 77 Qiming Road, Suzhou Industrial Park Suzhou, Jiangsu 215121 Peoples Republic of China	MFG, SC
Ruckus Wireless International Inc., Taiwan Branch @ Neihsu District, Taipei City, Rui Road 411, 10th floor, Taipei	SW DE
ARRIS Group India Pvt Limited (AGIPL) Salarpuria Supreme, Ground Floor West Wing & First Floor Munnekolalu Village, Varthur Hobli, Outer Ring Road, Bangalore-560037	SW DE
ARRIS Group de Mexico S.A. de C.V. Av. La Paz 11721 Parque Industrial Pacifico Tijuana, BC 22643 Mexico	MFG, REP, SC
ARRIS Communications Ireland Limited Building 4300, Cork Airport Business Park Kinsale Road Cork County Ireland	HW & SW DE
ARRIS Group India Private Limited "The Senate" No:33/1, Ulsoor Road, Bangalore - 560 042 India	HW & SW DE

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001



Dr. Cem O. Onus
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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Four of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
ARRIS Group, Inc. 50 Stranmillis Embankment Belfast, BT95FL Northern Ireland	SW DE
CommScope Czech Republic, s.r.o Turanka 856/98B 627 00 Brno Czech Republic	HW DE,
CommScope CZ, spol. s.r.o. U Morusi 888, 53006 Pardubice Czech Republic Czech Republic	HW DE,
CommScope Connectivity UK Limited Units 1 and 4 Kinmel Park Industrial Estate Bodelwyddan, Denbighshire, LL18 5TZ United Kingdom	HW DE, MFG, SAL
CommScope Design & Integration UK Ltd. Unit 5 & 6 Eden Business Park Eden House Drive Old Malton, Malton, North Yorkshire YO17 6AE United Kingdom	HW DE, MFG, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001



Dr. Cem O. Onus
Managing Director

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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Five of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
CommScope Design & Integration UK Limited 412 The Quadrant, Birchwood Park Warrington, WA3 6FW United Kingdom	SER
CommScope EMEA Ltd. Corke Abbey Avenue Bray, Co. Dublin Ireland	MFG, SAL
CommScope EMEA Ltd. Diestsesteenweg 692 3010 Kessel-Lo, Belgium	HW DE, MFG, SAL
CommScope Italy Srl Via Archimede, 22/24 Agrate Brianza (MB) 20864 Italy	HW DE, REP, SW DE
Telecom Networks Americas AV. HIPOLITO YRIGOYEN 2999, DEPOSITO 6 EL TALAR, TIGRE Buenos Aires B1618AXD Argentine Republic	SAL, DIST
CommScope Networks India Private Limited Salarpuria Softzone, A Block, 1st Floor Survey No 80/1, 81/1, 81/2, B Wing, Belandur Village, Varthur Hobli, Outer Ring Bangalore – Karnataka 560103 India	SW DE
ADC India Communications Ltd. No 10 C , 2nd Phase Peenya Industrial Area Bangalore – Karnataka 560058 India	MFG, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001



Dr. Cem O. Onus
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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Six of Seven

The Quality Management System and implementation of:

CommScope, Inc.

With site at:

CommScope Asia (Suzhou) Technologies Co.,Ltd.

77 Qiming Road, Suzhou Industrial Park
Suzhou, Jiangsu 215121
Peoples Republic of China

meets the requirements of the standard:

ISO 9001:2015

The validity of this certificate depends on the validity of the main certificate.

Scope:

Production of network cable, fiber cable and communication equipment component (copper patch cords, copper panel, accessories etc.)

Certification Structure: Multi-site

Certificate Expires:	January 04, 2026
Certificate Issued:	January 05, 2023
Certified Since:	January 10, 2001



Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
Atlanta, GA 30339 USA
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证书附录

证书编号: 111045.000

附录第7页,共7页

质量管理体系和实施:

CommScope, Inc.

其场所:

康普科技 (苏州) 有限公司

中国江苏省苏州工业园区启明路77号,邮编215121

符合以下标准要求:

ISO 9001:2015

本证书的有效性取决于主证书的有效性。

范围:

网络线、光缆、通信系统设备材料 (网络跳线、配线装置等) 的生产。

认证结构: 多场所

证书有效期: 2026.01.04

发证日期: 2023.01.05

首次发证日期: 2001.1.10



Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
Atlanta, GA 30339 USA
(215) 997-4519
<https://www.dekra.us/en/audits/>



Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2015

This is to certify that:

CommScope, Inc. of North Carolina
1100 CommScope Place SE
Hickory
North Carolina
28603-0339
USA

Holds Certificate No:

EMS 648387

and operates an Environmental Management System which complies with the requirements of ISO 14001:2015 for the following scope:

The environmental management system to control the risks associated with the manufacture, distribution, field support and central function of telecommunication products and services.

For and on behalf of BSI:

Carlos Pitanga, Chief Operating Officer Assurance – Americas

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

Page: 1 of 5



...making excellence a habit.™

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Telecommunications de Reynosa S. de R.L. de C.V. Av. Industrial Reynosa Lte 2 al 5 Parque Industrial Center Reynosa Tamaulipas 88780 Mexico	Manufacture and distribution of telecommunication products including antenna and cable.
CommScope Asia (Suzhou) Technologies Co., Ltd. EPZ II, 77 Qiming Road Suzhou Industrial Park Suzhou Jiangsu 215121 China	Manufacture and distribution of telecommunication products, including cable.
Andrew Telecommunications India Pvt. Ltd. Plot No. N-2, Phase IV Verna Industrial Estate Verna Salcette Goa 403 722 India	Manufacture and distribution of telecommunication products, including antenna and cable.
CommScope EMEA Ltd. Corke Abbey Avenue Bray County Dublin A98FY03 Ireland	Manufacture and distribution of telecommunication products, including cable and connectors.
CommScope Telecommunications (China) Co., Ltd. 68 West Su Hong Xi Lu Suzhou Industrial Park Suzhou Jiangsu 215021 China	Manufacture and distribution of telecommunication products, including antenna and cables.

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

Page: 2 of 5

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Wireless Systems GmbH Industriering 10 Buchdorf 86675 Germany	Manufacture and distribution of telecommunication products, including amplifiers and antenna systems.
CommScope, Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Corporate headquarters responsible for management system oversight of all locations listed on this certificate.
CommScope Inc. 6519 CommScope Road Catawba North Carolina 28609-0199 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Inc. 3642 US Hwy 70 East Claremont North Carolina 28610-0879 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Czech Republic s.r.o. Turanka 98B Brno 62700 Czech Republic	Manufacture and distribution of telecommunication products, including connectors and terminations.
CommScope Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Customer care, facility maintenance, and administrative functions.
ADC de Delicias, S. de R.L. de C.V. Blvd. Fernando Baeza No. 1301 Sur Delicias Chihuahua 33000 Mexico	Manufacturing and distribution of telecommunication products.

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

Page: 3 of 5

Certificate No: **EMS 648387**

Location	Registered Activities
ADC de Juarez S. de R.L. de C.V. Parque Industrial Antonio J Bermudez Ciudad Juarez Chihuahua 32470 Mexico	Manufacturing and distribution of telecommunication products.
CommScope Connectivity Belgium bvba Diestsesteenweg 692 Kessel-lo 3010 Belgium	Manufacture and distribution of telecommunication products.
CommScope Technologies de Juarez S. de R.L. de C.V. Santiago Troncoso 331 Praderas del Sur, Ciudad Juarez Chihuahua 32575 Mexico	Manufacture of Fiber Optic Splice Closures (FOSC), Fiber Guide Systems (FGS), Hardened Connectivity and Molding-Gel Filling, including: plastic injection molding, plastic extrusion, plastic and metal machining, and assembly operations.
CommScope Connectivity UK Limited Unit 1 Kinmel Park Bodelwyddan Rhyl, Denbighshire LL18 5TZ United Kingdom	Fibre optic cable manufacturing, termination and design of other telecommunication products and services.
CommScope 11312 S. Pipeline Road Eules Texas 76040 USA	Manufacture, distribution, field support and central function of telecommunication products.
ARRIS GROUP DE MEXICO SA DE CV Av. De la Paz, #11721 Parque Industrial Pacifico Tijuana Baja California 22643 Mexico	Manufacture, repair, support, repair service, distribution of products and components for telecommunications that provide integrated solutions for voice, video and data through the processes of SMT, manual and mechanical assembly, soldering (manual, selective, printed, wave) electrical testing and packaging.

Original Registration Date: 2016-03-01

Effective Date: 2022-03-15

Latest Revision Date: 2022-04-21

Expiry Date: 2025-03-14

Page: 4 of 5

Certificate No: **EMS 648387**

Location	Registered Activities
CommScope Design & Integration UK Ltd Unit 5 & 6, Eden Business Park Edenhouse Drive Old Malton Malton YO17 6AE United Kingdom	Manufacture and distribution of telecommunications products including cabinets.
Arris Indústria Eletrônica do Brasil Ltda. CNPJ: 09.154.836/0001-15 Avenida Torquato Tapajós, 9475 Tarumã Manaus Amazonas 69041-025 Brasil	Manufacturer and distribution of Receivers, Television signal Decoders and Modulator/Router.
CommScope Design and Integration UK Ltd. Lovell House, 412 The Quadrant Birchwood Park Warrington WA3 6FW United Kingdom	Telecommunications project management, site surveys, installations commissioning and rigging.

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

Page: 5 of 5

LIMITED WARRANTY



1. **Definitions.** For purposes of this Warranty, (i) “Buyer” shall mean the individual or entity identified on the applicable purchase order or supply agreement (or, if different, on Seller’s quotation, order acknowledgement or statement of work), (ii) “Seller” shall mean the CommScope entity identified on such entity’s quotation, order acknowledgement, statement of work or supply agreement, (iii) “Hardware” means equipment designed and manufactured by or on behalf of Seller, or any third-party manufacturer’s equipment offered for sale by Seller to Buyer, (iv) “Product” shall mean a product manufactured by or on behalf of Seller pursuant to the applicable supply agreement, quotation or order acknowledgement, and includes any combination of Hardware and Software, (v) “Services” means site engineering, system integration, product installation, implementation, training, maintenance and technical support services for Products, or other professional services provided by Seller to Buyer. Services exclude managed services and hosted cloud services provided by Seller, (vi) “Software” means Seller-licensed software, either embedded or standalone, including any updates provided, and any other enhancements, modifications, and bug fixes provided thereto, in object code form only (unless otherwise specified), and any full or partial copies thereof. Software does not include software created or owned by third parties, including but not limited to MediaKind Software, Google’s Android Software or any third party application software, and (vii) “Warranty Period” means, unless a different time period is set forth in **Exhibit A**, (a) for Hardware, one year from date of original shipment from Seller’s facility, (b) for Software-only Products, ninety (90) days from the date such Software is first made available to Buyer, or for Software embedded in a Hardware Product, ninety (90) days from date of original shipment of the Product from Seller’s facility, and (c) for Services, thirty (30) days from the date the performance of such Services has been rendered.

2. **Limited Warranty.** Seller warrants that, as of the date of delivery, Seller has good title to the Product, free from any lawful security interest or other lien or encumbrance unknown to Buyer. In addition, during the Warranty Period, the Product and Services will be free from defects in materials or workmanship arising under proper and normal use. This Warranty shall apply only to the Products and Services and shall not apply to any other goods or materials, parts or components of a system or any system as a whole. This Warranty does not cover ordinary wear and tear. Seller does not warrant (i) Products not purchased from Seller or its authorized resellers; (ii) that the operation of the Product will be uninterrupted or error-free; (iii) that the Product will operate in combination with other third-party products selected by Buyer; or (iv) any products manufactured by third parties; provided that Seller will, to the extent permitted by the manufacturer, assign third-party warranties to Buyer. Seller gives no warranty for, and shall have no liability with respect to, any defects arising from any software (other than the Software), including, but not limited to MediaKind Software, Android Software or any third-party application software, downloaded to or otherwise used in conjunction with the Product. Seller further warrants to Buyer that during the Warranty Period, all Services performed by Seller for Buyer will be provided in a workmanlike manner.

3. **Disclaimers.** EXCEPT AS EXPRESSLY SET FORTH IN THIS LIMITED WARRANTY OR IN A SEPARATE, APPLICABLE SOFTWARE LICENSE AGREEMENT, ALL SOFTWARE IS LICENSED ON AN “AS IS” BASIS WITHOUT WARRANTY.

4. **Inspection and Return Authorization.** Buyer must promptly notify Seller of any claimed defect in the Product and/or Services. If Buyer claims that a Product is defective in materials or workmanship, Seller shall have the right to either examine the Product where it is located or, in its sole discretion, issue shipping instructions for return of the Product. Seller’s inspection in response to a warranty claim shall not constitute acceptance or acknowledgment of the claim’s validity. Except as otherwise agreed to in writing, Products may not be returned to Seller without prior authorization. Buyer must contact Seller to obtain an authorization number and return the Products to the location designated by Seller. Any Products returned to Seller without proper authorization will be returned to Buyer at Buyer’s expense. Risk of loss, damage and insurance responsibilities for the Products shall not pass from Buyer to Seller until delivery of the Products to Seller’s designated location. Buyer shall prepay all transportation charges for such return.

5. **Remedies.** Seller’s sole and exclusive obligation and Buyer’s exclusive remedy under this Warranty is Seller’s repair or replacement of the defective Product or re-performance of Services or issuance of a credit for the net book value of the purchase price of the defective Product. Seller shall have sole discretion as to which of these remedies Seller will provide. Seller is not liable for any repair or maintenance costs incurred by Buyer, unless Seller authorizes such charges in writing in advance of the commencement of the work. If Seller elects to replace or repair the defective Product, the replaced or repaired Product will be warranted for the remainder of the Warranty Period applicable to the originally shipped Product, but the Warranty shall not be extended beyond the original Warranty Period. Replacement Products may be new, refurbished or contain refurbished materials.

6. **Notice and Waiver.** If Buyer discovers any defect in the Product, Buyer must provide prompt (and in no case later than thirty (30) days after discovery) written notice to Seller of the claimed defect. Such notice shall describe, in reasonable detail, the symptoms of such defect. The notice must be received by Seller during the Warranty Period for such Product. Failure to give timely notice of a claim shall result in Buyer’s waiver of such claim.

7. **Transfer of Ownership.** This Warranty is not transferable unless Buyer is expressly authorized by Seller in writing to resell the Product. In addition, Buyer must notify Seller on or before the fifteenth (15th) day after the date on which it transfers ownership of the warranted Product. Any transfers in violation of this Section shall invalidate this Warranty. Notice of the transfer of ownership must be in writing and shall include the name and address of the new owner.

8. **Exclusions from Warranty.** This Warranty shall not apply to problems attributable to, or as a result of:

- (a) improper installation or misapplication of parts;
- (b) chain or system failures induced by other products or components;
- (c) lack of proper inspection or maintenance or failure to provide a suitable operating environment;
- (d) any consumables provided with the Product, including but not limited to batteries and other accessories, and any other materials, components or products manufactured by a third party;
- (e) power surges, fire, unusual mechanical, physical or electrical stress, severe weather conditions or acts of nature, including but not limited to, lightning or floods;
- (f) usage or operation not in accordance with published ratings, specifications or instructions, including but not limited to environmental specifications identified by Seller;
- (g) any adjustment, modification, alteration, removal or repair of any part of the Product, including but not limited to removal or alteration of serial numbers or other identifying marks not expressly authorized by Seller in writing;
- (h) accidental damage, misuse, abuse, neglect or unauthorized access of the Product or of any system of which the warranted Product is a part;
- (i) any type of aesthetic changes due to oxidation or corrosion occurring on stainless steel or galvanized steel parts installed in unusually corrosive marine and industrial atmospheres (in which case Seller’s only obligation shall be to ensure that Product complies with Seller’s published material specifications);
- (j) use of the Product for purposes other than that for which it was designed; or
- (k) mishandling during shipment of the Product.

LIMITED WARRANTY

This Warranty is for Products installed and used in accordance with Seller's design, installation and operating parameters. Buyer's failure to ensure conformity with such parameters will void all warranties. Under no circumstance shall Seller have any liability or obligation with respect to expenses, liabilities or losses associated with the installation or removal of any Product or the installation or removal of any components for inspection, testing or redesign occasioned by any defect or by any repair or replacement of a Product.

9. **Limitation on Liability.** THE WARRANTIES SET FORTH IN SECTION 2 HEREOF ARE EXCLUSIVE AND ARE MADE ONLY TO BUYER. SELLER MAKES NO OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY DISCLAIMS AND EXCLUDES ANY REPRESENTATION OR WARRANTY OF MERCHANTABILITY, NONINFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE AND ANY REPRESENTATION OR WARRANTY ARISING BY USAGE OF TRADE, COURSE OF DEALING OR COURSE OR PERFORMANCE. No person is authorized to give any additional warranties on Seller's behalf or to assume for Seller any other liability, except in a writing signed by an authorized officer of Seller. SELLER'S TOTAL LIABILITY FOR ANY CLAIM OR DAMAGE ARISING OUT OF AND/OR IN CONNECTION WITH THE MANUFACTURE, SALE, DELIVERY OR USE OF THE PRODUCTS OR SERVICES WILL BE LIMITED TO PROVEN DIRECT DAMAGES, NOT TO EXCEED (I) FOR PRODUCTS, THE DEPRECIATED VALUE OF THE PURCHASE PRICE OF SUCH PRODUCTS OR (II) FOR SERVICES, THE ACTUAL AMOUNT PAID TO SELLER FOR SERVICES DURING THE 12 MONTH PERIOD IMMEDIATELY PRIOR TO THE EVENT (OR SERIES OF EVENTS) GIVING RISE TO THE LIABILITY. IN NO EVENT WILL SELLER BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY CLAIM FOR LOSS OF ACTUAL OR ANTICIPATED DATA, USE, REVENUES OR PROFITS. The Products are not specifically designed, tested, manufactured or intended for operation or use in any inherently dangerous, life endangering or life support applications where any failure of the Products could lead to death, personal injury or significant physical or environmental damage (High Risk Activities). If Buyer uses the Products in High Risk Activities, including but not limited to nuclear facilities or the flight, navigation or communication of aircraft, Buyer agrees that neither Seller nor its third party licensors are liable in whole or in part, for any claims or damages arising from such use, and that Buyer shall indemnify and hold Seller and its third party licensors harmless from any and all claims for loss, cost, damage, expense or liability arising out of or in connection with any use of the Products in High Risk Activities. These limitations on liability will apply regardless of the form of action, whether in contract, tort, strict liability or otherwise, and whether damages were foreseeable and will survive failure of any exclusive remedies provided in Section 4 hereof.

10. **Choice of Law.** The terms and conditions contained herein and the rights of the parties to any transaction to which they relate shall be governed by and construed in accordance with the laws of the State of North Carolina, U.S.A. The United Nations Convention on Contracts for the International Sale of Goods shall not apply.

LIMITED WARRANTY

Exhibit A

Product Categories	Warranty Period from Original Shipment Date*
<p>Category A Products E6000® Converged Edge Router (CER); E6000n™ Remote PHY Devices (RPDs); E6000r™ Remote PHY Shelves; E6000n™ Remote MACPHY Devices (RMDs); vManager; Remote OLT (R-OLT); associated power supplies and accessories. FLX PON OLT portfolio including vOLT. CherryPicker products, Encoder products including ME-7000, SE-6000; DSR-4xxx, DSR-6xxx and DSR-7xxx series IRD products, and Uplink systems including TME-2020, VDP-1000, BNC, DEM, and SEM; All APEX Universal EQAM including APEX1000 and APEX3000; All Aloha interactive products including OM2000, ARPD, ADM4000 and NC1500 4.0. All SDM products. All VUE and VTM Software Products. All STDC products.</p>	Hardware One (1) Year Software Ninety (90) Days
<p>Category B Products All High and Standard Definition Transport Adapter MS4000™ Media Streamer</p>	Hardware One (1) Year Software Ninety (90) days ** For certain CPE, option for 1% overship in lieu of Hardware warranty is standard
<p>Category C Products Intentionally left blank.</p>	
<p>Category D Products All Third Party OEM Products: power meters; All VUE and VTM hardware platforms; NC1500 4.0 hardware platform; LQA256 Legacy QAM Adapter; Elemental Products including Live, Server, Delta, Conductor and StatMux; DC2180 Cabinet Node, Cooling Systems</p>	Pass Through from OEM: Hardware One (1) Year Software Ninety (90) Days
<p>Category E Products Intentionally left blank</p>	
<p>Category F Products All OM and SG optical node platforms, Flex Max® and Starline® amplifier platforms, RF Taps & Passives, and Optical Passives</p>	Hardware Five (5) Years within the United States and Canada Hardware Three (3) Years outside United States and Canada Software Ninety (90) Days
<p>Category F1 Products All CHP Headend Optical (HEO) Elements</p>	Hardware Three (3) Years Software Ninety (90) Days
<p>Category G1 Products All NC optical node platforms and Optical Passives, including OP/NP/DP/DC models.</p>	Hardware Five (5) Years Software Ninety (90) Days
<p>Category G2 Products All CH3 Headend (HEO) Elements</p>	One (1) year
<p>Category G3 Products All EPON and GPON ONUs, RFoG/HPON R-ONUs, including, CP8 models and associated power supplies and accessories</p>	Hardware Three (3) Years Software Ninety (90) Days

LIMITED WARRANTY

<p>Category H Products All ConvergeMedia™ Distribution Platforms and Management Suite, AdManager™ including SkyVision Ad Management and EMP solutions CVEx™, SVA, all Vertasent products including SVOM, SVM and ERM, AdEdge™ COM and AdEdge APS,VMS, Manifest Delivery Controller (MDC), ARRIS Video Content Manager (AVCM) and Next Generation Insertion (NGI) and Multicast ABR.</p>	<p>Hardware One (1) Year Software Ninety (90) Days</p>
<p>Category I Products ServAssure® Advanced, ServAssure® NXT - Alarm Central, ServAssure® NXT - Analyze, ServAssure Domain Manager and EventAssure™. WorkAssure™@ Workforce Management, Mobile TV, SecureMedia and Titanium</p>	<p>Hardware One (1) Year Software Ninety (90) Days</p>
<p>Category J Products Intentionally left blank</p>	
<p>Category K Products Intentionally left blank.</p>	
<p>Category L Products Intentionally left blank</p>	
<p>Category M Products Intentionally left blank.</p>	
<p>Category N Products Intentionally left blank.</p>	
<p>Category O Products All CAS Products including DAC, CASMR (and associated plug-ins), CAST, Advisor, CSS, OLL, CSS-Lite, KLS, DKS, CPMS</p>	<p>DAC, CASMR, CAST, Advisor, CSS Hardware Three (3) Years OLL, CSS-Lite, KLS, DKS, OLES, CPMS Hardware One (1) Year Software Ninety (90) Days</p>
<p>Category P Products Intentionally left blank.</p>	
<p>Category P1 Products Intentionally left blank</p>	
<p>Category Q Products Intentionally left blank</p>	
<p>Category R Products Intentionally left blank</p>	
<p>Category R1 Products Intentionally left blank</p>	
<p>Category S Products Intentionally left blank</p>	
<p>Category S1 Products Intentionally left blank</p>	

LIMITED WARRANTY

<p>Category T Products RUCKUS Wi-Fi</p>	<p>Hardware:</p> <ul style="list-style-type: none"> - Indoor Access Points and Wall Plate Access Points – Limited Lifetime Warranty,** except for access points with an “e” suffix (e.g., R350e), for which the HW warranty period is one (1) year. - Outdoor Access Points – One (1) Year - Controllers – One (1) Year, except ZoneDirector controllers are covered by the Limited Lifetime Warranty** <p style="text-align: center;">Software Ninety (90) Days</p>
<p>Category T1 Products RUCKUS ICX Switches</p>	<ul style="list-style-type: none"> - ICX Switches (including switch modules, PSUs, and Fans, but excluding removable optics/transceivers and LEDs) – Limited Lifetime Warranty,** except for ICX 7150- C08PT, for which the HW warranty period is 13 months. - LEDs – 12 months - Removable Optics/Transceivers – 60 months (13 months if shipped from Seller prior to June 1, 2021) <p>Software: Limited lifetime access to defect repairs, and software maintenance updates through end of support date of product</p>
<p>Category T2 Products Intentionally left blank</p>	
<p>Category U Products</p> <p>Other OSP Cable Products (P3®, Drop Coax, Fiber Cable, Fiber Drop Cable, CIC)</p> <p>NovuX Products</p> <p>Prodigy</p> <p>Products FDH</p> <p>Products</p> <p>Multiservice terminals (MST), Open Terminals (OTE) and Hardened Drop Cable</p> <p>Assemblies OSP “Box” Products</p> <p>Mini-RDTs and RDTs</p> <p>FOSC™, FIST™ and</p> <p>Tenio™</p> <p>OSP Copper Connect and Closure Products</p> <p>HELIAX® FiberFeed® Products, including FiberFeed® hybrid and fiber cables and assemblies, power cables and junction boxes</p> <p>Fiber Optic Panels, including Accessories, Mounting Hardware, Modules</p> <p>Fiber Optic Field Terminated Connectors, Kits, Tools, Consumables,</p> <p>Accessories Indoor Fiber Cable, Patch Cords, Cable Assemblies, Fiber Trunks</p> <p>Passive Optical Components and Value Added Modules (VAMs)</p> <p>FiberGuide® : Fiber cable Management System</p> <p>Optical Distribution Frames, including Modules, Blocks, Accessories and</p> <p>Hardware Cabinets Cable and Apparatus Products</p> <p>Alifabs™ Cabinets & Ancillary Products</p> <p>Alifabs™ Telecommunications Towers and Accessories</p> <p>Metro Cell Products, including Enclosures; Integrated Pole; Standard Poles; Accessories; and Wood Pole Brackets</p>	<p>One (1) year</p>

LIMITED WARRANTY

<p>Category V Products ValuDAS® Passive Products, including Air Directional Couplers, Hybrid Couplers, High Power Splitters, and Cell-Max™ Antennas Standard Tower Mounted Amplifier, Bias Tee and Power Distribution Unit Products Standard Filter & Combiner Products</p> <p>Electronic Enclosure Products (Cabinets)</p> <p>Alifabs™ Free Cooling Products and Accessories and Spare Parts, including Monitor All-In-One FLX (Active Passive Cabines)</p> <p>PowerShift™ & Power Products</p>	<p>Two (2) years</p>
<p>Category W Products ValuSite® Products</p> <p>I-Line Accessory Products</p> <p>Microwave Antennas</p> <p>Terrestrial Microwave System Products (including Microwave System Flex-Twist, Coupler, Filter and Diplexer Products)</p>	<p>Three (3) years</p>
<p>Category X Products Broadband RF Connectivity Products</p> <p>Premium Passive Products, including In-Building Directional Couplers, Hybrid Matrices, Tappers, Power Splitters, Terminations, Attenuators and CMAX Antenna Products</p>	<p>Five (5) years</p>
<p>Category Y Products QR® Coaxial Cable</p>	<p>Five (5) years</p>
<p>Category Z Products Standard RADIAX® Cable, Connector, Accessory and Cable Assembly* Products</p> <p>* RADIAX® Cable Assembly Product means any RADIAX® coaxial cable that has been fitted with Seller’s connectors in accordance with the installation instructions.</p>	<p>One (1) year</p>
<p>Category AA Products Standard CNT® Cable, Connector, Accessory and Cable Assembly* Products</p> <p>* CNT® Cable Assembly Product means any CNT® coaxial cable that has been fitted with Seller’s connectors by Seller or its certified distributor</p>	<p>Five (5) years; except that the Warranty Period for Products purchased for resale purposes shall be one (1) year.</p>
<p>Category BB Products Standard HELIAX® Cable, Connector, Accessory and Cable Assembly* Products</p> <p>* HELIAX® Cable Assembly Product means any HELIAX® coaxial cable or elliptical waveguide that has been fitted with Seller’s connectors by Seller or its certified distributor.</p>	<p>Ten (10) years; except for the following: (i) three (3) years for weatherproofing kits (including SureGuard boots); (ii) one (1) year for cable preparation tools (excluding blades); (iii) one year for single click-on hanger kits; and (iv) two (2) years for surge arrestors.</p>
<p>Category CC Products Standard ERA/ION-E®, ION-M®, ION-U®, MR, CMR, i-POI®, e-POI™, and Node Repeater Products</p>	<p>Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of shipment.</p> <p>Software Ninety (90) Days</p>
<p>Category DD Products In- Building and Fixed Subscriber Antennas</p>	<p>The earlier of: (i) three (3) years from the date of installation or (ii) thirty-nine (39) months from the date of original shipment</p>

LIMITED WARRANTY

<p>Category EE Products OneCell®</p> <p>Powered Fiber Cable Solution: Hybrid Copper and Fiber Cables, Class 2 Power Supplies, Indoor/Outdoor POE Extenders, Field Terminated Outlets, Consolidation Boxes and Related Passive Components</p>	<p>Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of original shipment Software Ninety (90) Days</p>
<p>Category FF Products Small Cell Device Management System (DMS) Software DAS Device Management System (AIMOS) Software</p>	<p>Ninety (90) days</p>
<p>Category GG Products Base Station Antenna, Small Cell Antenna & Mosaic™ Products</p>	<p>Two (2) years for all base station antennas except base station antennas incorporating N-type connectors, which shall have a warranty of one (1) year</p>
<p>Category HH Products DryLine® Dehydrator Systems and Line Monitoring Systems</p>	<p>Three (3) years or 3,000 hours of actual run time, whichever occurs first; except the Warranty Period for the compressor is only one (1) year or 1,000 hours of actual run time, whichever occurs first.</p>
<p>Category II Products SiteRise™ Solutions</p>	<p>One (1) year on workmanship for the Solution.</p>
<p>Category JJ Products Copper Structured Cabling Products</p> <p>Other Enterprise Products (Coax, Automotive Cables, Enterprise Enclosures and miscellaneous items) (excluding software)</p>	<p>One (1) year from the date of Installation</p>
<p>Category KK Products Alifabs™ Services (power upgrades, enablements, installation and decommission work, rigging, and fault management)</p>	<p>One (1) year from the date of completion of the work.</p>
<p>Category LL Products imVision Overlays and Controllers</p>	<p>Three (3) years</p>

** For Category H and Category I Products only, if Seller is engaged by Buyer to provide Services for the implementation of the purchased Products, warranty period for such Products shall commence upon Buyer's acceptance of the Products and Services.*

*** For Category T Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing for as long as the original end user of the Product continues to own and use the Product. For Category T1 Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing (i) for as long as the original end user of the Product continues to own and use the Product or (ii) through the End of Support date, as defined in the RUCKUS End of Life Policy, whichever is earlier.*

PFP-PX-8M

Power Express module, connects up to 8 Powered Fiber Cables



Product Classification

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin America | North America

Product Type

Power supply module

Dimensions

Height

43.688 mm | 1.72 in

Width

87.376 mm | 3.44 in

Depth

193.675 mm | 7.625 in

Compatible Gauge Range

24–8 AWG

Electrical Specifications

Input Current Range

0–20 A

Input Voltage Range

-42 to -60 Vdc

Output Voltage Range

-42 to -58 Vdc

Output Voltage, nominal

-57 Vdc

Electrical Safety Standard

CSA C22.2 No. 60950-1-03

Electromagnetic Compatibility/Interference (EMC/EMI)

FCC-CFR, Part 15, sub-part B | GR1089 Class A

Total Output Power

100 W, per circuit

Environmental Specifications

Operating Temperature

-40 °C to +65 °C (-40 °F to +149 °F)

Relative Humidity

5%–95%, non-condensing

Standards Compliance

EN 61000-4-2 level 4

PFP-PX-8M

Packaging and Weights

Packaging quantity	1
Packaging Type	Carton
Weight, net	0.363 kg 0.8 lb

Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Below maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant
UK-ROHS	Compliant



PFP-PX-S1

Power Express Class 2 shelf and starter kit, accomodates up to 4 modules of 8 SELV/Class 2 outputs, 1U



Product Classification

Regional Availability	Asia Australia/New Zealand EMEA Latin America North America
Product Type	Power supply subrack

General Specifications

Application	Mounts up to 4 Power Express Class 2 Modules
Color	White
Rack Type	19 in
Rack Units	1
Shelf Movement	Fixed

Dimensions

Height	44.45 mm 1.75 in
Width	444.5 mm 17.5 in
Depth	285.75 mm 11.25 in

Electrical Specifications

Electrical Safety Standard	CSA C22.2 No. 60950-1-03 IEC 60950-1 UL
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Environmental Specifications

Standards Compliance	EN 61000-4-2 level 4 GR 1089, Issue 4
-----------------------------	---

Packaging and Weights

Packaging quantity	1
Packaging Type	Carton

PFP-PX-S1

Weight, net

2.948 kg | 6.5 lb

Regulatory Compliance/Certifications

Agency

Classification

CHINA-ROHS

Below maximum concentration value

ISO 9001:2015

Designed, manufactured and/or distributed under this quality management system

REACH-SVHC

Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS

Compliant

UK-ROHS

Compliant



PFP-PX-SF



Power Express Slot Filler, used when a module slot is empty

Product Classification

Regional Availability Asia | Australia/New Zealand | EMEA | Latin America | North America
Product Type Blank module

Packaging and Weights

Packaging quantity 1
Packaging Type Carton

Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Below maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant
UK-ROHS	Compliant



PFP-SPS-1600M



Slimline SPS DC Rectifier Module, 1600 Watts

Product Classification

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin America | North America

Product Type

Power supply module

Dimensions

Height

41.656 mm | 1.64 in

Width

126.492 mm | 4.98 in

Depth

205.994 mm | 8.11 in

Electrical Specifications

Input Current Range

15-12A @ 90-120Vac | 7.5A @ 230Vac

Output Voltage Range

-42 to -58 Vdc

Electrical Safety Standard

CE | CSA C22.2 No. 60950-1-03 | UL

Electromagnetic Compatibility/Interference (EMC/EMI)

FCC-CFR, Part 15, sub-part B | GR1089 Class A

Power Efficiency

95 %

Environmental Specifications

Operating Temperature

-40 °C to +75 °C (-40 °F to +167 °F)

Standards Compliance

EN 61000-4-2 level 4 | GR 1089, Issue 4 | GR-63

Packaging and Weights

Packaging quantity

1

Packaging Type

Carton

Weight, net

1.397 kg | 3.08 lb

PFP-SPS-1600M

Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Below maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant
UK-ROHS	Compliant



PFP-SPS-C1



SPS DC Rectifier controller, factory set to 57VDC

Product Classification

Regional Availability

Asia | Australia/New Zealand | EMEA | Latin America | North America

Product Type

Controller module

Dimensions

Height

44.45 mm | 1.75 in

Width

19.05 mm | 0.75 in

Depth

203.2 mm | 8 in

Electrical Specifications

Input Voltage, nominal

-57 Vdc

Electrical Safety Standard

UL

Electromagnetic Compatibility/Interference (EMC/EMI)

EN 55022 Class A

Environmental Specifications

Standards Compliance

EN 61000-4-2 level 4

Packaging and Weights

Packaging quantity

1

Packaging Type

Carton

Weight, net

0.227 kg | 0.5 lb

Regulatory Compliance/Certifications

Agency

CHINA-ROHS

Classification

Below maximum concentration value

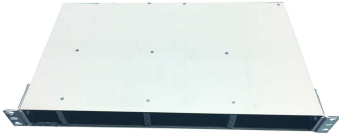
PFP-SPS-C1

ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant
UK-ROHS	Compliant/Exempted



PFP-SPS-S1

Slimline SPS DC Rectifier Shelf, 120/240VAC to 57VDC, accomodates up to 3 rectifier modules, 1U



Product Classification

Regional Availability	Asia Australia/New Zealand EMEA Latin America North America
Product Type	Power supply subrack

General Specifications

Application	Mounts up to 3 SPS DC Rectifier modules
Color	White
Rack Type	19 in
Rack Units	1
Shelf Movement	Fixed

Dimensions

Height	41.656 mm 1.64 in
Width	482.6 mm 19 in
Depth	261.62 mm 10.3 in

Packaging and Weights

Packaging quantity	1
Packaging Type	Carton
Weight, net	1.397 kg 3.08 lb

Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Below maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system

PFP-SPS-S1

REACH-SVHC

Compliant as per SVHC revision on www.commscope.com/ProductCompliance

ROHS

Compliant

UK-ROHS

Compliant



PFP-SPS-SF

SPS Slot Filler, used when a module slot is empty



Product Classification

Regional Availability	Asia Australia/New Zealand EMEA Latin America North America
Product Type	Blank module

Dimensions

Height	41.656 mm 1.64 in
Width	126.492 mm 4.98 in

Packaging and Weights

Packaging quantity	1
Packaging Type	Carton

Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Below maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant
UK-ROHS	Compliant



RoHS Certificate of Compliance




Product Name: 150027362 POWER EXPRESS 8 PORT MODULE

Product Number: PFP-PX-8M

Company Name: CommScope
3642 E US Highway 70
Claremont, NC 28610 USA

Contact: ProductCompliance@Commscope.com

Generated on: May 21, 2024

Certified by: 

Vinatha Viswanathan, Director Product Compliance

Disclaimer

This information is provided based on reasonable inquiry of our suppliers and represents our current actual knowledge based on the information they provided and our analysis and assessment of the risks. This information is subject to change and if a change occurs which affects compliance, then this Statement will be updated. Compliance to EU ROHS 2011/65 amended by EU RoHS 2015/863 means the part numbers have a maximum concentration of no more than 0.1% by weight in homogenous materials for lead, hexavalent chromium, mercury, PBB, PBDE, and 0.01% for cadmium, or qualify for an exemption to these limits as defined in the Annexes of Directive 2011/65/EU (RoHS2). These parts also have a maximum concentration of no more than 0.1% by weight in homogenous materials for DEHP, BBP, DBP and DIBP (substances that are restricted starting from July 22, 2019). Finished electrical and electronic products will be CE marked as required by Directive 2011/65/EU. Components may not be CE marked.

Compliance Status	Regulation	Revision	RoHS exemptions if any
Compliant	ROHS	EU RoHS - 2011/65/EU	

10 REVISIONS			
REV	CMO	DATE	APPROVED
A	40118461CMO	29SEP2020	TA
B	40121676CMO	18NOV2020	TA

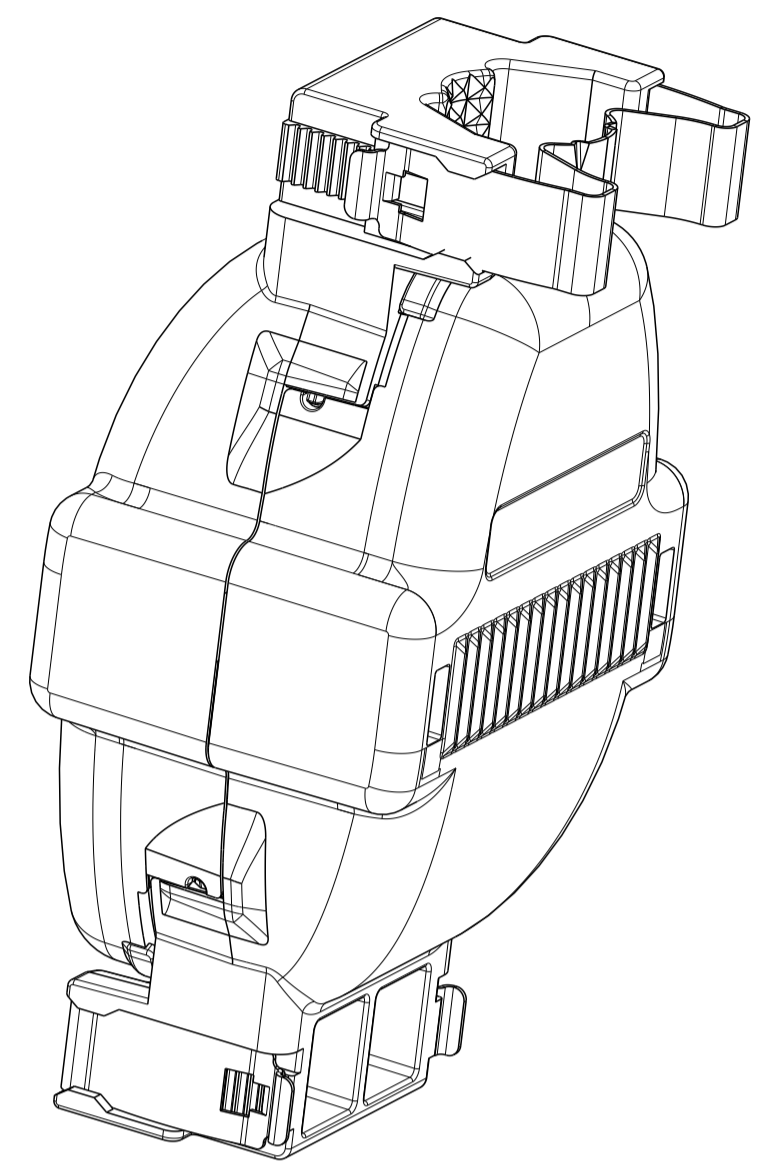
NOTES:

1. SEE COMMSCOPE CATALOG FOR COMPLETE LIST OF PARTS RELATED TO THE USE OF THIS PRODUCT.

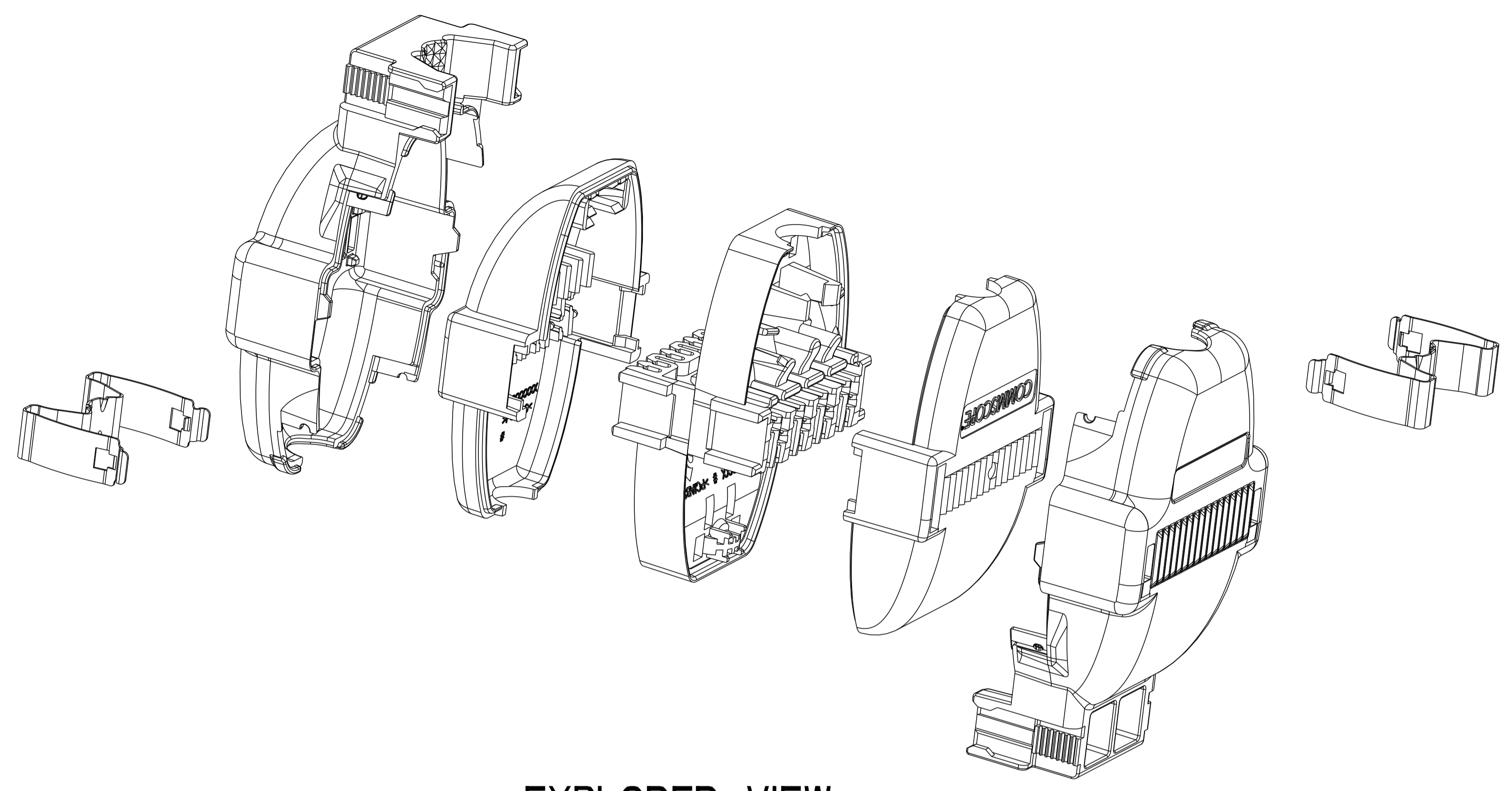
2. DIMENSIONS ARE IN INCHES [MM].

3. PARTS INCLUDED:
KIT CONTAINS 5 PACKAGED CONNECTORS

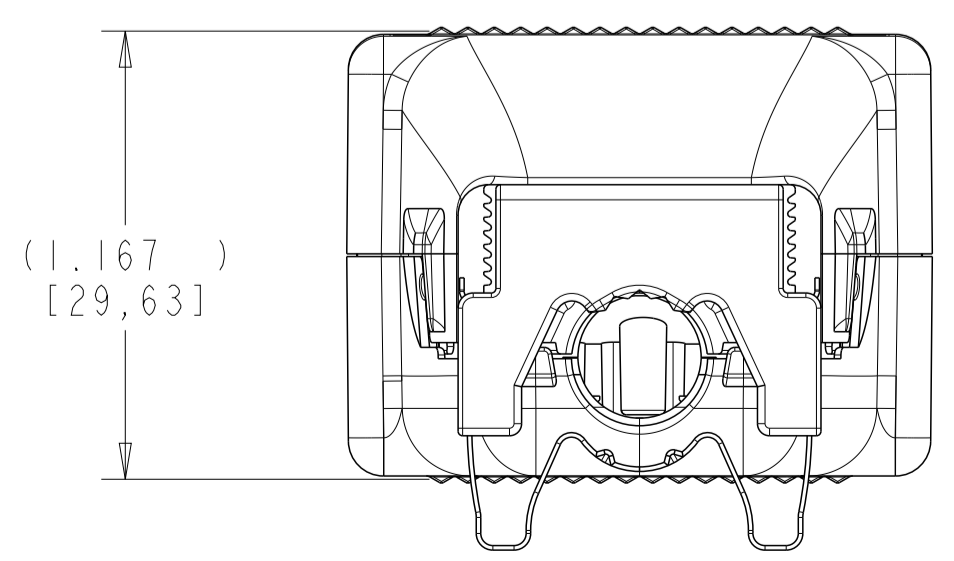
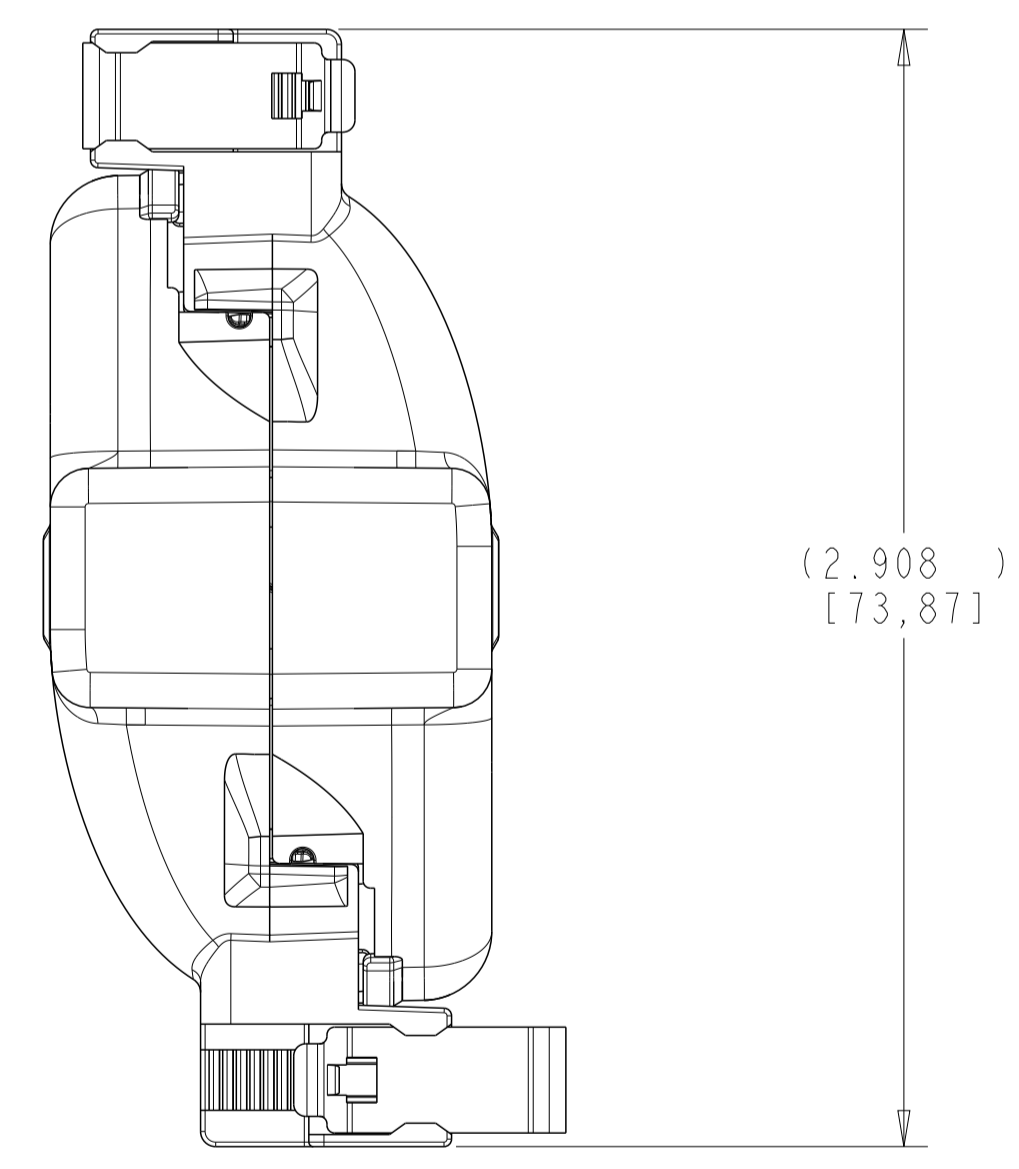
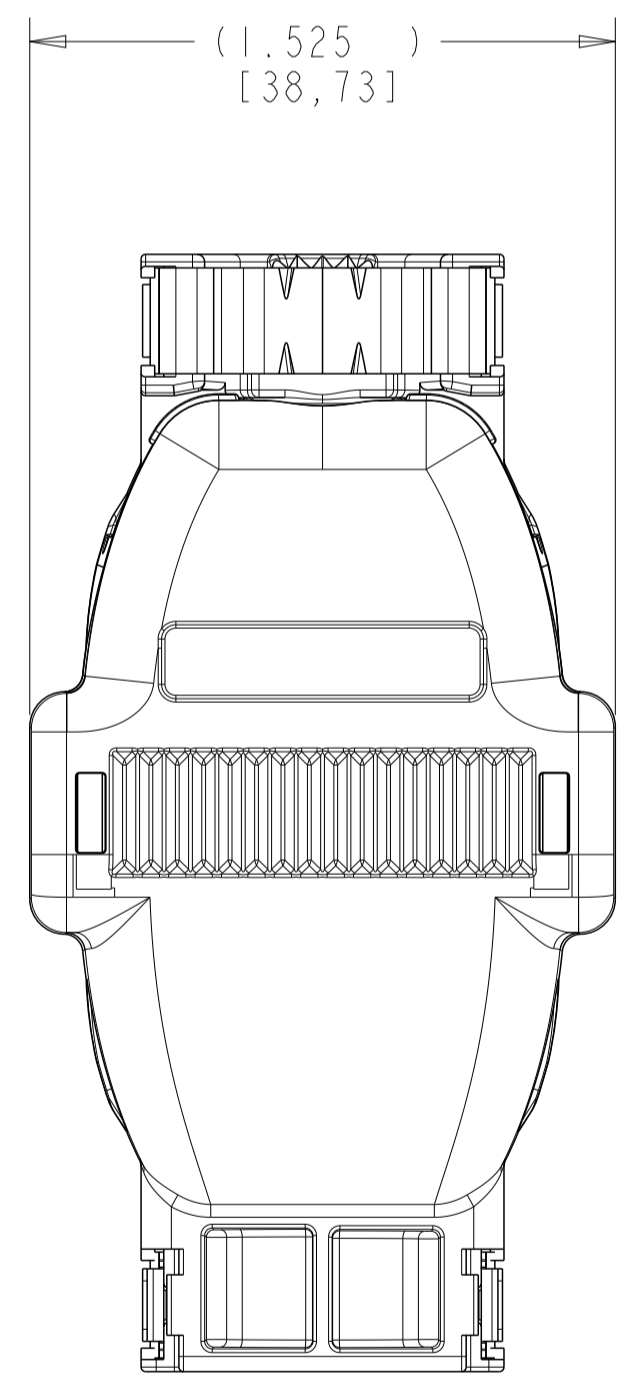
EACH CONNECTOR CONTAINS THE FOLLOWING:
(1 PC) ASSEMBLY, CEILING CONNECTOR, WHITE
(2 PC) CAP, CEILING CONNECTOR, WHITE
(2 PC) SHIELDS, DIE CAST, PLATED ZINC
(2 PC) CONTACT, SPRING, STAINLESS STEEL



ASSEMBLED VIEW



EXPLODED VIEW



COMMSCOPE, INC.			
DRAFTER G. GARRETT	TITLE SHIELDED CEILING CONNECTOR, PACK OF 5		
ENGINEER T. ANDERSON	SIZE A1	SCALE 2.000	DOCUMENT NO. 760250028
CUSTOMER DRAWING			REVISION SHEET B 1 OF 1



Shielded Ceiling Connector Assembly (CCA) without cordage, Silver (5 ea /pkg)

- Perfect solution for connected devices in the ceiling: IP cameras, Wi-Fi access points and in-building wireless systems, LED lighting and sound masking systems
- For installation in difficult-to-access areas
- Provides a high-quality cable interconnection, available as a standalone unit or pre-terminated to an RJ45 plug

Product Classification

Regional Availability	Asia Australia/New Zealand EMEA Latin America North America
Portfolio	CommScope®
Product Type	Connector kit

General Specifications

ANSI/TIA Category	6 6A
Cable Type	F/FTP (shielded) F/UTP (shielded) S/FTP (shielded)
Conductor Type	Solid Stranded

Dimensions

Height	29.718 mm 1.17 in
Width	38.862 mm 1.53 in
Depth	73.914 mm 2.91 in
Compatible Conductor Gauge, solid	26–22 AWG
Compatible Conductor Gauge, stranded	26–22 AWG

Electrical Specifications

Contact Resistance Variation, maximum	20 mOhm
Contact Resistance, maximum	100 mOhm
Current Rating at Temperature	1.5 A @ 20 °C 1.5 A @ 68 °F
Insulation Resistance, minimum	500 MOhm

Material Specifications

Contact Plating Material	Precious metals
IDC Termination Material	Phosphor Bronze

760250028 | ECO CCA-SHLD-5

Material Type High-impact, flame retardant, thermoplastic | Phosphor Bronze | Stainless Steel
Contact Spring | Zinc Die Cast Shield

Mechanical Specifications

Plug Insertion Life, minimum 750 times
Plug Retention Force, minimum 44.645 kg/m | 30 lb/ft

Environmental Specifications

Operating Temperature -10 °C to +60 °C (+14 °F to +140 °F)
Storage Temperature -40 °C to +70 °C (-40 °F to +158 °F)
Relative Humidity Up to 95%, non-condensing
Environmental Space Low Smoke Zero Halogen (LSZH) | Plenum
Flammability Rating UL 94 V-0
Safety Standard ETL | cETL

Packaging and Weights

Packaging quantity 5

Regulatory Compliance/Certifications

Agency	Classification
CHINA-ROHS	Below maximum concentration value
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant
UK-ROHS	Compliant



Ceiling Connector Assembly FAQ

Q.	What is the ceiling connector assembly?
A.	The ceiling connector assembly provides a high-quality cable interconnection. It is available as a standalone unit or pre-terminated to an RJ45 plug.
Q.	Why did we develop it?
A.	We are seeing increasing numbers of applications migrating to the ceiling; from WiFi APs, to IP security, low voltage LED lighting and more.
Q.	What is the alternative to this?
A.	There are two common alternatives; the first is the traditional termination of the horizontal cable in an information outlet. This continues to be the preferred method and is CommScope's recommended approach whenever feasible. The second method involves the field termination of an RJ45 plug on the horizontal cable. The ceiling connector assembly provides a superior and simpler installation than field terminated plugs provide.
Q.	Why do we recommend the ceiling connector assembly over the field terminated plug in a ceiling application?
A.	Field terminating an RJ45 plug in a ceiling environment is a more challenging operation. There are many small parts associated with this installation method, and given the limited space and visibility in most ceilings, it is difficult to achieve the level of termination quality that can be done in factory conditions. This is easily achieved with a ceiling connector assembly.
Q.	Does the ceiling connector assembly offer other advantages over field installable plugs?
A.	The ceiling connector assembly allows use of a factory-terminated patchcord with a standard plug, in terms of size, design and performance. This allows the ceiling connector assembly to be connected to all existing wireless access points, as well as many security cameras where the equipment connector is mounted flush to the equipment.
Q.	What are the ordering options for the ceiling connector assembly?
A.	The ceiling connector assembly can be ordered individually or with a UTP "pigtail" in lengths from 18 inches (.45m) to 50 feet (15.25m). Plenum and LSZH options are available.
Q.	What cable types can be terminated in the ceiling connector assembly?
A.	Category 5e, 6 and 6A UTP can be terminated in the ceiling connector. Category 6 and Category 6A versions are available with a factory-terminated plug ended cord.
Q.	For installations using the standalone ceiling connector, is there a minimum cord length?
A.	The existing solution guidelines for minimum cord lengths must be followed.
Q.	What environments are available?
A.	The ceiling connector assembly is designed for ceiling applications. It may also be deployed in outdoor applications provided it is placed and sealed in an outdoor-rated enclosure, as the CCA is not water-resistant or UV-resistant.
Q.	Does the use of the ceiling connector assembly count as an extra connection?
A.	Yes, the ceiling connector counts as a single connection.
Q.	Is the ceiling connector assembly available in shielded?
A.	Yes, the ceiling connector is available in both unshielded and shielded versions.
Q.	Can this be used to connect cable on both sides to "lengthen" or to use as "repair"?
A.	It can be, but requirements for maximum distance and connector count must be conserved. Splices are not supported by industry cabling standards.
Q.	Are the channel specifications still applicable when the ceiling connector assembly is used?
A.	Yes. The ceiling connector supports the channel specifications of SYSTIMAX GigaSPEED X10D, GigaSPEED XL and PowerSUM U/UTP solutions, as well as Uniprise and NETCONNECT solutions. The CCA-CAT6A supports the channel specifications for all of CommScope's Category 6A/Class EA infrastructure solutions. The CCA-CAT6 supports the channel specifications for all of CommScope's Category 6/Class E as well as Category 5e/Class D infrastructure solutions.

Q. What do the standards say regarding a link containing a ceiling connector assembly?

A. According to TIA-568.2-D and ISO/IEC 11801-1 standards:

1. The CCA module counts as an extra connector and if used should not exceed the total 4 connections in a channel
2. The CCA connection module (without the plug and cordage) has tested as an individual Category 6 or 6A component in the electrical lab using standard discrete wire termination fixtures at both ends.
3. The link with a modular plug at one end of the CCA is the same as a modular plug terminated permanent link (MPTL) specified in TIA 568.2-D annex F
4. The CCA link, consisting of a connection in the telecom room, horizontal cable, ceiling connector, cordage and modular plug, together can be tested as a 3 connection permanent link (see Figure F.1 of TIA-568-D)
5. The results shall comply with the PL requirements in Table 37, line 2256 in TIA 568.2-D because this equation has a 33.13 slope above 300 MHz to account for the higher NEXT caused by 3 connections instead of 2 shown in the equation in Table 37
6. A similar slope adjustment at higher frequencies with additional relaxation above 450 MHz for Category 6A is specified in the ISO 11801-1 FDIS

Q. How does a link with the CCA get tested?

A. Field testing of a CCA link is described in ANSI-TI568.2-D Annex F for lengths up to 90 meters. Most field testers are capable of evaluating the performance of a modular plug terminated link using a combination of appropriate adapters.

CommScope pushes the boundaries of communications technology with game-changing ideas and ground-breaking discoveries that spark profound human achievement. We collaborate with our customers and partners to design, create and build the world's most advanced networks. It is our passion and commitment to identify the next opportunity and realize a better tomorrow. Discover more at [commscope.com](https://www.commscope.com)



[commscope.com](https://www.commscope.com)

Visit our website or contact your local CommScope representative for more information.

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Further information regarding CommScope's commitment can be found at www.commscope.com/About-Us/Corporate-Responsibility-and-Sustainability.

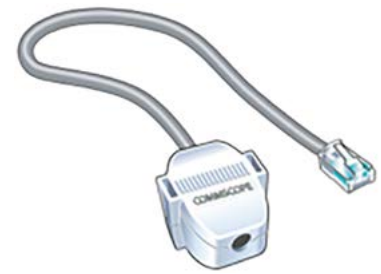
CO-112172.1-EN (05/21)

Design guidelines for ceiling connector assembly

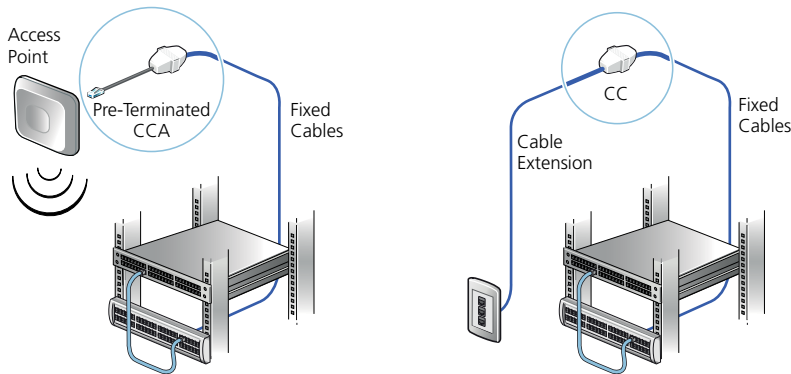


APPLICATIONS

The ceiling connector assembly (referred to as CCA) provides a means to connect horizontal cable to a short, single-ended patch cord assembly in the field. Whereas the CCA includes the patch cord for convenience, the ceiling connector is also available for those who wish to terminate the assembly to a single ended patch cord. Once installed, the plug ended link may be used to connect to cameras, access points, and other ceiling-mounted devices. As an alternative to a connector termination with cord, a cable end can be easily terminated on the CCA and plugged into the end equipment. In a different application, office moves can sometimes require a change in outlet location, and the ceiling connector can be used if the new outlet location requires additional cable length. The ceiling connector is available in both shielded and unshielded versions.



Ceiling connector pigtail (UTP)



Shielded ceiling connector termination

Building upon CommScope's cable engineering knowledge, the ceiling connector solution is designed to provide maximum performance, flexibility and durability. They feature a simplified termination that requires no special tools and can provide a high quality result in typically challenging working locations, such as over drop ceilings.

The ceiling connector supports the channel specifications of SYSTIMAX GigaSPEED X10D, GigaSPEED XL and PowerSUM solutions, as well as Uniprise and NETCONNECT solutions. The CCA-CAT6A supports the channel specifications for all of CommScope's Category 6A/Class EA infrastructure solutions. The CCA-CAT6 supports the channel specifications for all of CommScope's Category 6/Class E as well as Category 5e/Class D infrastructure solutions.

KEY FEATURES & BENEFITS

Electrical performance:	ANSI/TIA-568-C.2 Category 6A / ISO 11801 Class EA performance compliant. Meets or exceeds all ANSI/TIA-568-C.2 Category 6A and ISO 11801 Class EA connector and channel transmission performance requirements.
	Meets applicable requirements of IEC 60603-7
	Supports IEEE 802.3af, 802.3at and proposed 802.3bt* PoE applications.
Mechanical features:	Flammability rating: The Connector is dual rated - Plenum and Low Smoke Zero Halogen
	Operating temperature: 14°F to 140°F (-10°C to 60°C)
	Storage temperature: -40°F to 158°F (-40°C to 70°C)
Compliance:	Safety compliance: ETL Listed; UL 1863 and CAN/CSA-C22.2 (ETL File 3166536CRT-001)
	RoHS compliant
	Supports 20 re-termination cycles

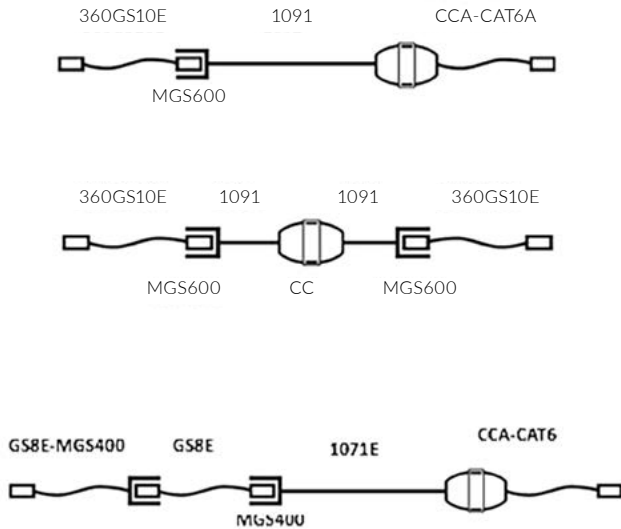
* Consult a CommScope Field Application Engineer if Type 4 Power Sourcing Equipment (PSE) is deployed.

CCA HANDLING

The ceiling connector solution can be used in a conventional cable environment and can be routed and placed through typical indoor cabling pathways as cable, but should not be pulled through constraining pathway features. Conduit pulls are not supported, although they can be passed through short sleeves. For termination instructions, refer to 860634932 ceiling connector assembly Installation for UTP and 860656301 for Shielded Ceiling Connector Installation.

CHANNEL CONFIGURATIONS

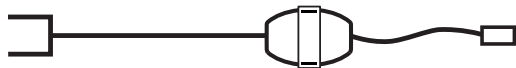
While the ceiling connector allows for cable extension, cabling distance must still fall within infrastructure solution requirements to meet the performance specifications. Connector count must also satisfy solution requirements. When used in a channel, the ceiling connector should be counted as a connection. ceiling connectors are designed for direct cable or cord termination, so configurations are limited. The following configurations show some typical examples:



For ordering information on the ceiling connector assembly please refer to [Field installed connector solution for above ceiling applications](#)

FIELD TESTING

The CCA can be tested within either a link or a channel. Conventional link testing is defined between connector endpoints, while conventional channel testing is defined between plug endpoints.



For a link, the CCA may be test per ANSI-TIA568.2-D Annex F Modular Plug Terminated Link with the ceiling connector as the consolidation point. For additional details on MPTL solutions refer to 860656585 Design Guidelines for Modular Plug Terminated Link (MPTL).

CommScope pushes the boundaries of communications technology with game-changing ideas and ground-breaking discoveries that spark profound human achievement.

We collaborate with our customers and partners to design, create and build the world's most advanced networks. It is our passion and commitment to identify the next opportunity and realize a better tomorrow. Discover more at commscope.com

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CO-112170.2-EN (05/21)

CERTIFICATE

Certificate Number: 111045.000
Including Seven Page Addendum

The Quality Management System and implementation of:

CommScope, Inc.

With Virtual Central Function at:
1100 CommScope Place SE
Hickory, NC 28602
United States

meets the requirements of the standard:

ISO 9001:2015

Scope:

The sales, marketing, design, manufacture, test, repair, support, service, and distribution of telecommunications products, components, and services for the telecommunications, wireless, and broadcast networks industries

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001

Business Segments	Exceptions
Connectivity and Cable Solutions (CCS)	None
Networking, Intelligent Cellular & Security Solutions (NICS)	None
Outdoor Wireless Networks (OWN)	None
Access Network Solutions (ANS)	None



Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
Atlanta, GA 30339 USA
(215) 997-4519
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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page One of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Activities Legend:	HQ = Headquarters	MFG = Manufacturing	SER = Services (Professional Services and/or Technical Support)
	HW DE= Hardware Development	REP = Repair	SC = Purchasing, Supplier Management, Manufacturing Support, Repair Support
	SW DE= Software Development	SAL = Sales, Marketing	DIST = Distribution

Site Address	Site Activities
CommScope Inc 1100 CommScope Place SE Hickory, NC 28602 United States	HQ (Virtual)
ARRIS Technology, Inc. 3871 Lakefield Drive Suwanee, GA 30024 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 101 Tournament Dr. Horsham, PA, 19044 United States	HW & SW DE, SAL, SER, SC
ARRIS Technology, Inc. 6450 Sequence Drive San Diego, CA 92121 United States	SW DE, SER
ARRIS Technology, Inc. 900 Chelmsford St. Lowell, MA 01851 United States	HW & SW DE, SER, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001



Dr. Cem O. Onus
Managing Director

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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
 ADDENDUM Page Two of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
ARRIS Solutions, Inc. 2400 Ogden Ave., Suite 180 Lisle, IL 60532 United States	HW & SW DE, SAL, SER, SC
ARRIS 15 Sterling Drive Wallingford, CT 06492 United States	HW & SW DE, SER, SC
ARRIS Technology, Inc. 2450/2500 Walsh Avenue Santa Clara, CA 95051 United States	HW & SW DE, SAL, SER
Ruckus Wireless International Inc. 350 West Java Dr. Sunnyvale, CA 94089 United States	HW & SW DE, SER
Ruckus Wireless Network Technology (Shenzhen) Co. Ltd. Units C&D, 5th Floor, No. 2 Finance base, 8 KeFa Road, Shenzhen, China	SW DE, SC, HW DE

Certificate Expires: January 04, 2026
 Certificate Issued: January 05, 2023
 Certified Since: January 10, 2001



Dr. Cem O. Onus
 Managing Director

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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Three of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
CommScope Asia (Suzhou) Technologies Co., Ltd. 77 Qiming Road, Suzhou Industrial Park Suzhou, Jiangsu 215121 Peoples Republic of China	MFG, SC
Ruckus Wireless International Inc., Taiwan Branch @ Neihsu District, Taipei City, Rui Road 411, 10th floor, Taipei	SW DE
ARRIS Group India Pvt Limited (AGIPL) Salarpuria Supreme, Ground Floor West Wing & First Floor Munnekolalu Village, Varthur Hobli, Outer Ring Road, Bangalore-560037	SW DE
ARRIS Group de Mexico S.A. de C.V. Av. La Paz 11721 Parque Industrial Pacifico Tijuana, BC 22643 Mexico	MFG, REP, SC
ARRIS Communications Ireland Limited Building 4300, Cork Airport Business Park Kinsale Road Cork County Ireland	HW & SW DE
ARRIS Group India Private Limited "The Senate" No:33/1, Ulsoor Road, Bangalore - 560 042 India	HW & SW DE

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001



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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Four of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
ARRIS Group, Inc. 50 Stranmillis Embankment Belfast, BT95FL Northern Ireland	SW DE
CommScope Czech Republic, s.r.o Turanka 856/98B 627 00 Brno Czech Republic	HW DE,
CommScope CZ, spol. s.r.o. U Morusi 888, 53006 Pardubice Czech Republic Czech Republic	HW DE,
CommScope Connectivity UK Limited Units 1 and 4 Kinmel Park Industrial Estate Bodelwyddan, Denbighshire, LL18 5TZ United Kingdom	HW DE, MFG, SAL
CommScope Design & Integration UK Ltd. Unit 5 & 6 Eden Business Park Eden House Drive Old Malton, Malton, North Yorkshire YO17 6AE United Kingdom	HW DE, MFG, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001



Dr. Cem O. Onus
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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Five of Seven

The Quality Management System and implementation of:

CommScope, Inc.

meets the requirements of the standard:

ISO 9001:2015

Site Address	Site Activities
CommScope Design & Integration UK Limited 412 The Quadrant, Birchwood Park Warrington, WA3 6FW United Kingdom	SER
CommScope EMEA Ltd. Corke Abbey Avenue Bray, Co. Dublin Ireland	MFG, SAL
CommScope EMEA Ltd. Diestsesteenweg 692 3010 Kessel-Lo, Belgium	HW DE, MFG, SAL
CommScope Italy Srl Via Archimede, 22/24 Agrate Brianza (MB) 20864 Italy	HW DE, REP, SW DE
Telecom Networks Americas AV. HIPOLITO YRIGROYEN 2999, DEPOSITO 6 EL TALAR, TIGRE Buenos Aires B1618AXD Argentine Republic	SAL, DIST
CommScope Networks India Private Limited Salarpuria Softzone, A Block, 1st Floor Survey No 80/1, 81/1, 81/2, B Wing, Belandur Village, Varthur Hobli, Outer Ring Bangalore – Karnataka 560103 India	SW DE
ADC India Communications Ltd. No 10 C , 2nd Phase Peenya Industrial Area Bangalore – Karnataka 560058 India	MFG, SC

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001



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CERTIFICATE ADDENDUM

Certificate Number: 111045.000
ADDENDUM Page Six of Seven

The Quality Management System and implementation of:

CommScope, Inc.

With site at:

CommScope Asia (Suzhou) Technologies Co.,Ltd.

77 Qiming Road, Suzhou Industrial Park
Suzhou, Jiangsu 215121
Peoples Republic of China

meets the requirements of the standard:

ISO 9001:2015

The validity of this certificate depends on the validity of the main certificate.

Scope:

Production of network cable, fiber cable and communication equipment component (copper patch cords, copper panel, accessories etc.)

Certification Structure: Multi-site

Certificate Expires: January 04, 2026
Certificate Issued: January 05, 2023
Certified Since: January 10, 2001



Dr. Cem O. Onus
Managing Director

DEKRA Certification, Inc.
1945 The Exchange SE #300
Atlanta, GA 30339 USA
(215) 997-4519
<https://www.dekra.us/en/audits/>



证书附录

证书编号: 111045.000

附录第7页,共7页

质量管理体系和实施:

CommScope, Inc.

其场所:

康普科技 (苏州) 有限公司

中国江苏省苏州工业园区启明路77号,邮编215121

符合以下标准要求:

ISO 9001:2015

本证书的有效性取决于主证书的有效性。

范围:

网络线、光缆、通信系统设备材料(网络跳线、配线装置等)的生产。

认证结构: 多场所

证书有效期: 2026.01.04

发证日期: 2023.01.05

首次发证日期: 2001.1.10



Dr. Cem O. Onus
Managing Director

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(215) 997-4519
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Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2015

This is to certify that:

CommScope, Inc. of North Carolina
1100 CommScope Place SE
Hickory
North Carolina
28603-0339
USA

Holds Certificate No:

EMS 648387

and operates an Environmental Management System which complies with the requirements of ISO 14001:2015 for the following scope:

The environmental management system to control the risks associated with the manufacture, distribution, field support and central function of telecommunication products and services.

For and on behalf of BSI:

Carlos Pitanga, Chief Operating Officer Assurance – Americas

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

Page: 1 of 5



...making excellence a habit.™

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Telecommunications de Reynosa S. de R.L. de C.V. Av. Industrial Reynosa Lte 2 al 5 Parque Industrial Center Reynosa Tamaulipas 88780 Mexico	Manufacture and distribution of telecommunication products including antenna and cable.
CommScope Asia (Suzhou) Technologies Co., Ltd. EPZ II, 77 Qiming Road Suzhou Industrial Park Suzhou Jiangsu 215121 China	Manufacture and distribution of telecommunication products, including cable.
Andrew Telecommunications India Pvt. Ltd. Plot No. N-2, Phase IV Verna Industrial Estate Verna Salcette Goa 403 722 India	Manufacture and distribution of telecommunication products, including antenna and cable.
CommScope EMEA Ltd. Corke Abbey Avenue Bray County Dublin A98FY03 Ireland	Manufacture and distribution of telecommunication products, including cable and connectors.
CommScope Telecommunications (China) Co., Ltd. 68 West Su Hong Xi Lu Suzhou Industrial Park Suzhou Jiangsu 215021 China	Manufacture and distribution of telecommunication products, including antenna and cables.

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

Page: 2 of 5

Certificate No: **EMS 648387**

Location	Registered Activities
Andrew Wireless Systems GmbH Industriering 10 Buchdorf 86675 Germany	Manufacture and distribution of telecommunication products, including amplifiers and antenna systems.
CommScope, Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Corporate headquarters responsible for management system oversight of all locations listed on this certificate.
CommScope Inc. 6519 CommScope Road Catawba North Carolina 28609-0199 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Inc. 3642 US Hwy 70 East Claremont North Carolina 28610-0879 USA	Manufacture and distribution of telecommunication products, including cable.
CommScope Czech Republic s.r.o. Turanka 98B Brno 62700 Czech Republic	Manufacture and distribution of telecommunication products, including connectors and terminations.
CommScope Inc. of North Carolina 1100 CommScope Place SE Hickory North Carolina 28603-0339 USA	Customer care, facility maintenance, and administrative functions.
ADC de Delicias, S. de R.L. de C.V. Blvd. Fernando Baeza No. 1301 Sur Delicias Chihuahua 33000 Mexico	Manufacturing and distribution of telecommunication products.

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

Page: 3 of 5

Certificate No: **EMS 648387**

Location	Registered Activities
ADC de Juarez S. de R.L. de C.V. Parque Industrial Antonio J Bermudez Ciudad Juarez Chihuahua 32470 Mexico	Manufacturing and distribution of telecommunication products.
CommScope Connectivity Belgium bvba Diestsesteenweg 692 Kessel-lo 3010 Belgium	Manufacture and distribution of telecommunication products.
CommScope Technologies de Juarez S. de R.L. de C.V. Santiago Troncoso 331 Praderas del Sur, Ciudad Juarez Chihuahua 32575 Mexico	Manufacture of Fiber Optic Splice Closures (FOSC), Fiber Guide Systems (FGS), Hardened Connectivity and Molding-Gel Filling, including: plastic injection molding, plastic extrusion, plastic and metal machining, and assembly operations.
CommScope Connectivity UK Limited Unit 1 Kinmel Park Bodelwyddan Rhyl, Denbighshire LL18 5TZ United Kingdom	Fibre optic cable manufacturing, termination and design of other telecommunication products and services.
CommScope 11312 S. Pipeline Road Eules Texas 76040 USA	Manufacture, distribution, field support and central function of telecommunication products.
ARRIS GROUP DE MEXICO SA DE CV Av. De la Paz, #11721 Parque Industrial Pacifico Tijuana Baja California 22643 Mexico	Manufacture, repair, support, repair service, distribution of products and components for telecommunications that provide integrated solutions for voice, video and data through the processes of SMT, manual and mechanical assembly, soldering (manual, selective, printed, wave) electrical testing and packaging.

Original Registration Date: 2016-03-01

Effective Date: 2022-03-15

Latest Revision Date: 2022-04-21

Expiry Date: 2025-03-14

Page: 4 of 5

Certificate No: **EMS 648387**

Location	Registered Activities
CommScope Design & Integration UK Ltd Unit 5 & 6, Eden Business Park Edenhouse Drive Old Malton Malton YO17 6AE United Kingdom	Manufacture and distribution of telecommunications products including cabinets.
Arris Indústria Eletrônica do Brasil Ltda. CNPJ: 09.154.836/0001-15 Avenida Torquato Tapajós, 9475 Tarumã Manaus Amazonas 69041-025 Brasil	Manufacturer and distribution of Receivers, Television signal Decoders and Modulator/Router.
CommScope Design and Integration UK Ltd. Lovell House, 412 The Quadrant Birchwood Park Warrington WA3 6FW United Kingdom	Telecommunications project management, site surveys, installations commissioning and rigging.

Original Registration Date: 2016-03-01

Latest Revision Date: 2022-04-21

Effective Date: 2022-03-15

Expiry Date: 2025-03-14

Page: 5 of 5

LIMITED WARRANTY



1. **Definitions.** For purposes of this Warranty, (i) “Buyer” shall mean the individual or entity identified on the applicable purchase order or supply agreement (or, if different, on Seller’s quotation, order acknowledgement or statement of work), (ii) “Seller” shall mean the CommsScope entity identified on such entity’s quotation, order acknowledgement, statement of work or supply agreement, (iii) “Hardware” means equipment designed and manufactured by or on behalf of Seller, or any third-party manufacturer’s equipment offered for sale by Seller to Buyer, (iv) “Product” shall mean a product manufactured by or on behalf of Seller pursuant to the applicable supply agreement, quotation or order acknowledgement, and includes any combination of Hardware and Software, (v) “Services” means site engineering, system integration, product installation, implementation, training, maintenance and technical support services for Products, or other professional services provided by Seller to Buyer. Services exclude managed services and hosted cloud services provided by Seller, (vi) “Software” means Seller-licensed software, either embedded or standalone, including any updates provided, and any other enhancements, modifications, and bug fixes provided thereto, in object code form only (unless otherwise specified), and any full or partial copies thereof. Software does not include software created or owned by third parties, including but not limited to MediaKind Software, Google’s Android Software or any third party application software, and (vii) “Warranty Period” means, unless a different time period is set forth in **Exhibit A**, (a) for Hardware, one year from date of original shipment from Seller’s facility, (b) for Software-only Products, ninety (90) days from the date such Software is first made available to Buyer, or for Software embedded in a Hardware Product, ninety (90) days from date of original shipment of the Product from Seller’s facility, and (c) for Services, thirty (30) days from the date the performance of such Services has been rendered.

2. **Limited Warranty.** Seller warrants that, as of the date of delivery, Seller has good title to the Product, free from any lawful security interest or other lien or encumbrance unknown to Buyer. In addition, during the Warranty Period, the Product and Services will be free from defects in materials or workmanship arising under proper and normal use. This Warranty shall apply only to the Products and Services and shall not apply to any other goods or materials, parts or components of a system or any system as a whole. This Warranty does not cover ordinary wear and tear. Seller does not warrant (i) Products not purchased from Seller or its authorized resellers; (ii) that the operation of the Product will be uninterrupted or error-free; (iii) that the Product will operate in combination with other third-party products selected by Buyer; or (iv) any products manufactured by third parties; provided that Seller will, to the extent permitted by the manufacturer, assign third-party warranties to Buyer. Seller gives no warranty for, and shall have no liability with respect to, any defects arising from any software (other than the Software), including, but not limited to MediaKind Software, Android Software or any third-party application software, downloaded to or otherwise used in conjunction with the Product. Seller further warrants to Buyer that during the Warranty Period, all Services performed by Seller for Buyer will be provided in a workmanlike manner.

3. **Disclaimers.** EXCEPT AS EXPRESSLY SET FORTH IN THIS LIMITED WARRANTY OR IN A SEPARATE, APPLICABLE SOFTWARE LICENSE AGREEMENT, ALL SOFTWARE IS LICENSED ON AN “AS IS” BASIS WITHOUT WARRANTY.

4. **Inspection and Return Authorization.** Buyer must promptly notify Seller of any claimed defect in the Product and/or Services. If Buyer claims that a Product is defective in materials or workmanship, Seller shall have the right to either examine the Product where it is located or, in its sole discretion, issue shipping instructions for return of the Product. Seller’s inspection in response to a warranty claim shall not constitute acceptance or acknowledgment of the claim’s validity. Except as otherwise agreed to in writing, Products may not be returned to Seller without prior authorization. Buyer must contact Seller to obtain an authorization number and return the Products to the location designated by Seller. Any Products returned to Seller without proper authorization will be returned to Buyer at Buyer’s expense. Risk of loss, damage and insurance responsibilities for the Products shall not pass from Buyer to Seller until delivery of the Products to Seller’s designated location. Buyer shall prepay all transportation charges for such return.

5. **Remedies.** Seller’s sole and exclusive obligation and Buyer’s exclusive remedy under this Warranty is Seller’s repair or replacement of the defective Product or re-performance of Services or issuance of a credit for the net book value of the purchase price of the defective Product. Seller shall have sole discretion as to which of these remedies Seller will provide. Seller is not liable for any repair or maintenance costs incurred by Buyer, unless Seller authorizes such charges in writing in advance of the commencement of the work. If Seller elects to replace or repair the defective Product, the replaced or repaired Product will be warranted for the remainder of the Warranty Period applicable to the originally shipped Product, but the Warranty shall not be extended beyond the original Warranty Period. Replacement Products may be new, refurbished or contain refurbished materials.

6. **Notice and Waiver.** If Buyer discovers any defect in the Product, Buyer must provide prompt (and in no case later than thirty (30) days after discovery) written notice to Seller of the claimed defect. Such notice shall describe, in reasonable detail, the symptoms of such defect. The notice must be received by Seller during the Warranty Period for such Product. Failure to give timely notice of a claim shall result in Buyer’s waiver of such claim.

7. **Transfer of Ownership.** This Warranty is not transferable unless Buyer is expressly authorized by Seller in writing to resell the Product. In addition, Buyer must notify Seller on or before the fifteenth (15th) day after the date on which it transfers ownership of the warranted Product. Any transfers in violation of this Section shall invalidate this Warranty. Notice of the transfer of ownership must be in writing and shall include the name and address of the new owner.

8. **Exclusions from Warranty.** This Warranty shall not apply to problems attributable to, or as a result of:

- (a) improper installation or misapplication of parts;
- (b) chain or system failures induced by other products or components;
- (c) lack of proper inspection or maintenance or failure to provide a suitable operating environment;
- (d) any consumables provided with the Product, including but not limited to batteries and other accessories, and any other materials, components or products manufactured by a third party;
- (e) power surges, fire, unusual mechanical, physical or electrical stress, severe weather conditions or acts of nature, including but not limited to, lightning or floods;
- (f) usage or operation not in accordance with published ratings, specifications or instructions, including but not limited to environmental specifications identified by Seller;
- (g) any adjustment, modification, alteration, removal or repair of any part of the Product, including but not limited to removal or alteration of serial numbers or other identifying marks not expressly authorized by Seller in writing;
- (h) accidental damage, misuse, abuse, neglect or unauthorized access of the Product or of any system of which the warranted Product is a part;
- (i) any type of aesthetic changes due to oxidation or corrosion occurring on stainless steel or galvanized steel parts installed in unusually corrosive marine and industrial atmospheres (in which case Seller’s only obligation shall be to ensure that Product complies with Seller’s published material specifications);
- (j) use of the Product for purposes other than that for which it was designed; or
- (k) mishandling during shipment of the Product.

LIMITED WARRANTY

This Warranty is for Products installed and used in accordance with Seller's design, installation and operating parameters. Buyer's failure to ensure conformity with such parameters will void all warranties. Under no circumstance shall Seller have any liability or obligation with respect to expenses, liabilities or losses associated with the installation or removal of any Product or the installation or removal of any components for inspection, testing or redesign occasioned by any defect or by any repair or replacement of a Product.

9. **Limitation on Liability.** THE WARRANTIES SET FORTH IN SECTION 2 HEREOF ARE EXCLUSIVE AND ARE MADE ONLY TO BUYER. SELLER MAKES NO OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY DISCLAIMS AND EXCLUDES ANY REPRESENTATION OR WARRANTY OF MERCHANTABILITY, NONINFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE AND ANY REPRESENTATION OR WARRANTY ARISING BY USAGE OF TRADE, COURSE OF DEALING OR COURSE OR PERFORMANCE. No person is authorized to give any additional warranties on Seller's behalf or to assume for Seller any other liability, except in a writing signed by an authorized officer of Seller. SELLER'S TOTAL LIABILITY FOR ANY CLAIM OR DAMAGE ARISING OUT OF AND/OR IN CONNECTION WITH THE MANUFACTURE, SALE, DELIVERY OR USE OF THE PRODUCTS OR SERVICES WILL BE LIMITED TO PROVEN DIRECT DAMAGES, NOT TO EXCEED (I) FOR PRODUCTS, THE DEPRECIATED VALUE OF THE PURCHASE PRICE OF SUCH PRODUCTS OR (II) FOR SERVICES, THE ACTUAL AMOUNT PAID TO SELLER FOR SERVICES DURING THE 12 MONTH PERIOD IMMEDIATELY PRIOR TO THE EVENT (OR SERIES OF EVENTS) GIVING RISE TO THE LIABILITY. IN NO EVENT WILL SELLER BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY CLAIM FOR LOSS OF ACTUAL OR ANTICIPATED DATA, USE, REVENUES OR PROFITS. The Products are not specifically designed, tested, manufactured or intended for operation or use in any inherently dangerous, life endangering or life support applications where any failure of the Products could lead to death, personal injury or significant physical or environmental damage (High Risk Activities). If Buyer uses the Products in High Risk Activities, including but not limited to nuclear facilities or the flight, navigation or communication of aircraft, Buyer agrees that neither Seller nor its third party licensors are liable in whole or in part, for any claims or damages arising from such use, and that Buyer shall indemnify and hold Seller and its third party licensors harmless from any and all claims for loss, cost, damage, expense or liability arising out of or in connection with any use of the Products in High Risk Activities. These limitations on liability will apply regardless of the form of action, whether in contract, tort, strict liability or otherwise, and whether damages were foreseeable and will survive failure of any exclusive remedies provided in Section 4 hereof.

10. **Choice of Law.** The terms and conditions contained herein and the rights of the parties to any transaction to which they relate shall be governed by and construed in accordance with the laws of the State of North Carolina, U.S.A. The United Nations Convention on Contracts for the International Sale of Goods shall not apply.

LIMITED WARRANTY

Exhibit A

Product Categories	Warranty Period from Original Shipment Date*
<p>Category A Products E6000® Converged Edge Router (CER); E6000n™ Remote PHY Devices (RPDs); E6000r™ Remote PHY Shelves; E6000n™ Remote MACPHY Devices (RMDs); vManager; Remote OLT (R-OLT); associated power supplies and accessories. FLX PON OLT portfolio including vOLT. CherryPicker products, Encoder products including ME-7000, SE-6000; DSR-4xxx, DSR-6xxx and DSR-7xxx series IRD products, and Uplink systems including TME-2020, VDP-1000, BNC, DEM, and SEM; All APEX Universal EQAM including APEX1000 and APEX3000; All Aloha interactive products including OM2000, ARPD, ADM4000 and NC1500 4.0. All SDM products. All VUE and VTM Software Products. All STDC products.</p>	Hardware One (1) Year Software Ninety (90) Days
<p>Category B Products All High and Standard Definition Transport Adapter MS4000™ Media Streamer</p>	Hardware One (1) Year Software Ninety (90) days ** For certain CPE, option for 1% overship in lieu of Hardware warranty is standard
<p>Category C Products Intentionally left blank.</p>	
<p>Category D Products All Third Party OEM Products: power meters; All VUE and VTM hardware platforms; NC1500 4.0 hardware platform; LQA256 Legacy QAM Adapter; Elemental Products including Live, Server, Delta, Conductor and StatMux; DC2180 Cabinet Node. Cooling Systems</p>	Pass Through from OEM: Hardware One (1) Year Software Ninety (90) Days
<p>Category E Products Intentionally left blank</p>	
<p>Category F Products All OM and SG optical node platforms, Flex Max® and Starline® amplifier platforms, RF Taps & Passives, and Optical Passives</p>	Hardware Five (5) Years within the United States and Canada Hardware Three (3) Years outside United States and Canada Software Ninety (90) Days
<p>Category F1 Products All CHP Headend Optical (HEO) Elements</p>	Hardware Three (3) Years Software Ninety (90) Days
<p>Category G1 Products All NC optical node platforms and Optical Passives, including OP/NP/DP/DC models.</p>	Hardware Five (5) Years Software Ninety (90) Days
<p>Category G2 Products All CH3 Headend (HEO) Elements</p>	One (1) year
<p>Category G3 Products All EPON and GPON ONUs, RFoG/HPON R-ONUs, including, CP8 models and associated power supplies and accessories</p>	Hardware Three (3) Years Software Ninety (90) Days

LIMITED WARRANTY

<p>Category H Products All ConvergeMedia™ Distribution Platforms and Management Suite, AdManager™ including SkyVision Ad Management and EMP solutions CVEx™, SVA, all Vertasent products including SVOM, SVM and ERM, AdEdge™ COM and AdEdge APS,VMS, Manifest Delivery Controller (MDC), ARRIS Video Content Manager (AVCM) and Next Generation Insertion (NGI) and Multicast ABR.</p>	<p>Hardware One (1) Year Software Ninety (90) Days</p>
<p>Category I Products ServAssure® Advanced, ServAssure® NXT - Alarm Central, ServAssure® NXT - Analyze, ServAssure Domain Manager and EventAssure™. WorkAssure™@ Workforce Management, Mobile TV, SecureMedia and Titanium</p>	<p>Hardware One (1) Year Software Ninety (90) Days</p>
<p>Category J Products Intentionally left blank</p>	
<p>Category K Products Intentionally left blank.</p>	
<p>Category L Products Intentionally left blank</p>	
<p>Category M Products Intentionally left blank.</p>	
<p>Category N Products Intentionally left blank.</p>	
<p>Category O Products All CAS Products including DAC, CASMR (and associated plug-ins), CAST, Advisor, CSS, OLL, CSS-Lite, KLS, DKS, CPMS</p>	<p>DAC, CASMR, CAST, Advisor, CSS Hardware Three (3) Years OLL, CSS-Lite, KLS, DKS, OLES, CPMS Hardware One (1) Year Software Ninety (90) Days</p>
<p>Category P Products Intentionally left blank.</p>	
<p>Category P1 Products Intentionally left blank</p>	
<p>Category Q Products Intentionally left blank</p>	
<p>Category R Products Intentionally left blank</p>	
<p>Category R1 Products Intentionally left blank</p>	
<p>Category S Products Intentionally left blank</p>	
<p>Category S1 Products Intentionally left blank</p>	

LIMITED WARRANTY

<p>Category T Products RUCKUS Wi-Fi</p>	<p>Hardware:</p> <ul style="list-style-type: none"> - Indoor Access Points and Wall Plate Access Points – Limited Lifetime Warranty,** except for access points with an “e” suffix (e.g., R350e), for which the HW warranty period is one (1) year. - Outdoor Access Points – One (1) Year - Controllers – One (1) Year, except ZoneDirector controllers are covered by the Limited Lifetime Warranty** <p style="text-align: center;">Software Ninety (90) Days</p>
<p>Category T1 Products RUCKUS ICX Switches</p>	<ul style="list-style-type: none"> - ICX Switches (including switch modules, PSUs, and Fans, but excluding removable optics/transceivers and LEDs) – Limited Lifetime Warranty,** except for ICX 7150- C08PT, for which the HW warranty period is 13 months. - LEDs – 12 months - Removable Optics/Transceivers – 60 months (13 months if shipped from Seller prior to June 1, 2021) <p>Software: Limited lifetime access to defect repairs, and software maintenance updates through end of support date of product</p>
<p>Category T2 Products Intentionally left blank</p>	
<p>Category U Products</p> <p>Other OSP Cable Products (P3®, Drop Coax, Fiber Cable, Fiber Drop Cable, CIC)</p> <p>NovuX Products</p> <p>Prodigy</p> <p>Products FDH</p> <p>Products</p> <p>Multiservice terminals (MST), Open Terminals (OTE) and Hardened Drop Cable</p> <p>Assemblies OSP “Box” Products</p> <p>Mini-RDTs and RDTs</p> <p>FOSC™, FIST™ and</p> <p>Tenio™</p> <p>OSP Copper Connect and Closure Products</p> <p>HELIAX® FiberFeed® Products, including FiberFeed® hybrid and fiber cables and assemblies, power cables and junction boxes</p> <p>Fiber Optic Panels, including Accessories, Mounting Hardware, Modules</p> <p>Fiber Optic Field Terminated Connectors, Kits, Tools, Consumables,</p> <p>Accessories Indoor Fiber Cable, Patch Cords, Cable Assemblies, Fiber Trunks</p> <p>Passive Optical Components and Value Added Modules (VAMs)</p> <p>FiberGuide® : Fiber cable Management System</p> <p>Optical Distribution Frames, including Modules, Blocks, Accessories and</p> <p>Hardware Cabinets Cable and Apparatus Products</p> <p>Alifabs™ Cabinets & Ancillary Products</p> <p>Alifabs™ Telecommunications Towers and Accessories</p> <p>Metro Cell Products, including Enclosures; Integrated Pole; Standard Poles; Accessories; and Wood Pole Brackets</p>	<p>One (1) year</p>

LIMITED WARRANTY

<p>Category V Products ValuDAS® Passive Products, including Air Directional Couplers, Hybrid Couplers, High Power Splitters, and Cell-Max™ Antennas Standard Tower Mounted Amplifier, Bias Tee and Power Distribution Unit Products Standard Filter & Combiner Products</p> <p>Electronic Enclosure Products (Cabinets)</p> <p>Alifabs™ Free Cooling Products and Accessories and Spare Parts, including</p> <p>Monitor All-In-One FLX (Active Passive Cabines)</p> <p>PowerShift™ & Power Products</p>	<p>Two (2) years</p>
<p>Category W Products ValuSite® Products</p> <p>I-Line Accessory Products</p> <p>Microwave Antennas</p> <p>Terrestrial Microwave System Products (including Microwave System Flex-Twist, Coupler, Filter and Diplexer Products)</p>	<p>Three (3) years</p>
<p>Category X Products Broadband RF Connectivity Products</p> <p>Premium Passive Products, including In-Building Directional Couplers, Hybrid Matrices, Tappers, Power Splitters, Terminations, Attenuators and CMAX Antenna Products</p>	<p>Five (5) years</p>
<p>Category Y Products QR® Coaxial Cable</p>	<p>Five (5) years</p>
<p>Category Z Products Standard RADIAX® Cable, Connector, Accessory and Cable Assembly* Products</p> <p>* RADIAX® Cable Assembly Product means any RADIAX® coaxial cable that has been fitted with Seller’s connectors in accordance with the installation instructions.</p>	<p>One (1) year</p>
<p>Category AA Products Standard CNT® Cable, Connector, Accessory and Cable Assembly* Products</p> <p>* CNT® Cable Assembly Product means any CNT® coaxial cable that has been fitted with Seller’s connectors by Seller or its certified distributor</p>	<p>Five (5) years; except that the Warranty Period for Products purchased for resale purposes shall be one (1) year.</p>
<p>Category BB Products Standard HELIAX® Cable, Connector, Accessory and Cable Assembly* Products</p> <p>* HELIAX® Cable Assembly Product means any HELIAX® coaxial cable or elliptical waveguide that has been fitted with Seller’s connectors by Seller or its certified distributor.</p>	<p>Ten (10) years; except for the following: (i) three (3) years for weatherproofing kits (including SureGuard boots); (ii) one (1) year for cable preparation tools (excluding blades); (iii) one year for single click-on hanger kits; and (iv) two (2) years for surge arrestors.</p>
<p>Category CC Products Standard ERA/ION-E®, ION-M®, ION-U®, MR, CMR, i-POI®, e-POI™, and Node Repeater Products</p>	<p>Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of shipment.</p> <p>Software Ninety (90) Days</p>
<p>Category DD Products In- Building and Fixed Subscriber Antennas</p>	<p>The earlier of: (i) three (3) years from the date of installation or (ii) thirty-nine (39) months from the date of original shipment</p>

LIMITED WARRANTY

<p>Category EE Products OneCell®</p> <p>Powered Fiber Cable Solution: Hybrid Copper and Fiber Cables, Class 2 Power Supplies, Indoor/Outdoor POE Extenders, Field Terminated Outlets, Consolidation Boxes and Related Passive Components</p>	<p>Hardware, the earlier of: (i) one (1) year from the date of installation; or (ii) fifteen (15) months from the date of original shipment Software Ninety (90) Days</p>
<p>Category FF Products Small Cell Device Management System (DMS) Software DAS Device Management System (AIMOS) Software</p>	<p>Ninety (90) days</p>
<p>Category GG Products Base Station Antenna, Small Cell Antenna & Mosaic™ Products</p>	<p>Two (2) years for all base station antennas except base station antennas incorporating N-type connectors, which shall have a warranty of one (1) year</p>
<p>Category HH Products DryLine® Dehydrator Systems and Line Monitoring Systems</p>	<p>Three (3) years or 3,000 hours of actual run time, whichever occurs first; except the Warranty Period for the compressor is only one (1) year or 1,000 hours of actual run time, whichever occurs first.</p>
<p>Category II Products SiteRise™ Solutions</p>	<p>One (1) year on workmanship for the Solution.</p>
<p>Category JJ Products Copper Structured Cabling Products</p> <p>Other Enterprise Products (Coax, Automotive Cables, Enterprise Enclosures and miscellaneous items) (excluding software)</p>	<p>One (1) year from the date of Installation</p>
<p>Category KK Products Alifabs™ Services (power upgrades, enablements, installation and decommission work, rigging, and fault management)</p>	<p>One (1) year from the date of completion of the work.</p>
<p>Category LL Products imVision Overlays and Controllers</p>	<p>Three (3) years</p>

** For Category H and Category I Products only, if Seller is engaged by Buyer to provide Services for the implementation of the purchased Products, warranty period for such Products shall commence upon Buyer's acceptance of the Products and Services.*

*** For Category T Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing for as long as the original end user of the Product continues to own and use the Product. For Category T1 Products only, "Limited Lifetime Warranty" means the period beginning on the Product shipment date and continuing (i) for as long as the original end user of the Product continues to own and use the Product or (ii) through the End of Support date, as defined in the RUCKUS End of Life Policy, whichever is earlier.*

RoHS Certificate of Compliance




Product Name: ECO CCA, SHIELDED, 5 PACK

Product Number: 760250028

Company Name: CommScope
3642 E US Highway 70
Claremont, NC 28610 USA

Contact: ProductCompliance@Commscope.com

Generated on: May 21, 2024

Certified by: 

Vinatha Viswanathan, Director Product Compliance

Disclaimer

This information is provided based on reasonable inquiry of our suppliers and represents our current actual knowledge based on the information they provided and our analysis and assessment of the risks. This information is subject to change and if a change occurs which affects compliance, then this Statement will be updated. Compliance to EU ROHS 2011/65 amended by EU RoHS 2015/863 means the part numbers have a maximum concentration of no more than 0.1% by weight in homogenous materials for lead, hexavalent chromium, mercury, PBB, PBDE, and 0.01% for cadmium, or qualify for an exemption to these limits as defined in the Annexes of Directive 2011/65/EU (RoHS2). These parts also have a maximum concentration of no more than 0.1% by weight in homogenous materials for DEHP, BBP, DBP and DIBP (substances that are restricted starting from July 22, 2019). Finished electrical and electronic products will be CE marked as required by Directive 2011/65/EU. Components may not be CE marked.

Compliance Status	Regulation	Revision	RoHS exemptions if any
Compliant	ROHS	EU RoHS - 2011/65/EU	

Shielded Ceiling Connector Assembly Installation

860656301

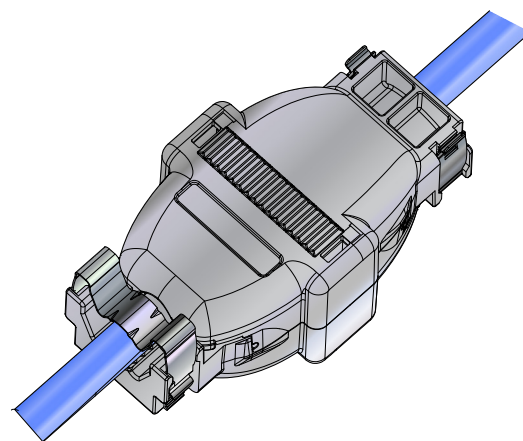
Rev C November 2020

www.commscope.com

General

These instructions provide the installation procedure for the Shielded Ceiling Connector (760250028, Package of 5) and cable assemblies incorporating the Shielded Ceiling Connector Assembly. See the **CommScope** Product Catalog for available cord configurations.

The Ceiling Connector is a straight through wired connector. Be sure to confirm end connections have the same wiring configurations before termination, i.e. TIA 568B or TIA 568A wiring.



**Shielded
Ceiling Connector**

How to Contact Us

- To find out more about **CommScope**® products, visit us on the web at www.commscope.com/
- For technical assistance, customer service, or to report any missing/damaged parts, visit us at <http://www.commscope.com/SupportCenter>

Tools Required

- Cable jacket scoring tool (such as Xcelite® 2CSKY or JOKARI® No.1-Cat)
- Flush-cutting wire cutters (such as Xcelite MS545JV)
- Tongue-and-groove pliers (optional)
- Flat-blade screwdriver (only required for removal)

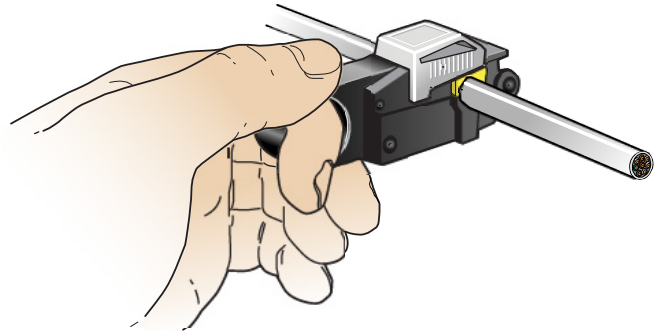
Parts List

Verify parts against the parts list below:

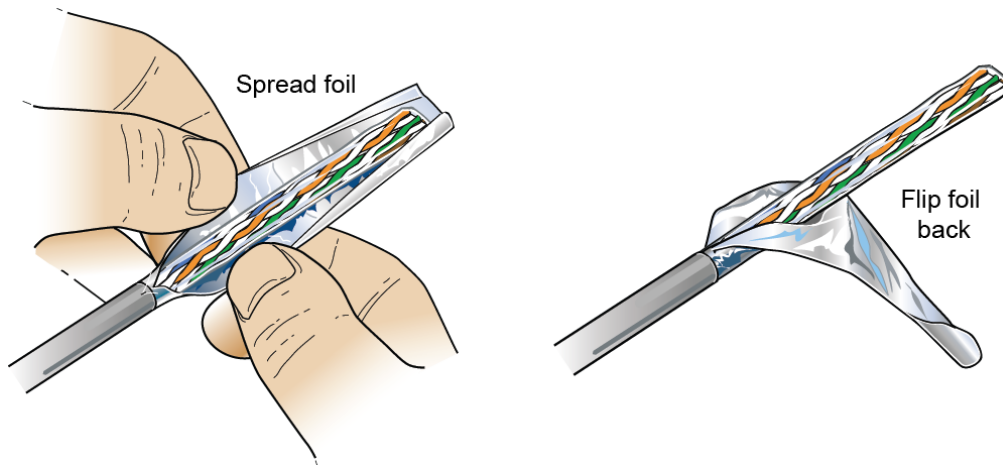
Quantity	Description
1	Ceiling connector housing assembly
2	Ceiling connector cap (one pre-installed in cable assemblies)
2	Ceiling Connector Shield
2	Contact Spring

Preparation of F/UTP and F/FTP Cables for Termination

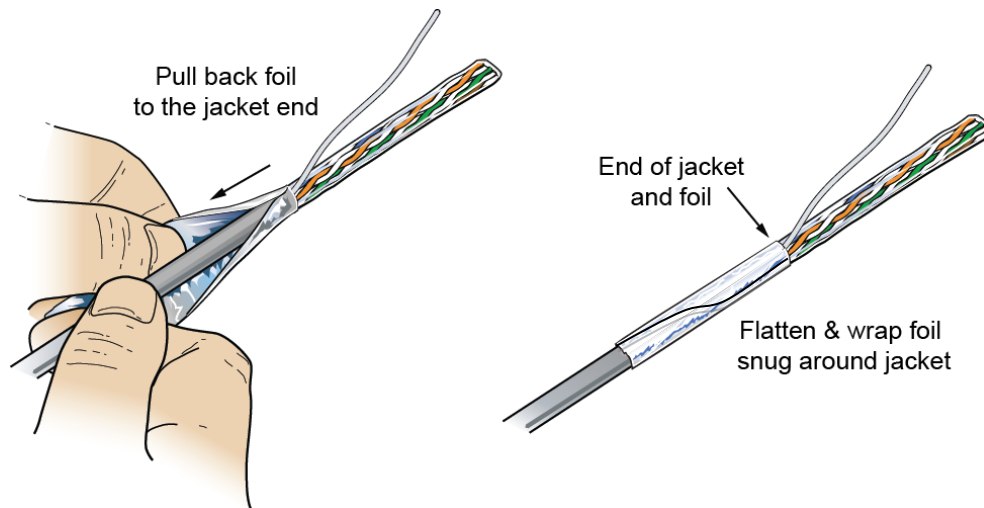
1. Score cable jacket approximately 75 mm (3 inches) from the cable end using a precision jacket scoring tool that has fine adjustment settings, such as the **Xcelite 2CSKY** (shown) or **JOKARI No.1-Cat**.

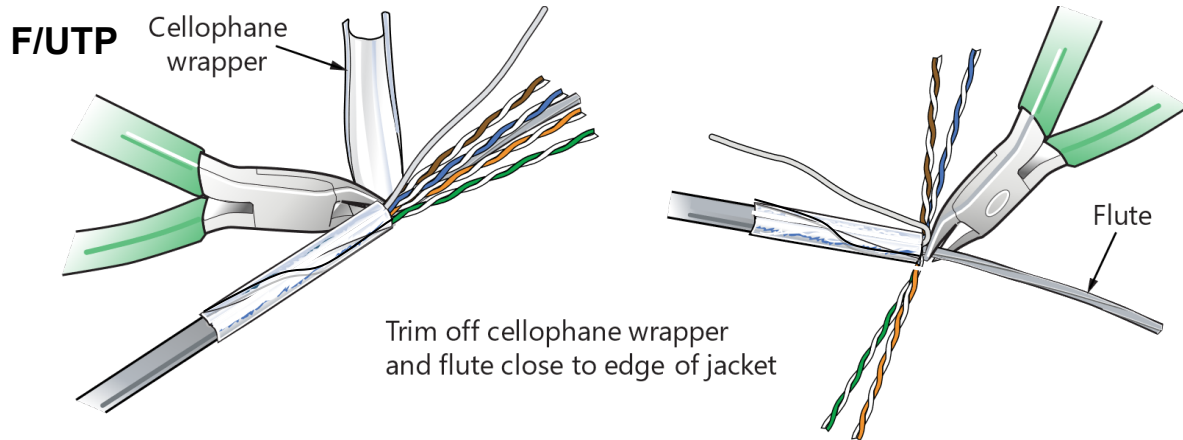


2. Carefully spread foil from around twisted pairs and flip opened foil back over cable jacket.



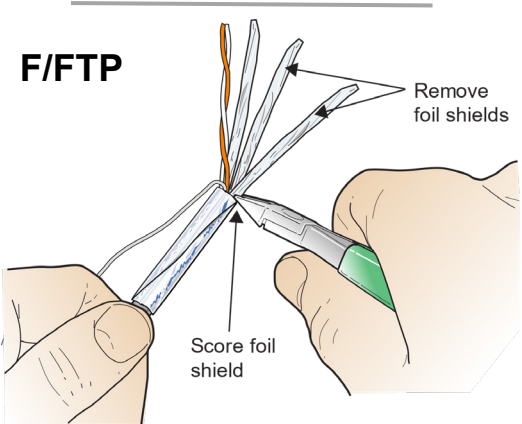
3. Leaving drain wire extended, pull foil back over cable jacket, then flatten it and wrap snug around jacket. If necessary, twist foil slightly around cable to get complete coverage around the cable jacket. **Ensure that the foil is not cut or damaged.**





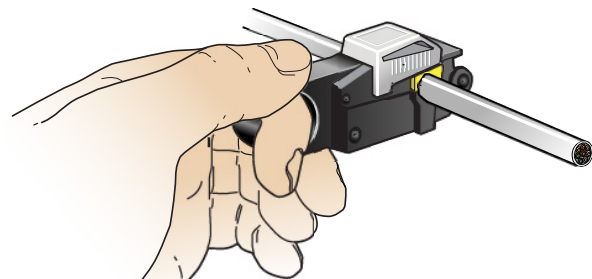
4. For F/UTP cables, using a flush cutting, tapered head wire cutter (such as **Xcelite MS545JV**), trim off clear cellophane wrapping and then separate pairs to trim off flute close to edge of cable jacket.

For F/FTP cables, remove foil shield from each pair. Foil shields may be removed by nicking each one with side cutters (shown) or scoring with a suitable stripping tool. **Ensure that the conductor insulation is not damaged.**

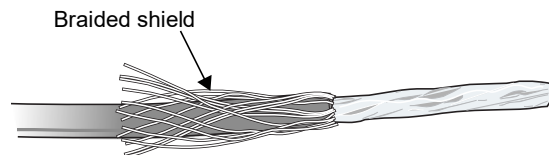


Preparation of S/FTP Cable for Termination

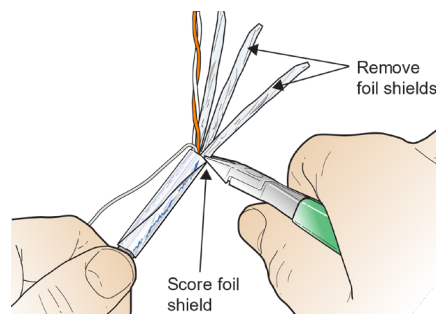
1. Score cable jacket using a precision jacket scoring tool that has fine adjustment settings, such as the **Xcelite 2CSKY** (shown) or **JOKARI No.1-Cat**.



2. Push braided shield straight back and fold it over cable jacket.

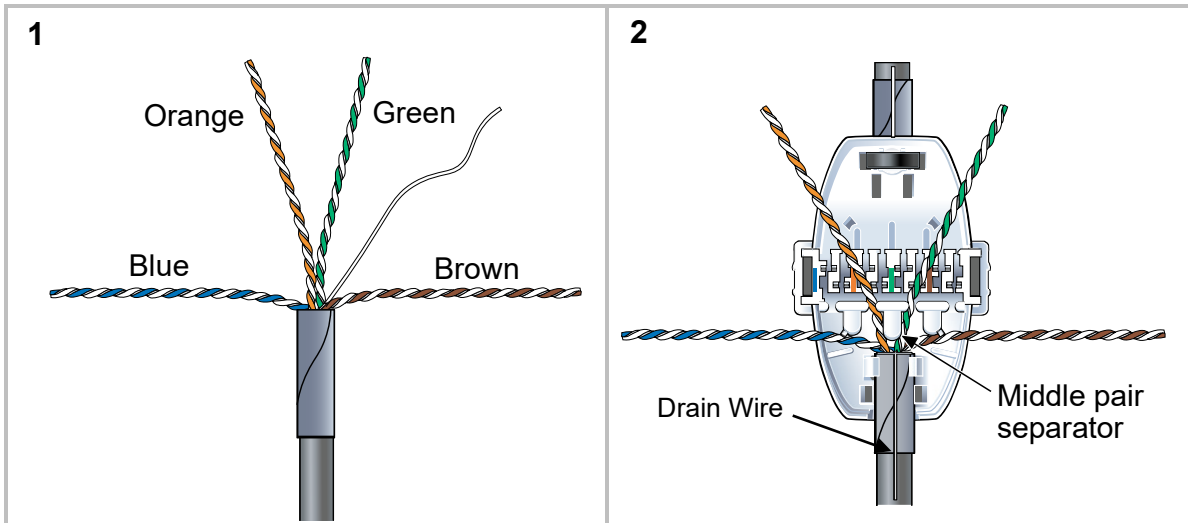


3. Remove the foil shields from each pair. Foil shields may be removed by nicking each one with side cutters (shown) or scoring with a suitable stripping tool. **Ensure that the conductor insulation is not damaged.**



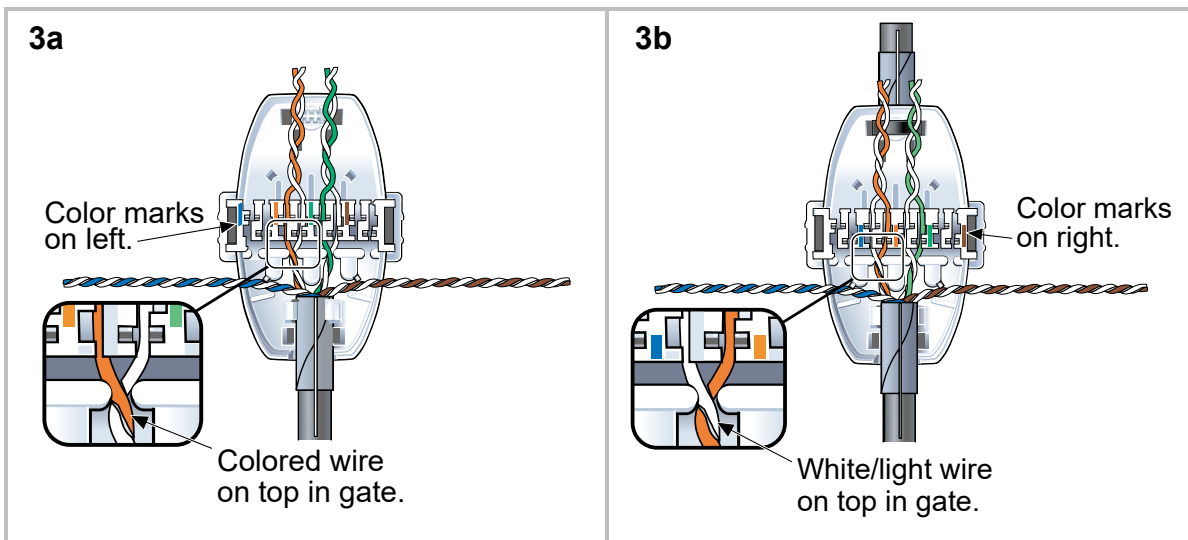
Cable Termination

1. Arrange the wires in order – BLUE, ORANGE, GREEN, BROWN – with the blue and brown pairs bent 90° in opposite directions, as shown in image 1, below.
2. Orient cable with connector. For FTP cables fold drain wire back on top of cable over foil. Insert the cable into the connector and push it tight against the middle pair separator, shown in image 2



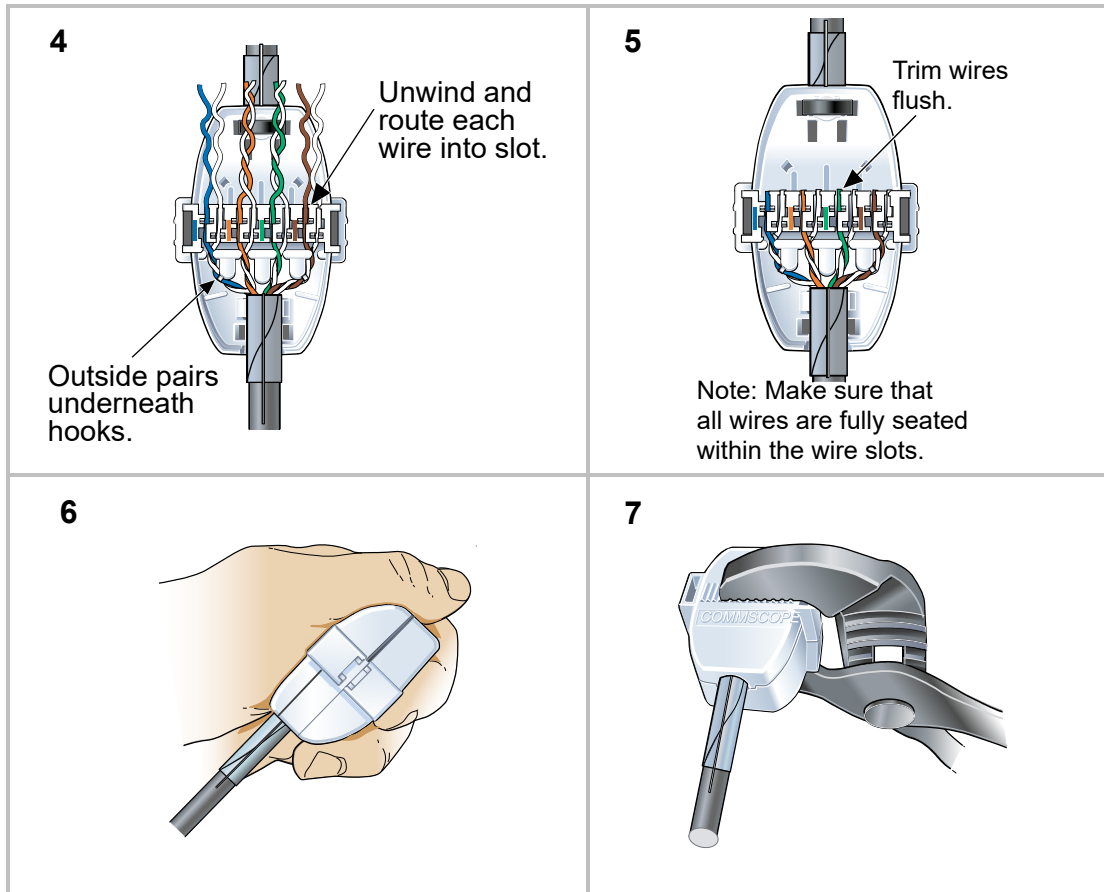
3. Add twist to each pair so that the proper wire is on top over the pair gate and place it into the gate.

IMPORTANT: The two sides of the connector are color marked differently. The colored wire must be on top in the gate with the color markings positioned to the left as shown in 3a. On the side with the color markings positioned to the right (3b), the white/light wire must be on top in the gate.



Note: For cables with larger 22 AWG wires, the wire pairs may need to be untwist past the gate and each wire laid into the vertical gate one at a time.

- Unwind and route each wire into its respective slot (colored wire by color marking), pulling the wire underneath the retention barbs at the end of each slot. Start with the center pairs and keep the cable tight against the middle pair separator. Route the outside pairs underneath the hooks as shown in image 4.
- Trim wires flush with the end of the wire slots, image 5.

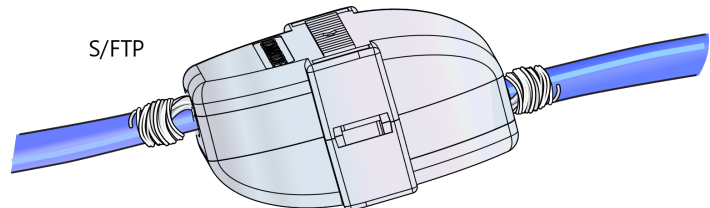
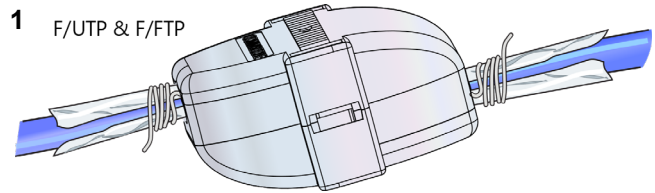


- Install a cap over the wires and squeeze it lightly to partially seat the wires.
Note: Repeat steps 1-6 to terminate the other side of the connector, if necessary.
- Squeeze the caps to engage retention snaps on both sides of each cap as shown in image 7. This may be done by hand or with tongue-and-groove pliers. If using pliers, squeeze along the ribbed surface.

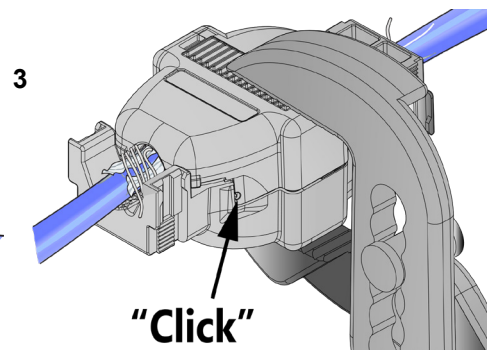
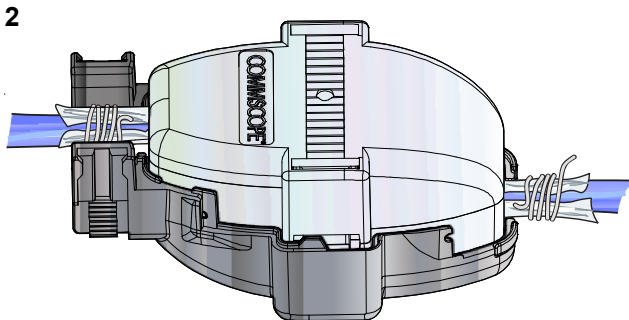
Shield Assembly

1. For F/UTP and F/FTP cables, wrap drain wire around cable jacket and foil shielding. Start wrap approximately 5 mm (3/16 inch) from end of Ceiling Connector and stop wrap 13 mm (1/2 inch) from end of CCA connector. **Do not overlap drain wire when wrapping.**

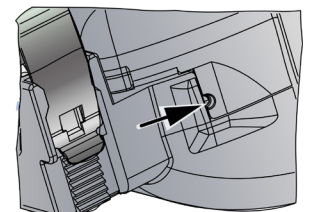
For S/FTP cables, twist and bunch up braiding around cable from as it exits the Ceiling Connector to approximately 13mm (1/2 inch) length.



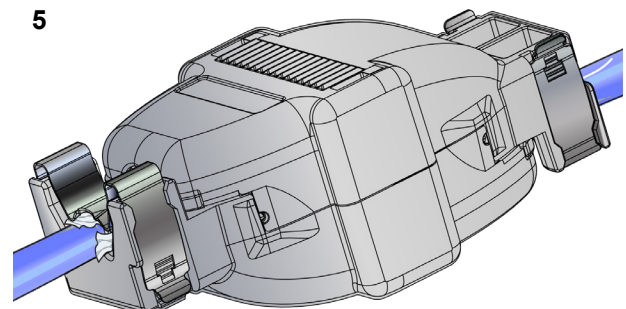
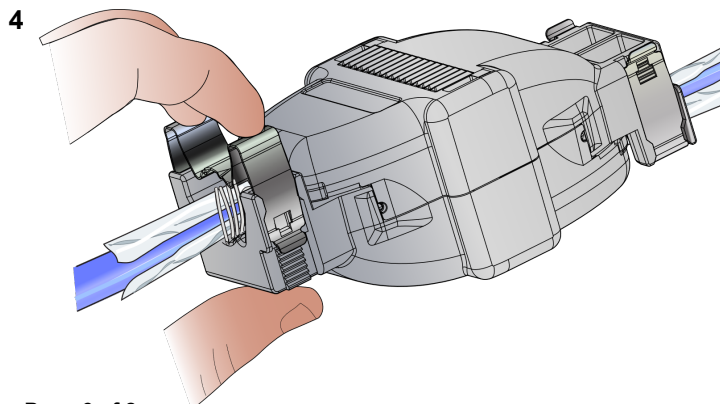
2. Place terminated Ceiling Connector in one of the die cast shield halves.
3. Assemble the second shield half around the Ceiling Connector and snap the two shield halves together. This may be done by hand or tongue-and-groove pliers. **Be sure the shields are fully seated.** There will be an audible click at assembly. Shields will be flush to each other and dimple features will latch into half round openings in all four corners of the shields.



4. Assemble ratcheting contact springs into ratchet slots on either end of shield. Seat contacts tight against cable by hand, clamping foil/drain wire or braiding.
5. For F/UTP and F/FTP cables remove excess foil and drain wire behind contact spring with wire cutters.



Dimple seated in latch



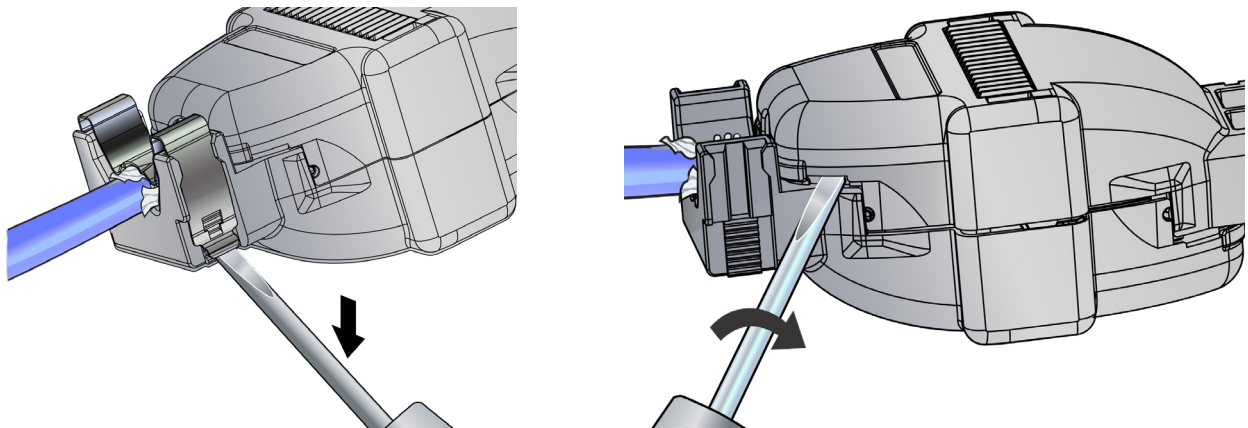
Mount the Connector (Optional)

The shielded ceiling connector can be mounted to nearby objects with a cable tie (not included) inserted through the tunnels on either side of the connector. Multiple connectors can also be tied together side-by-side.

Note: Avoid mounting the connector with constant or steady tension on the attached cables.

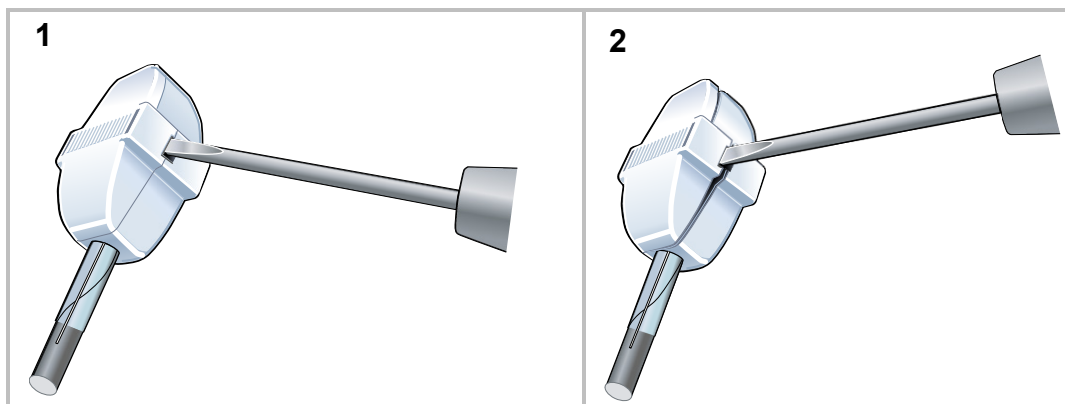
Shield Removal

1. Release each side of contact spring from ratchet and push contact out of ratchet slots. Remove spring contacts from both ends of shield.
2. Place head of flat screw driver in one of the four corner slots between the two shield halves. Turn screwdriver to release shield latching at that corner. Repeat in the other three corner slots to fully separate shield halves.



Cap Removal

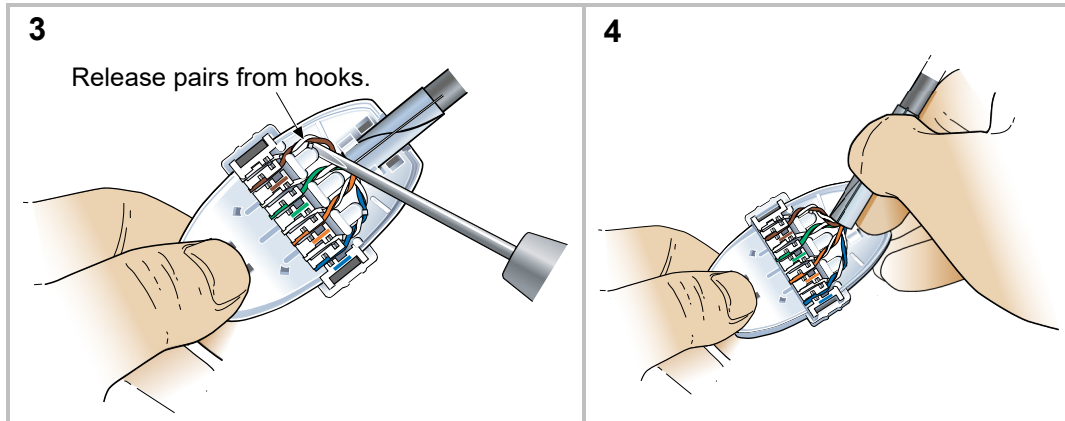
1. To remove a cap, insert screwdriver at a 45° angle, as shown in image 1, and rotate the handle upwards. Repeat to unlatch the opposite side and remove the cap as shown in image 2.



Remove a Terminated Cable

2. Remove the cap as in Step 1 above.

3. Use a small screwdriver or other suitable tool to pull the outside pairs out from underneath the small hooks on the pair separators, as shown in image 3.
4. Rock the cable up and down to pull the wires out of the IDC terminals, image 4.



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For patents, see www.cs-pat.com
For technical assistance, customer service or to report any missing/damaged parts, visit us at:
<http://www.commscope.com/SupportCenter>

Use of CommScope cabling for PoE applications

Early versions of the IEEE 802.3 standard covered the powering of remote devices over Type 1 (IEEE 802.3af) and Type 2 (IEEE 802.3at) systems. The IEEE 802.3bt standard covering the use of Type 3 and Type 4 power sourcing equipment (PSE) was published in January of 2019. A Type 4 PSE provides the maximum power to remote devices by supporting 0.86 Amps per pair (0.43 Amps per conductor) across all four pairs of the cabling. The standard recommends that Class D cabling (or better) be used to support Type 4 remote powering. In addition to the IEEE standard, the EN 50174-2: 2018 standard provides guidance on the bundling of cables supporting remote powering and recommends limiting bundle sizes to 24 cables taking care to include air gaps between bundles. These recommendations are consistent with those from CommScope and are in line with those contained in TIA TSB-184A aimed at limiting the temperature rise in bundled cabling¹.

In addition to the structured cabling standards, there are additional requirements imposed on the connector contacts that ensure they do not corrode or suffer degradation due to arcing when unplugged while under load. The applicable test standard for Types 1 and 2 is IEC 60512-99-001 while Types 3 and 4 are covered by the IEC 60512-99-002 standard.

CommScope has performed the full complement of IEC 60512-99-001/002 testing on its products and can assure customers that CommScope connectivity including the SL110 5e, UNJ500 and KJ510 family of modular jacks, DM 5E panels, and CA1, CO1 cords, fully comply with the requirements set forth in the IEC 60512-99-001 and IEC 60512-99-002 standards.

Further, CommScope has carried out extensive testing confirming that existing and legacy CommScope Class D (Cat 5e) or higher cable fully complies with the recommendations contained in the IEEE 802.3af, IEEE 802.3at, and IEEE 802.3bt standards.

CommScope recommends that customers follow the CommScope installation guidelines when installing their cabling products. These guidelines were developed to ensure that the temperature rise of cable bundles used for PoE applications is limited to 15°C. This is most easily accomplished by limiting the number of cables in a bundle to 24 for horizontal cable and to 12 for 28 AWG cords.

References

IEEE P802.3bt-2018 Standard for Ethernet Amendment 2: Power over Ethernet over 4 Pairs

EN 50174-2: 2018 Information technology - Cabling installation - Part 2: Installation planning and practices inside buildings

IEC 60512-99-001:2012 Connectors for electronic equipment - Tests and measurements - Part 99-001: Test schedule for engaging and separating connectors under electrical load - Test 99a: Connectors used in twisted pair communication cabling with remote power

IEC 60512-99-002:2019 Connectors for electrical and electronic equipment - Tests and measurements - Part 99-002:

Endurance test schedules - Test 99b: Test schedule for unmating under electrical load

TIA TSB-184-A Guidelines for Supporting Power Delivery Over Balanced Twisted-Pair Cabling

Visit our website or contact your local CommScope representative for more information.

For technical assistance or customer service, visit us at:

<http://www.commscope.com/SupportCenter>

The products referenced by this bulletin may be covered by U.S. patents or their foreign equivalents. For patents, see

www.commscope.com/ProductPatent/ProductPatent.aspx

¹ CommScope does not endorse the use of 30 AWG cables for use in PoE applications.

São Caetano do Sul, 01/11/2024.

À

Head Net Tecnologia da Informação Ltda.

A/C senhor Haroldo Sarot – Gerente Comercial

REF: Proposta PhD 013613 – NoBreak 30 kVA

Prezado senhor,

Conforme informado anteriormente, declaramos que nosso modelo atual de nobreak de 30 kVA trifásico da linha TR EY, que foi proposto a vocês, irá atender perfeitamente ao projeto. De qualquer forma, colocamo-nos à disposição para mais esclarecimentos.

Segue as características:

O Nobreak (UPS) do tipo 01 deverá ser uma máquina trifásica de 30kVA, apresentando baterias de chumbo reguladas por válvula (VRLA), fornecidas em gabinete no mesmo padrão do UPS e proporcionando uma autonomia mínima de 30 minutos, com as seguintes características mínimas:

Geral

gabinete em chapa de aço com tratamento anti-corrosivo e pintura eletrostática com tinta epóxi.

Possuir os seguintes componentes: Retificador e booster PFC com IGBT; Carregador de baterias IGBT; Inversor IGBT; Controle de processador de sinal digital (DSP) dedicado; Controlador incorporado para interfaces de

Entrada / Saída; Chave estática eletrônica e alimentação de by-pass; Chave manual de by-pass para manutenção; Armário para as baterias; Chave manual liga/desliga externa ao gabinete;

Sinalização visual exibida na parte frontal do painel através de leds e display LCD.

Sinalização sonora de alarmes críticos.

Execução de teste automático do banco de baterias

Capacidade de desligamento temporário automático durante uma interrupção prolongada de energia com término de autonomia das baterias.

Possuir interface serial RS232 para comunicação em tempo real com estação gerenciadora, das sinalizações críticas.

O equipamento suporta o gerenciamento remoto via SNMP e WEB, através de interface de comunicação TCP/IP.

Tipo on-line constituído de retificador, banco de baterias e inversor, com dupla conversão e isolamento de energia.

As cargas de saída deverão ser alimentadas permanentemente pelo inversor, na presença de energia da rede ou não.

- Saída estabilizada da rede.
- Possui transformador isolador.
- Possuir chave estática.
- Possuir chave by-pass automática, no caso de sobrecarga ou falha do no-break.
- Possuir chave by-pass manual para manutenção.
- Tempo de transferência do no-break para a chave by-pass e vice-versa sem interrupção.
- Supressão de interferência eletromagnética.
- Possuir recursos de gestão de baterias para aumento da vida útil do banco de baterias.
- Possuir ventilação forçada com ventilador.
- Possuir rodízios para movimentação do no-break.

Características Elétricas

- Potência Mínima de Saída: 30 kVA.
- Forma de Onda do Sinal de Saída: senoidal e estabilizada.
- Tensão Nominal de Entrada: 380/220Vac trifásico (FF/FN).
- Tensão Nominal de Saída: 440/254 VAC (FF/FN).
- Frequência Nominal de Entrada: 60 Hz 40-70 Hz
- Frequência Nominal de Saída: 60 Hz \sim 0,1 Hz
- Fator de Potência de entrada com carga nominal: $\geq 0,99$.
- Fator de Potência de saída: 0,9.
- Eficiência a plena carga: 93% (AC/AC do sistema UPS)
- Fator de crista da carga de saída: 3:1.
- Regulação estática da tensão de saída: $\pm 1\%$.
- Distorção da corrente de entrada (THDI) em condições de entrada nominal: $\leq 5\%$.
- Distorção da tensão de saída (THDV) com 100% de carga linear: $\leq 2\%$.
- Distorção da tensão de saída (THDV) com carga não linear: $\leq 5\%$.

Baterias

- Tecnologia ABS instaladas em gabinete metálico fechado, e do mesmo padrão do UPS (sem rodízios para movimentação)
- Banco de baterias seccionado por disjuntor no gabinete externo.
- As baterias devem, no caso de uma falha total da alimentação da rede, garantir o fornecimento de energia de saída do UPS, para a carga nominal, por um tempo mínimo de autonomia de 30 minutos.

Proteções

- Disjuntor de entrada.
- Fusível para bateria.
- Fusível para o inversor.
- Supressor de transitórios de tensão.
- Sensor de tensão de baterias.
- Sensor de falta/anormalidade de rede (energia).
- Contra descarga total das baterias. As baterias não podem ser descarregadas abaixo de 1,6Vcc por elemento.

Normas, Certificados e Padronizações

- O fabricante do no-break deve possuir sistema de gestão de qualidade conforme norma ISO 9.001, e políticas e práticas de gestão ambiental conforme norma ISO 14.001.
- O UPS (Nobreak) deverá atender as seguintes normas: IEC /EN 62040-1-1; EN 62040-2; IEC /EN 62040-3; IEC/EN 62040-3:VFI-SS-111.
- Deverá possuir marca CE de conformidade.

Sinalizações

O sistema de alimentação ininterrupta deve ser controlado por um microprocessador e exibir através de um display gráfico LCD e painel de controle com LEDs, medições (tensão, corrente e frequência), alarmes e modos de funcionamento.

Esse display também deve ilustrar simultaneamente, de maneira gráfica, o status de cada bloco funcional interno, o fluxo de energia e a porcentagem da carga de saída, tudo em tempo real.

Especificações Ambientais

Ruído Audível: < 65 dBA a 1 metro.

Temperatura Ambiental de Operação: 0°C a 40°C.

Atenciosamente,

Marcos Henrique Donato

Diretor Comercial

marcos@phdonline.com.br

Tel: 11 3215-6500

MARCOS HENRIQUE DONATO:31864269871
871

Assinado de forma digital
por MARCOS HENRIQUE
DONATO:31864269871
Dados: 2024.10.31
15:04:14 -03'00'



Nobreak Trifásico

TR EY 10 a 30 kVA - Torre

⚡ DIFERENCIAIS:

- ⚡ Entrada separada para rede e by-pass.
- ⚡ ECO MODE selecionável para economia de energia.
- ⚡ DSP (Digital Signal Processor).
- ⚡ Display LCD colorido e touch screen.
- ⚡ Compatibilidade com grupo gerador.
- ⚡ Sistema de gerenciamento avançado das baterias (ABM).
- ⚡ Compensação da tensão da recarga das baterias em função da temperatura (opcional).
- ⚡ Controle automático da velocidade do ventilador em função da carga aplicada.
- ⚡ Recarga de baterias também em modo by-pass.
- ⚡ Possibilidade de paralelismo de até 6 equipamentos (N + 5), alcançando 180 kVA.
- ⚡ Interface inteligente RS 232/RS 485 (Modbus RTU)/USB com software incluso para ambientes Windows.

⚡ CARACTERÍSTICAS:

- ⚡ Sistema On Line de Dupla Conversão.
- ⚡ Função EPO (Emergency Power Off).
- ⚡ Operação em alta frequência com baixo nível de ruídos e dimensões reduzidas.
- ⚡ Fator de potência de entrada próximo a 1 (PFC Technology) e fator de potência de saída igual a 0.9, propiciando maior economia de energia.
- ⚡ Ampla faixa de tolerância da tensão de entrada sem a utilização das baterias.
- ⚡ Baixos índices de distorção harmônica de entrada e saída.
- ⚡ Chave estática.
- ⚡ Partida pelas baterias (Cold Start).
- ⚡ Gerenciamento remoto através de SNMP (opcional).
- ⚡ Possibilidade de monitoramento através de placa de contato seco.
- ⚡ Auto teste no start do equipamento.
- ⚡ Chave de by-pass manual.
- ⚡ Ajuste/configuração disponíveis através do display.



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PERFIL TÉCNICO:

MODELOS		PHD TR EY 10 kVA	PHD TR EY 15 kVA	PHD TR EY 10 kVA	PHD TR EY 15 kVA	PHD TR EY 20 kVA	PHD TR EY 30 kVA
POTÊNCIA		10 kVA / 10 kW	15 kVA / 15 kW	10 kVA / 9 kW	15 kVA / 13,5 kW	20 kVA / 18 kW	30 kVA / 27 kW
SISTEMA	On-Line	Dupla conversão					
	Tecnologia	DSP (processador digital de sinal)					
	Formato	Torre					
ENTRADA	Tensão	220 / 127 Vac (3F + N + T)			380 / 220 Vac (3F + N + T)		
	Variação admissível	-29 % a +20 %			-27 % a +22 %		
	Frequência	40 - 70 Hz					
	Fator de potência	≥ 0,99 - PFC (corretor de fator de potência)					
	THDi	≤ 5%					
	Grupo gerador	Compatível					
SAÍDA	Tensão	220 / 127 Vac (ajustável 190 / 200 / 208)			380 / 220 Vac (ajustável 400 / 415)		
	Tensões opcionais	Customizável conforme necessidade					
	Regulação estática	± 1%					
	Frequência	Em sincronismo com a rede de entrada (50/60 Hz)					
	Forma de onda	Senoidal pura					
	THDv	≤ 2 % para cargas lineares e ≤ 5% para cargas não lineares					
	Fator de potência	1			0,9		
	Fator de crista	3:1					
	Sobrecarga	MODO REDE: ≤125% por 10min, ≤150% por 1min, >150% transfere para by-pass					
RENDIMENTO	Global	90 %			93 %		
	ECO MODE	97 %			98 %		
BATERIAS	Quantidade	16 / 18 / 20 unidades					
	Tensão CC	192 V / 216 V / 240 V					
	Acondicionamento das baterias	Externo					
	Auto Teste	Configurável (manual - via software)					
	Gerenciamento inteligente	ABM (gerenciamento avançado de baterias)					
BYPASS	Chave estática	Automática					
	ECO MODE	Configurável					
PROTEÇÃO	Barramento CC	Sobretensão, subtensão e sobrecarga					
	Tensão de entrada / saída	Sobretensão e subtensão					
	Corrente de entrada	Limitação eletrônica da corrente de entrada do retificador e disjuntor					
	Corrente de saída	Sobrecarga e curto circuito					
	Tensão do inversor	Subtensão e sobretensão para o inversor					
	By-pass	Sobretensão, subtensão e frequência anormal					
	Desligamento de Emergência (EPO)	Sim					
	Sobretensão	Retificador e inversor					
ALARMES	Sonoros e visuais	Modo bateria, bateria baixa, falha, sobrecarga, by-pass, sobretensão, etc.					
DISPLAY	LEDs	Modo inversor (rede), modo bateria, by-pass, sobrecarga e falha (alarme)					
	LCD colorido e touch screen	Informações de operação, funcionamento, programação e ajustes Visualização de tensões, carga (% , kW e kVA), frequências, temperatura interna, estado e alarmes					
COMUNICAÇÃO	Interface padrão	RS 232 (DB 9), RS 485/Modbus e USB					
	Interface opcional	TCP/IP (SNMP RJ 45), contato seco					
RUÍDO	1 metro	< 65 dB (A)		< 60 dB (A)		< 65 dB (A)	
OPCIONAIS	Auto transformador	Externo					
	Transformador isolador	Externo					
	Paralelismo redundante	Até 6 unidades					
CONDIÇÕES AMBIENTAIS	Temperatura	0° a 40°C (Recomendada 20° a 25°C em operação)					
	Umidade	20 a 90% sem condensação					
	Altitude	< 1500m					
	Ventilação	Forçada com controle gradual de exaustão (auto-fan)					
	Atmosfera de operação	Livre de partículas, maresia, gases tóxicos, líquidos e inflamáveis					
CONEXÕES	Grau de proteção	IP 20 (superior sob consulta)					
	Conexão de entrada	Borne					
	Conexões de saída						
Conexões de baterias							
Dimensões (AxLxP) mm	Sem / com embalagem	732 x 350 x 665 / 920 x 472 x 780					
Peso (Kg) - sem baterias	Sem / com embalagem	61 / 71	65 / 75	55 / 65	60 / 70	61 / 71	65 / 75

Obs.: Os produtos e suas especificações poderão sofrer alterações, customizações e adaptações por solicitação dos clientes ou por conveniência do fabricante sem comunicação prévia

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São Caetano do Sul, 01/11/2024.

À

Head Net Tecnologia da Informação Ltda.

A/C senhor Haroldo Sarot – Gerente Comercial

REF: Proposta PhD 013613 – NoBreak 10 kVA

Prezado senhor,

Conforme informado anteriormente, declaramos que nosso modelo atual de nobreak de 10 kVA em formato rack/torre em 220 V é da linha EA RT G4, que foi proposto a vocês. Estamos certos de que irá atender perfeitamente ao projeto. De qualquer forma, colocamo-nos à disposição para mais esclarecimentos.

Segue as características:

O Nobreak (UPS) do TIPO 2 deverá ser uma máquina monofásica de 10kVA, a apresentando baterias de chumbo reguladas por válvula (VRLA), fornecidas em gabinete no mesmo padrão do UPS, para montagem em rack 19” e proporcionando uma autonomia mínima de 30 minutos, com as seguintes características mínimas:

Geral

Gabinete em chapa de aço com tratamento anticorrosivo e pintura eletrostática com tinta epóxi, para montagem em rack padrão 19”.

Funciona em modo dupla conversão, com uso de inversor IGBT, um microprocessador e técnica de modulação PWM.

Sinalização visual exibida na parte frontal do painel através de leds.

Sinalização sonora de alarmes críticos.

Capacidade de desligamento temporário automático durante uma interrupção prolongada de energia com término de autonomia das baterias.

Possuir interface serial RS232 para comunicação em tempo real com estação gerenciadora, das sinalizações críticas.

O equipamento suporta o gerenciamento remoto via SNMP e WEB, através de interface de comunicação TCP/IP.

Tipo on-line constituído de retificador, banco de baterias e inversor, com dupla conversão.

As cargas de saída deverão ser alimentadas permanentemente pelo inversor, na presença de energia da rede ou não.

Saída estabilizada da rede.

Possuir chave estática para by-pass automático, no caso de sobrecarga ou falha do no-break.

Tempo de transferência do nobreak para a chave by-pass e vice-versa inferior a 0,5 ms.

Supressão de interferência eletromagnética.

Possuir ventilação forçada.

Possuir Manual de Instalação e Operação em Português ou Inglês.

Características Elétricas

Potência Mínima de Saída: 10 kVA.

Forma de Onda do Sinal de Saída: senoidal e estabilizada.

Tensão Nominal de Entrada: 220 VAC monofásico (FN).

Tensão Nominal de Saída: 220 VAC (FN).

Frequência Nominal de Entrada: 40 a 70 Hz autosensing

Frequência Nominal de Saída: 60 Hz ~ 0,1%

Fator de Potência de entrada com carga nominal: $\geq 0,99$.

Fator de Potência de saída: 1.

Eficiência a plena carga: $\geq 94\%$.

Fator de crista da carga de saída: 3:1.

Regulação estática da tensão de saída: $\pm 1\%$.

Distorção da corrente de entrada (THDI) em condições de entrada nominal: $\leq 5\%$.

Distorção da tensão de saída (THDV) com 100% de carga linear: $\leq 1\%$.

Baterias

Deverão ser fornecidas em invólucros para instalação em rack 19", feito de material auto-extinguível, e no mesmo padrão do UPS.

As baterias devem, no caso de uma falha total da alimentação da rede, garantir o fornecimento de energia de saída do UPS, para carga nominal, por um tempo mínimo de autonomia de 30 minutos, utilizando-se para tal a quantidade adequada de módulos de baterias.

Proteções

Disjuntor de entrada.

Fusível para bateria.

Fusível para o inversor.

Supressor de transitórios de tensão.

Sensor de tensão de baterias.

Sensor de falta/anormalidade de rede (energia).

Contra descarga total das baterias. As baterias não podem ser descarregadas abaixo de 1,6 Vcc por elemento.

Normas, Certificados e Padronizações

O fabricante do nobreak possui sistema de gestão de qualidade conforme norma ISO 9.001, e políticas e práticas de gestão ambiental conforme norma ISO 14.001.

O UPS (Nobreak) deverá atender a normas: IEC/EN 62040-1-1; EN 62040-2; IEC/EN 62040-3;

Deverá possuir marca CE de conformidade.

Sinalizações

Deverá ser através de LEDs que indiquem visualmente o status de funcionamento do UPS em tempo real.

Uma faixa luminosa deverá mostrar a carga conectada a o UPS e a carga da bateria.

Os LEDs devem indicar pelo menos as seguintes situações:

Falha do UPS;

Tensão principal dentro dos parâmetros normais de operação;

Capacidade da bateria;

Funcionamento do inversor;

By-pass ativo;

Nível de carga;

Sobrecarga.

Especificações Ambientais

Ruído Audível: ≤ 58 dBA a 1 metro.

Temperatura Ambiental de Operação: 0°C a 40°C.

Capacidade de supervisão, relatório de falhas e relatório de eventos anteriores, com data e hora.

Capacidade de informar aos usuários sobre o tempo de backup disponível.

Capacidade de proteção de dados (encerramento de processos, fechamento de arquivos) antes do desligamento automático.

Capacidade de monitoramento remoto das condições de funcionamento do nobreak e envio de mensagens SMS.

Atenciosamente,

Marcos Henrique Donato

Diretor Comercial

marcos@phdonline.com.br

Tel: 11 3215-6500

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HENRIQUE
DONATO:318642
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Assinado de forma digital
por MARCOS HENRIQUE
DONATO:31864269871
Dados: 2024.10.31
15:02:54 -03'00'



Nobreaks Monofásicos

EA RT 1 a 10 kVA Rack / Torre Reversível

⚡ DIFERENCIAIS:

- ⚡ ECO MODE selecionável para economia de energia.
- ⚡ Design nos formatos Torre e Rack.
- ⚡ DSP (Digital Signal Processor).
- ⚡ Display LCD ajustável aos padrões Rack ou Torre.
- ⚡ Compatibilidade com grupo gerador.
- ⚡ Sistema de gerenciamento avançado das baterias (ABM).
- ⚡ Possibilidade de paralelismo de até 4 nobreaks, alcançando 40 kVA. Para equipamentos a partir de 5 kVA e FP 0,9.

⚡ CARACTERÍSTICAS:

- ⚡ Sistema On Line de Dupla Conversão.
- ⚡ Função EPO (Emergency Power Off para linha G4).
- ⚡ Operação em alta frequência com baixo nível de ruídos e dimensões reduzidas.
- ⚡ Fator de potência de entrada próximo a 1 (PFC Technology) e fator de potência de saída igual a 0.9 ou 1, propiciando maior economia de energia.
- ⚡ Ampla faixa de tolerância da tensão de entrada sem a utilização das baterias.
- ⚡ Baixos índices de distorção harmônica de entrada e saída.
- ⚡ Chave estática.
- ⚡ Partida pelas baterias (Cold Start).
- ⚡ Interface inteligente RS 232/USB com software incluso para ambientes Windows/Linux/Mac.
- ⚡ Gerenciamento remoto através de placa de contato secos, a partir de 5 kVA, e SNMP (opcionais).
- ⚡ Possibilidade de monitoramento através de placa de contato seco.
- ⚡ Autoteste no start do equipamento.
- ⚡ Ajuste/configuração disponíveis através do display.



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PERFIL TÉCNICO:

MODELOS	PHD EA RT 1 kVA	PHD EA RT 2 kVA	PHD EA RT 3 kVA	PHD EA RT 5 kVA	PHD EA RT 6 kVA	PHD EA RT 10 kVA	PHD EA RT G4 6 kVA	PHD EA RT G4 10 kVA	
POTÊNCIA	1 kVA / 0,9 kW	2 kVA / 1,8 kW	3 kVA / 2,7 kW	5 kVA / 4,5 kW	6 kVA / 5,4 kW	10 kVA / 9 kW	6 kVA / 6 kW	10 kVA / 10 kW	
SISTEMA	On-Line	Dupla conversão							
	Tecnologia	DSP (processador digital de sinal)							
	Formato	Rack ou Torre							
ENTRADA	Tensão	110 Vac (F+N+T) ou 220 Vac (F+N+T ou F+F+T)			220 Vac (F+N+T ou F+F+T)				
	Varição admissível	+/- 27%			+/- 25%		- 20% e + 30%		
	Frequência	40 Hz - 70 Hz (auto sensing)							
	Fator de potência	≥ 0,99 - PFC (corretor de fator de potência)							
	THDI	≤ 6%			≤ 5%				
	Gerador	Compatível							
SAÍDA	Tensão	110 Vac (ajustável 100 / 110 / 115 / 120 / 127) ou 220 Vac (ajustável 208 / 230 / 240)			220 Vac (ajustável 208 / 230 / 240)				
	Regulação estática	+/- 1%							
	Frequência	Em sincronismo com a rede de entrada							
	Frequência (modo rede)	45 - 55 Hz ou 55 - 65 Hz (a frequência de saída sempre fica em sincronismo com a frequência da rede, para evitar curto circuito em caso de transferência para o by-pass)							
	Frequência (modo bateria)	50/60 Hz +/- 0,1 Hz		50/60 Hz +/- 0,2 Hz		50/60 Hz +/- 0,1 Hz			
	Forma de onda	Senoidal pura							
	THDv	≤ 2% para cargas lineares e ≤ 5% para cargas não lineares					≤ 1% para cargas lineares e ≤ 4% para cargas não lineares		
	Fator de potência	0,9					1		
	Fator de crista	3:1							
	Sobrecarga	MODO REDE: 105% ~ 125% por 1 minuto; 125% ~ 150% por 30 segundos; acima de 150% transfere para o by-pass em 300 ms			MODO REDE: 105% ~ 125% por 3 minutos; 125% ~ 150% por 30 segundos; acima de 150% transfere para o by-pass em 100 ms		MODO REDE: 102% ~ 110% por 10 minutos; 110% ~ 125% por 1 minuto; 125% ~ 150% por 30 segundos		
RENDIMENTO	Modo rede	≥ 90%	≥ 91%	≥ 92%	≥ 92%		≥ 94%		
	Modo ECO	≥ 95%	≥ 96%	≥ 97%	≥ 98%				
	Quantidade	2 unidades	4 unidades	6 unidades	16 unidades		16 ou 20 unidades		
BATERIAS	Tensão CC	24Vcc	48Vcc	72Vcc	192Vcc		192Vcc ou 240 Vcc		
	Carregador 5 amperes	N/A	N/A	Sim	N/A				
	Acondicionamento das baterias	Interno e/ou externo			Externo				
	Auto teste	Configurável (manual - via software)							
	Gerenciamento inteligente	ABM (gerenciamento avançado de baterias)							
	BYPASS	Chave estática	Automática						
ECO MODE		Configurável							
PROTEÇÃO	Barramento CC	Sobretensão, subtensão e sobrecarga							
	Tensão de entrada / saída	Sobretensão e subtensão							
	Corrente de entrada	Limitação eletrônica da corrente de entrada do retificador e fusível regenerativo							
	Corrente de saída	Sobrecarga e curto circuito							
	Tensão do inversor	Subtensão e sobretensão para o inversor							
	By-pass	Sobretensão e subtensão, frequência anormal							
ALARMES	Sonoros e visuais	Modo bateria, bateria baixa, falha, sobrecarga, by-pass e sobretemperatura							
	LEDs	Modo inversor (rede), modo bateria, by-pass, sobrecarga e falha (alarme)							
DISPLAY	LEDs	Informações de operação, funcionamento, programação e ajustes							
	LCD com backlight	Visualização de tensões, carga, frequências, temperatura interna, estado e alarmes							
COMUNICAÇÃO	Interface padrão	RS232 (DB 9)			RS232 (DB 9)		RS232 (DB 9) e USB		
	Interface opcional	TCP/IP (SNMP RJ 45) e USB			TCP/IP (SNMP RJ 45), USB e contato seco		TCP/IP (SNMP RJ 45), RS 485 e contato seco		
RUÍDO	1 metro	< 50 dB (A)			< 55 dB (A)		< 58 dB (A)		
OPCIONAIS	Transformadores	Somente externo							
	Isolação galvânica	Somente externo							
	Paralelismo redundante	N/A		Até 4 unidades			Até 3 unidades		
CONDIÇÕES AMBIENTAIS	Temperatura	0° a 40°C (Recomendada 20° a 25°C em operação)							
	Umidade	0% a 90% sem condensação							
	Altitude	< 1500 m					≤ 1000 m		
	Ventilação	Forçada com controle gradual de exaustão (auto-fan)							
Grau de proteção	Atmosfera de operação	Livre de particuladas, maresia, gases tóxicos, líquidos e inflamáveis							
		IP 20							
CONEXÕES	Conexão de entrada - 110 Vac	Cabo de 1,1 m e plug 10 A (compatível padrão NBR 14136)	Cabo de 1,1 m e plug 20 A (compatível padrão NBR 14136)	Cabo de 1,1 m e plug 30 A		N/A			
	Conexões de saída - 110 Vac	4 tomadas 10A padrão NBR 14136	4 tomadas 20A padrão NBR 14136			N/A			
	Conexão de entrada - 220 Vac	Cabo de 1,1 m e plug 10 A (compatível padrão NBR 14136)	Cabo de 1,1 m e plug 20 A (compatível padrão NBR 14136)				Borne		
	Conexões de saída - 220 Vac	4 tomadas 10A padrão NBR 14136		4 tomadas 20A padrão NBR 14136		Borne			
Dimensões (AxLxP) mm	Sem / com embalagem	88 x 440 x 468 / 201 x 545 x 592		88 x 440 x 668 / 201 x 545 x 782		132 x 440 x 580 / 227 x 530 x 703		88 x 440 x 580 / 168 x 514 x 696	
Peso (Kg) - sem baterias	Sem / com embalagem	12 / 15	14 / 17	15 / 19	16 / 20	16,5 / 21	17 / 22	12 / 14 / 14 / 16	

Obs.: Os produtos e suas especificações poderão sofrer alterações, customizações e adaptações por solicitação dos clientes ou por conveniência do fabricante sem comunicação prévia.

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São Caetano do Sul, 01/11/2024.

À

Head Net Tecnologia da Informação Ltda.

A/C senhor Haroldo Sarot – Gerente Comercial

REF: Proposta PhD 013613 – NoBreak 6 kVA

Prezado senhor,

Conforme informado anteriormente, declaramos que nosso modelo atual de nobreak de 6 kVA em formato rack/torre em 220 V é da linha EA RT G4, que foi proposto a vocês. Estamos certos de que irá atender perfeitamente ao projeto. De qualquer forma, colocamo-nos à disposição para mais esclarecimentos.

Segue as características:

O Nobreak (UPS) do tipo 03 deverá ser uma máquina monofásica de 06kVA, apresentando baterias de chumbo reguladas por válvula (VRLA), instaladas externamente no compartimento específico (inferior) do shelters, em quantidade suficiente para proporcionando uma autonomia mínima de 30 minutos, com as seguintes características mínimas:

Geral

Gabinete em chapa de aço com tratamento anticorrosivo e pintura eletrostática com tinta epóxi, para montagem em rack padrão 19".

Funciona em modo dupla conversão, com uso de inversor IGBT, um microprocessador e técnica de modulação PWM.

Sinalização visual exibida na parte frontal do painel através de leds.

Sinalização sonora de alarmes críticos.

Capacidade de desligamento temporário automático durante uma interrupção prolongada de energia com término de autonomia das baterias.

Possuir interface serial RS232 para comunicação em tempo real com estação gerenciadora, das sinalizações críticas.

O equipamento deve suportar o gerenciamento remoto via SNMP e WEB, através de interface de comunicação TCP/IP.

Deverá ser do tipo on-line constituído de retificador, banco de baterias e inversor, com dupla conversão.

As cargas de saída deverão ser alimentadas permanente mente pelo inversor, na presença de energia da rede ou não.

Saída estabilizada da rede.

Possuir chave estática para by-pass automático, no caso de sobrecarga ou falha do nobreak.

Tempo de transferência do nobreak para a chave by-pass e vice-versa inferior a 0,5ms.

Supressão de interferência eletromagnética.

Possuir ventilação forçada.

Possuir Manual de Instalação e Operação em Português ou Inglês.

Características Elétricas

Potência Mínima de Saída: 6 kVA

Forma de Onda do Sinal de Saída: senoidal e estabilizada.

Tensão Nominal de Entrada: 220Vac monofásico (FN)

Tensão Nominal de Saída: 220Vac (FN)

Frequência Nominal de Entrada: 40-70 Hz autosensing

Frequência Nominal de Saída: 60 Hz ~ 0,1%

Fator de Potência de entrada com carga nominal: $\geq 0,99$

Fator de Potência de saída: 1

Eficiência a plena carga: $\geq 0,94\%$

Fator de crista da carga de saída: 3:1

Regulação estática da tensão de saída: +/-1%

Distorção da corrente de entrada (THDI) em condições de entrada nominal: $\leq 5\%$

Distorção da tensão de saída (THDV) com 100% de carga linear: $\leq 1\%$ para carga lineares

Baterias

Deverão ser fornecidas em invólucros para instalação em rack 19", feito de material auto-extingüível, e no mesmo padrão do UPS.

As baterias devem, no caso de uma falha total da alimentação da rede, garantir o fornecimento de energia de saída do UPS, para carga nominal, por um tempo mínimo de autonomia de 30 minutos, utilizando-se para tal a quantidade adequada de módulos de baterias.

Proteções

Disjuntor de entrada.

Fusível para bateria.

Fusível para o inversor.

Supressor de transitórios de tensão.

Sensor de tensão de baterias.

Sensor de falta/anormalidade de rede (energia).

Contra descarga total das baterias. As baterias não podem ser descarregadas abaixo de 1,6 Vcc por elemento.

Normas, Certificados e Padronizações

O fabricante do nobreak deve possuir sistema de gestão de qualidade conforme norma ISO 9.001, e políticas e práticas de gestão ambiental conforme norma ISO 14.001.

O UPS (Nobreak) deverá atender a normas: IEC/EN 62040-1-1; EN 62040-2; IEC/EN 62040-3 Deverá possuir marca CE de conformidade

Sinalizações

Sinalização ser através de LEDs que indiquem visualmente o status de funcionamento do UPS em tempo real.

Uma faixa luminosa deverá mostrar a carga conectada o UPS e a carga da bateria.

Os LEDs devem indicar pelo menos as seguintes situações: Falha do UPS; Tensão principal dentro dos parâmetros normais de operação; capacidade da bateria; Funcionamento do inversor; By-pass ativo; Nível de carga; Sobrecarga

Especificações Ambientais

Ruído Audível: ≤55 dBA a 1 metro.

Temperatura Ambiental de Operação: 0°C a 40°C.

Atenciosamente,

Marcos Henrique Donato

Diretor Comercial

marcos@phdonline.com.br

Tel: 11 3215-6500

MARCOS
HENRIQUE
DONATO:318642
69871

Assinado de forma digital
por MARCOS HENRIQUE
DONATO:31864269871
Dados: 2024.10.31
14:58:16 -03'00'



Nobreaks Monofásicos

EA RT 1 a 10 kVA Rack / Torre Reversível

⚡ DIFERENCIAIS:

- ⚡ ECO MODE selecionável para economia de energia.
- ⚡ Design nos formatos Torre e Rack.
- ⚡ DSP (Digital Signal Processor).
- ⚡ Display LCD ajustável aos padrões Rack ou Torre.
- ⚡ Compatibilidade com grupo gerador.
- ⚡ Sistema de gerenciamento avançado das baterias (ABM).
- ⚡ Possibilidade de paralelismo de até 4 nobreaks, alcançando 40 kVA. Para equipamentos a partir de 5 kVA e FP 0,9.

⚡ CARACTERÍSTICAS:

- ⚡ Sistema On Line de Dupla Conversão.
- ⚡ Função EPO (Emergency Power Off para linha G4).
- ⚡ Operação em alta frequência com baixo nível de ruídos e dimensões reduzidas.
- ⚡ Fator de potência de entrada próximo a 1 (PFC Technology) e fator de potência de saída igual a 0.9 ou 1, propiciando maior economia de energia.
- ⚡ Ampla faixa de tolerância da tensão de entrada sem a utilização das baterias.
- ⚡ Baixos índices de distorção harmônica de entrada e saída.
- ⚡ Chave estática.
- ⚡ Partida pelas baterias (Cold Start).
- ⚡ Interface inteligente RS 232/USB com software incluso para ambientes Windows/Linux/Mac.
- ⚡ Gerenciamento remoto através de placa de contato secos, a partir de 5 kVA, e SNMP (opcionais).
- ⚡ Possibilidade de monitoramento através de placa de contato seco.
- ⚡ Autoteste no start do equipamento.
- ⚡ Ajuste/configuração disponíveis através do display.



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PERFIL TÉCNICO:

MODELOS	PHD EA RT 1 kVA	PHD EA RT 2 kVA	PHD EA RT 3 kVA	PHD EA RT 5 kVA	PHD EA RT 6 kVA	PHD EA RT 10 kVA	PHD EA RT G4 6 kVA	PHD EA RT G4 10 kVA	
POTÊNCIA	1 kVA / 0,9 kW	2 kVA / 1,8 kW	3 kVA / 2,7 kW	5 kVA / 4,5 kW	6 kVA / 5,4 kW	10 kVA / 9 kW	6 kVA / 6 kW	10 kVA / 10 kW	
SISTEMA	On-Line	Dupla conversão							
	Tecnologia	DSP (processador digital de sinal)							
	Formato	Rack ou Torre							
ENTRADA	Tensão	110 Vac (F+N+T) ou 220 Vac (F+N+T ou F+F+T)			220 Vac (F+N+T ou F+F+T)				
	Varição admissível	+/- 27%			+/- 25%		- 20% e + 30%		
	Frequência	40 Hz - 70 Hz (auto sensing)							
	Fator de potência	≥ 0,99 - PFC (corretor de fator de potência)							
	THDI	≤ 6%			≤ 5%				
	Gerador	Compatível							
SAÍDA	Tensão	110 Vac (ajustável 100 / 110 / 115 / 120 / 127) ou 220 Vac (ajustável 208 / 230 / 240)			220 Vac (ajustável 208 / 230 / 240)				
	Regulação estática	+/- 1%							
	Frequência	Em sincronismo com a rede de entrada							
	Frequência (modo rede)	45 - 55 Hz ou 55 - 65 Hz (a frequência de saída sempre fica em sincronismo com a frequência da rede, para evitar curto circuito em caso de transferência para o by-pass)							
	Frequência (modo bateria)	50/60 Hz +/- 0,1 Hz		50/60 Hz +/- 0,2 Hz		50/60 Hz +/- 0,1% Hz			
	Forma de onda	Senoidal pura							
	THDv	≤ 2% para cargas lineares e ≤ 5% para cargas não lineares					≤ 1% para cargas lineares e ≤ 4% para cargas não lineares		
	Fator de potência	0,9					1		
	Fator de crista	3:1							
	Sobrecarga	MODO REDE: 105% ~ 125% por 1 minuto; 125% ~ 150% por 30 segundos; acima de 150% transfere para o by-pass em 300 ms			MODO REDE: 105% ~ 125% por 3 minutos; 125% ~ 150% por 30 segundos; acima de 150% transfere para o by-pass em 100 ms		MODO REDE: 102% ~ 110% por 10 minutos; 110% ~ 125% por 1 minuto; 125% ~ 150% por 30 segundos		
RENDIMENTO	Modo rede	≥ 90%	≥ 91%	≥ 92%	≥ 92%		≥ 94%		
	Modo ECO	≥ 95%	≥ 96%	≥ 97%	≥ 98%				
	Quantidade	2 unidades	4 unidades	6 unidades	16 unidades		16 ou 20 unidades		
BATERIAS	Tensão CC	24Vcc	48Vcc	72Vcc	192Vcc		192Vcc ou 240 Vcc		
	Carregador 5 amperes	N/A	N/A	Sim	N/A				
	Acondicionamento das baterias	Interno e/ou externo			Externo				
	Auto teste	Configurável (manual - via software)							
	Gerenciamento inteligente	ABM (gerenciamento avançado de baterias)							
	BYPASS	Chave estática	Automática						
ECO MODE		Configurável							
PROTEÇÃO	Barramento CC	Sobretensão, subtensão e sobrecarga							
	Tensão de entrada / saída	Sobretensão e subtensão							
	Corrente de entrada	Limitação eletrônica da corrente de entrada do retificador e fusível regenerativo							
	Corrente de saída	Sobrecarga e curto circuito							
	Tensão do inversor	Subtensão e sobretensão para o inversor							
	By-pass	Sobretensão e subtensão, frequência anormal							
ALARMES	Sonoros e visuais	Modo bateria, bateria baixa, falha, sobrecarga, by-pass e sobretemperatura							
	LEDs	Modo inversor (rede), modo bateria, by-pass, sobrecarga e falha (alarme)							
DISPLAY	LEDs	Informações de operação, funcionamento, programação e ajustes							
	LCD com backlight	Visualização de tensões, carga, frequências, temperatura interna, estado e alarmes							
COMUNICAÇÃO	Interface padrão	RS232 (DB 9)			RS232 (DB 9)		RS232 (DB 9) e USB		
	Interface opcional	TCP/IP (SNMP RJ 45) e USB			TCP/IP (SNMP RJ 45), USB e contato seco		TCP/IP (SNMP RJ 45), RS 485 e contato seco		
RUÍDO	1 metro	< 50 dB (A)			< 55 dB (A)		< 58 dB (A)		
OPCIONAIS	Transformadores	Somente externo							
	Isolação galvânica	Somente externo							
	Paralelismo redundante	N/A		Até 4 unidades			Até 3 unidades		
CONDIÇÕES AMBIENTAIS	Temperatura	0° a 40°C (Recomendada 20° a 25°C em operação)							
	Umidade	0% a 90% sem condensação							
	Altitude	< 1500 m					≤ 1000 m		
	Ventilação	Forçada com controle gradual de exaustão (auto-fan)							
Grau de proteção	Atmosfera de operação	Livre de particuladas, maresia, gases tóxicos, líquidos e inflamáveis							
		IP 20							
CONEXÕES	Conexão de entrada - 110 Vac	Cabo de 1,1 m e plug 10 A (compatível padrão NBR 14136)	Cabo de 1,1 m e plug 20 A (compatível padrão NBR 14136)	Cabo de 1,1 m e plug 30 A		N/A			
	Conexões de saída - 110 Vac	4 tomadas 10A padrão NBR 14136	4 tomadas 20A padrão NBR 14136				N/A		
	Conexão de entrada - 220 Vac	Cabo de 1,1 m e plug 10 A (compatível padrão NBR 14136)	Cabo de 1,1 m e plug 20 A (compatível padrão NBR 14136)				Borne		
	Conexões de saída - 220 Vac	4 tomadas 10A padrão NBR 14136		4 tomadas 20A padrão NBR 14136		Borne			
Dimensões (AxLxP) mm	Sem / com embalagem	88 x 440 x 468 / 201 x 545 x 592		88 x 440 x 668 / 201 x 545 x 782		132 x 440 x 580 / 227 x 530 x 703		88 x 440 x 580 / 168 x 514 x 696	
Peso (Kg) - sem baterias	Sem / com embalagem	12 / 15	14 / 17	15 / 19	16 / 20	16,5 / 21	17 / 22	12 / 14 / 14 / 16	

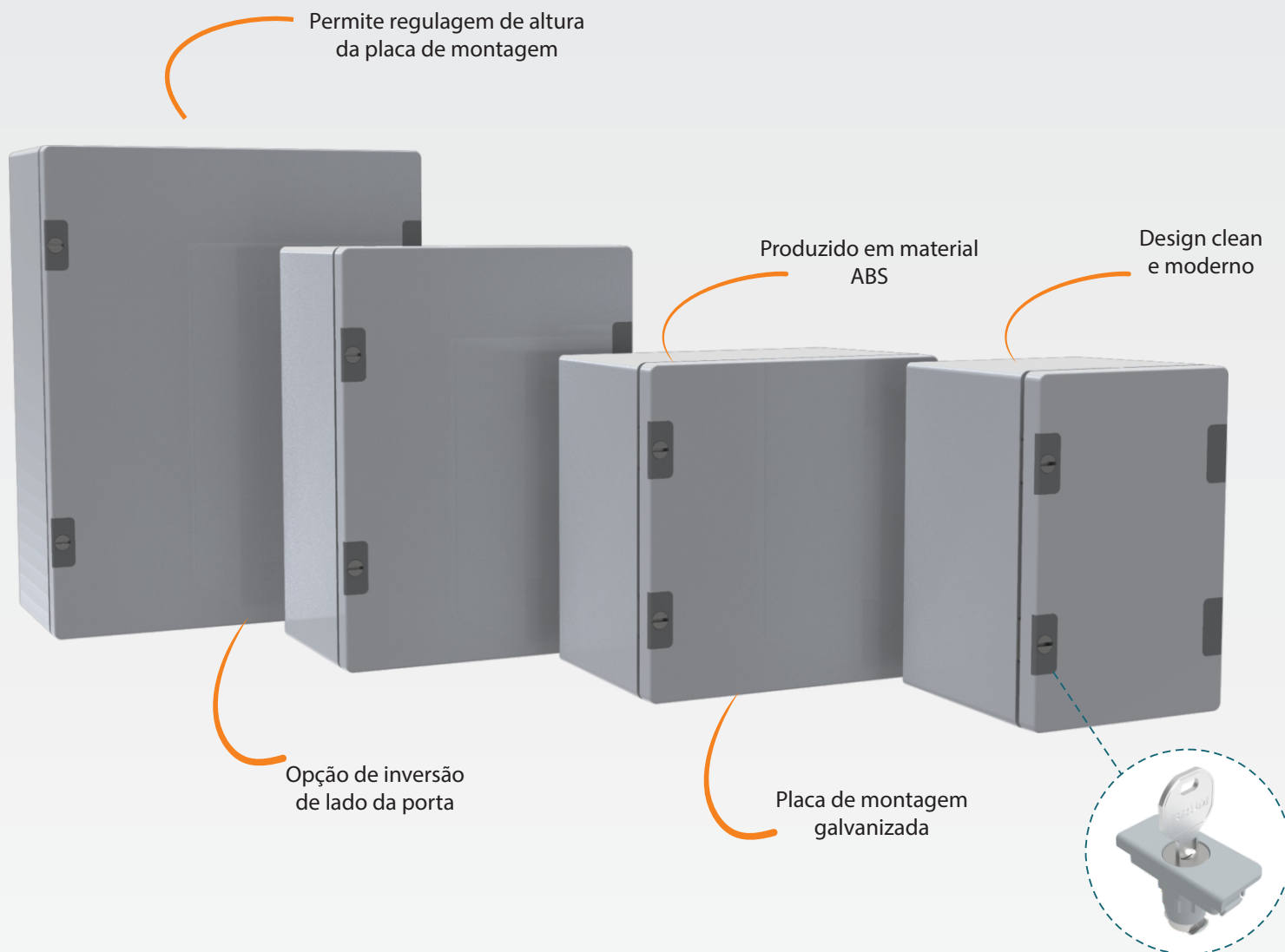
Obs.: Os produtos e suas especificações poderão sofrer alterações, customizações e adaptações por solicitação dos clientes ou por conveniência do fabricante sem comunicação prévia.

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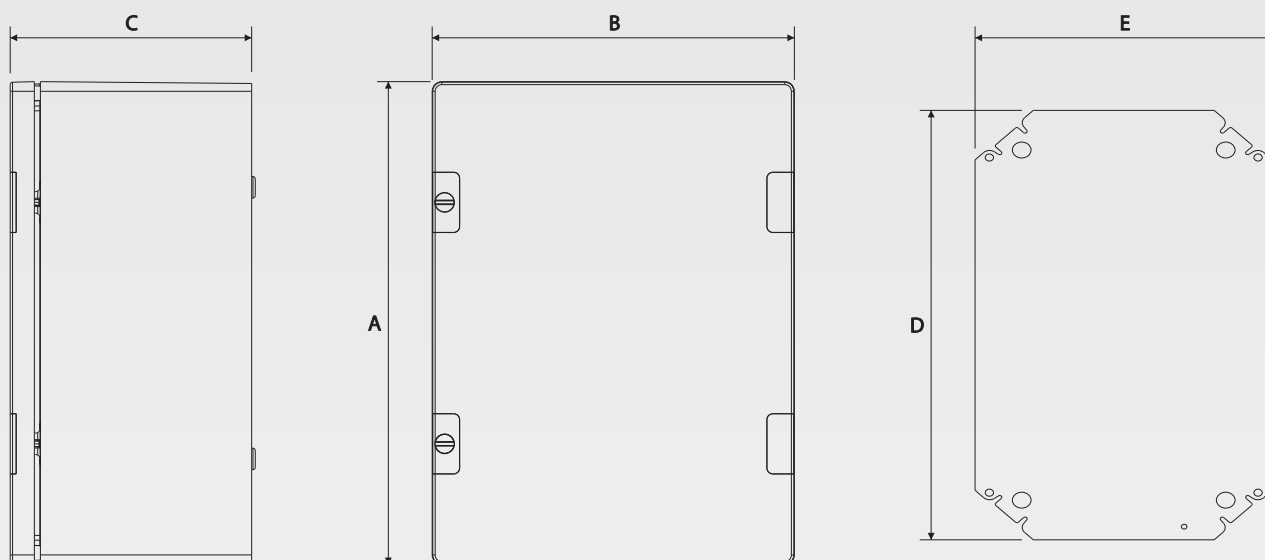
BRUM



Conheça a linha de quadros de comando termoplásticos NEOBOX. Produzidos em ABS com proteção contra raios ultravioleta (UV), garantem maior vida útil ao produto em áreas externas. Dobradiças metálicas garantem maior rigidez mecânica e possuem pinos imperdíveis que permitem rápida remoção/inversão da porta. Os fechos, também metálicos, estão fora da vedação da caixa, impossibilitando a entrada de partículas sólidas ou líquidas e podem ser facilmente substituídos por modelos com chave Yale sem o uso de ferramentas.

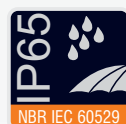
Características construtivas

- Grau de proteção IP65;
- Placa de montagem galvanizada;
- Parafusos em aço inox;
- Disponível com opção de fecho com chave;
- Conforto e praticidade na montagem, instalação e manutenção;
- Regulagem da altura de instalação da placa de montagem
- Segura: Atende a norma a NBR IEC 61439.



REF.	CÓDIGO	A	B	C	D	E
NB302020	060.200.001	300	200	200	243	143
NB303020	060.200.005	300	300	200	243	243
NB403020	060.200.009	400	300	200	348	246
Nb504020	060.200.013	500	400	200	448	346
NB806030	060.200.024	800	600	300	743	520

QUADRO DE COMANDO TERMOPLÁSTICO IP65



Grau de proteção contra o ingresso de sólidos e água



Grau de proteção contra impactos mecânicos



Conjunto de manobra e comando de baixa tensão



Nível de proteção Classe II contra choques elétricos



Proteção contra raios ultravioleta (UV)



Resistente ao calor anormal e ao fogo



ACESSÓRIOS



ITEN - INSTITUTO TECNOLÓGICO DE ENSAIOS LTDA.

REP - Relatório de Ensaios de Produtos

nº. 2002033-1/001

Emissão: 27.04.2020

Solicitante: ELETRO METALÚRGICA BRUM

Endereço: Av. Ambrósio Fumagalli, 1.608 - Parque Egisto Ragazzo - Limeira/ SP

CEP: 13485-333 **Fone:** (19) 3404-3835

e-mail: juliano.santos@brum.com.br

Fabricante: ELETRO METALÚRGICA BRUM

Descrição da amostra: Quadro de comando em termoplástico NEOBOX

Código/ referência: ---

Proposta comercial: 2002033-1 **Ordem de serviço:** 2002033-1/001

Quantidade recebida: 5 caixas + 1 tampa **Com lacre:** () **Sem lacre:** (X)

Início/ término dos ensaios: 25.02.2020 / 09.04.2020

Normas utilizadas:

- ABNT NBR IEC 61439-1:2016 Versão Corrigida:2017 - Conjuntos de manobra e comando de baixa tensão - Parte 1: Regras gerais;

- ABNT NBR IEC 61439-3:2017 - Conjuntos de manobra e comando de baixa tensão Parte 3: Quadro de distribuição destinado a ser utilizado por pessoas comuns (DBO).

Observações: Este relatório poderá ser reproduzido, somente de forma total, mediante autorização do ITEN.

- Este relatório de ensaio é válido, exclusivamente, para a amostra ensaiada, não sendo extensivo a quaisquer lotes, ainda que similares.

- Endereço e local da realização das atividades do laboratório:

- Avenida Victor Civita, 2064 - Jd. Santa Maria - Osasco - S.P. - **CEP:** 06149-225.

- Fones: (11) 3606-7373 / 3431-4145 - **E-mail:** rep@itensp.com.br / comercial1@itensp.com.br - **Site:** www.itensp.com.br

- Ensaio(s) solicitado(s): Itens da NBR IEC 61439-3 / Descrição do(s) ensaio(s):			Incerteza de medição dos ensaios:
5	Características de interface		NA
8.1.2	Resistência à corrosão		NA
8.1.3	Propriedades de materiais isolantes	8.1.3.1 - Estabilidade térmica	NA
		8.1.3.2 - Resistência de materiais isolantes ao calor anormal e ao fogo	U = 0,013 s
8.1.4	Resistência à radiação ultravioleta (UV)	Flexão	U = 2,14 MPa
		Impacto Charpy	U = 10,19 %
8.1.5	Funcionamento mecânico		NA
8.1.6	Içamento		NA
8.2.3	Conjunto com partes removíveis		NA
8.3	Distância de isolamento no ar e distância de escoamento		U = 0,02 mm
8.4	Proteção contra choques elétricos		NA
8.5	Incorporação de dispositivos de manobra		NA
8.6	Circuitos elétricos internos e conexões		NA
8.7	Refrigeração		NA
8.8	Bornes para condutores externos		NA
9.1	Propriedades dielétricas		NA
9.2	Limites de elevação de temperatura		U = 0,33 °C
10.2.7	Marcações		NA

NA: Incerteza de medição Não Aplicável.

Instrumentos utilizados:	Código:	
Alicate amperímetro	ALA	003 e 004
Termômetro	CON	001
Cronômetro	CRO	011 e 014
Dinamômetro	DIN	001
Maquina universal de ensaios	ECD	031
Hi-Pot	EDD	257
Multímetro	MUL	021
Paquímetro	PAQ	007
Ponta para alta tensão	POA	008
Sensor termopar	SEN	008, 065 e 167 (23 a 30)
Termo higrômetro	TEH	014
Termômetro	TER	008 e 014

As condições específicas de ensaios, incluindo condições ambientais, quando não contempladas no relatório, encontram-se disponíveis nos dados brutos específicos por um ano.

Itens da NBR IEC 61439-3 / Descrição do(s) ensaio(s):

5 - Características de interface

5.1 Generalidades

As características do CONJUNTO devem ser compatíveis com as características nominais dos circuitos aos quais ele é conectado e com as condições de instalação, e devem ser declaradas pelo montador do CONJUNTO utilizando o critério identificado de 5.2 a 5.6.

Este objetivo pode ser alcançado por um dos dois processos típicos; o usuário escolhe um produto do catálogo cujas características satisfazem as suas necessidades, ou faz um acordo específico com o montador.

Em ambos os casos, a folha de especificações de acordo com o Anexo AA é destinada a ajudar o usuário a fornecer todos os dados necessários a especificar, e a ajudar o montador a caracterizar o DBO real. Em alguns casos, as informações indicadas pelo montador do DBO podem tomar o lugar de um acordo.

- **Encontrado:** As características do CONJUNTO são compatíveis com as características nominais dos circuitos aos quais ele é conectado e com as condições de instalação.

5.2 Características nominais de tensão

5.2.1 Tensão nominal (U_n) (do CONJUNTO)

A tensão nominal deve ser ao menos igual à tensão nominal do sistema elétrico.

- **Encontrado:** Tensão nominal é igual do sistema elétrico.

5.2.2 Tensão nominal de utilização (U_c) (de um circuito de um CONJUNTO)

A tensão nominal de utilização de todos os circuitos não pode ser inferior à tensão nominal do sistema elétrico ao qual é previsto para ser conectado.

Caso seja diferente da tensão nominal do CONJUNTO, a tensão nominal de utilização apropriada do circuito deve ser especificada.

- **Encontrado:** Tensão nominal de utilização é igual do sistema elétrico.

5.2.3 Tensão nominal de isolamento (U_i) (de um circuito de um CONJUNTO)

A tensão nominal de isolamento de um circuito de um CONJUNTO é o valor da tensão para os quais as tensões de ensaio dielétricas e distâncias de escoamento são referidas.

A tensão nominal de isolamento de um circuito deve ser superior ou igual aos valores estabelecidos para U_n e para U_e para o mesmo circuito.

NOTA - Para circuitos monofásicos derivados de sistemas IT (ver IEC 60364-5-52), convém que a tensão nominal de isolamento seja pelo menos igual à tensão entre fases de alimentação.

- **Encontrado:** Tensão nominal de isolamento é igual aos valores estabelecidos para U_n e para U_e .

5.2.4 Tensão nominal de impulso suportável (U_{imp}) (do CONJUNTO)

A tensão nominal de impulso suportável deve ser superior ou igual aos valores indicados para as sobretensões transitórias que ocorrem no sistema elétrico para o qual o circuito foi projetado para ser conectado.

Os DBO devem ser conforme no mínimo a categoria de sobretensão III (ver IEC 60364-4-44), de acordo com a Tabela G.1 da Parte 1.

- **Encontrado:** Tensão nominal de impulso é igual aos valores indicados para as sobretensões transitórias.

5.3.1 Corrente nominal do CONJUNTO (I_{nA})

A corrente nominal do CONJUNTO é a menor entre:

- a soma das correntes nominais dos circuitos de entrada do CONJUNTO funcionando em paralelo;
- a corrente total que o barramento principal é capaz de distribuir na disposição particular do CONJUNTO.

Esta corrente deve circular sem que a elevação de temperatura das partes individuais exceda os limites especificados em 9.2.

NOTA 1 - A corrente nominal de um circuito de entrada pode ser inferior à corrente nominal do dispositivo de entrada (de acordo com a respectiva norma de dispositivo) instalado no CONJUNTO.

NOTA 2 - Neste contexto, o barramento principal pode ser uma barra individual ou a combinação de barras individuais que normalmente são conectadas em serviço, por exemplo, por meio de um acoplador de barras.

NOTA 3 - A corrente nominal do CONJUNTO é a corrente de carga máxima admissível que o CONJUNTO pode distribuir e que não pode ser ultrapassada quando futuras unidades de saídas são adicionadas.

- **Encontrado:** A corrente nominal é menor entre a soma das correntes nominais dos circuitos de entrada do CONJUNTO funcionando em paralelo

5.3.2 Corrente nominal de um circuito (I_{nc})

A corrente nominal de um circuito é o valor da corrente que pode ser transportada pelo circuito de carga isoladamente, nas condições normais de utilização. Essa corrente deve circular sem que a elevação de temperatura das diversas partes do CONJUNTO excedam os limites especificados em 9.2.

NOTA 1 - A corrente nominal de um circuito pode ser inferior às correntes nominais dos dispositivos (de acordo com a respectiva norma do dispositivo) instalados neste circuito.

NOTA 2 - Devido à complexidade dos fatores que determinam as correntes nominais, nenhum valor padronizado pode ser fornecido.

- **Encontrado:** Ver item 9.2.

5.3.3 Corrente nominal de pico admissível (I_{pk})

A corrente nominal de pico admissível deve ser superior ou igual aos valores indicados como valor de pico da corrente de curto-circuito presumida do sistema de alimentação para o qual o circuito é projetado para ser conectado (ver também 9.3.3).

- **Encontrado:** A corrente nominal de pico admissível é igual aos valores indicados como valor de pico da corrente de curto-circuito.

5.3.4 Corrente nominal de curta duração admissível (I_{cw}) (de um circuito do CONJUNTO)

A corrente nominal de curta duração admissível deve ser superior ou igual ao valor eficaz da corrente de curto-circuito presumida em cada ponto de conexão do circuito à alimentação (ver também 3.8.10.3).

Diferentes valores de I_{cw} podem ser atribuídos a um CONJUNTO para diferentes durações (por exemplo, 0,2 s; 1 s; 3 s).

Em corrente alternada, o valor da corrente é o valor eficaz da componente alternada.

- **Encontrado:** A corrente nominal de curta duração admissível é igual ao valor eficaz da corrente de curto-circuito.

5.3.5 Corrente nominal de curto-circuito condicional de um CONJUNTO (I_{cc})

A corrente nominal de curto-circuito condicional deve ser superior ou igual ao valor eficaz da corrente de curto-circuito presumida (I_{cp}) para uma duração limitada pelo funcionamento do dispositivo de proteção contra curtos-circuitos que protege o CONJUNTO.

A capacidade de interrupção e as características de limitação da corrente (P_t , $/P_k$) do dispositivo de proteção contra curtos-circuitos especificado devem ser indicadas pelo montador do CONJUNTO, levando em consideração os dados fornecidos pelo fabricante do dispositivo.

- **Encontrado:** A corrente nominal de curto-circuito é igual ao valor eficaz da corrente de curto-circuito.

5.4 Fator de diversidade nominal (RDF)

O fator de diversidade nominal é o valor por unidade da corrente nominal, declarado pelo montador do CONJUNTO, para o qual circuitos de saída de um CONJUNTO podem ser carregados de forma contínua e simultânea levando em consideração as influências térmicas mútuas.

O fator de diversidade nominal pode ser indicado:

- para grupos de circuitos;
- para o CONJUNTO completo.

O fator de diversidade nominal multiplicado pela corrente nominal dos circuitos deve ser igual ou superior à carga presumida dos circuitos de saída. A carga presumida dos circuitos de saída deve ser tratada pela norma pertinente do CONJUNTO-NOTA 1. A carga presumida dos circuitos de saída pode ser uma corrente constante ou equivalente térmica de uma corrente variável (ver Anexo E).

O fator de diversidade nominal é aplicável quando o CONJUNTO funciona com a corrente nominal (I_n)

NOTA 2 - O fator de diversidade nominal reconhece que na prática as unidades funcionais não são completamente carregadas simultaneamente ou são carregadas intermitentemente.

Ver Anexo E para detalhes adicionais.

NOTA 3 - Na Noruega, não é permitido que a proteção contra sobrecarga nos condutores seja baseada somente na utilização dos fatores de diversidade dos circuito a jusante.

Na ausência de um acordo entre o montador do DBO e o usuário referente às correntes de carga reais, a carga assumida dos circuitos de saída do DBO ou grupos de circuitos de saída pode ser baseada nos valores da Tabela 101.

- **Encontrado:** NA

5.5 Frequência nominal (f_n)

A frequência nominal de um circuito é o valor da frequência a qual as condições de funcionamento se referem. Quando os circuitos de um CONJUNTO forem projetados para valores diferentes de frequência, deve ser indicada a frequência nominal de cada circuito.

NOTA - Convém que a frequência esteja dentro dos limites especificados nas normas pertinentes dos componentes incorporados. Salvo indicação em contrário pelo montador do CONJUNTO, admite-se que os limites sejam iguais a 98 % e 102 % da frequência nominal.

- **Encontrado:** 50 ~60 Hz.

5.6 - As características seguintes devem ser declaradas:	Encontrado:
a) Requisitos adicionais que dependem das condições de utilização especificadas de funcional (por exemplo, tipo de coordenação, características de sobrecarga);	NA
b) grau de poluição (ver 3.6.9);	Ambiente 1
c) tipos de esquema de aterramento para os quais o CONJUNTO é projetado;	Bornes
d) instalação abrigada e/ou ao tempo (ver 3.5.1 e 3.5.2);	Abrigada e ao tempo
e) Fixa ou móvel;	Fixa
f) grau de proteção;	IP65
g) destinação para uso por pessoas qualificadas ou leigas (ver 3.7.12 e 3.7.14);	Destinado para uso por pessoas leigas
h) classificação de compatibilidade eletromagnética (EMC) (ver Anexo J);	NA
i) condições especiais de utilização, se aplicáveis (ver 7.2);	NA
j) SLP em invólucro;	NA
k) proteção contra impacto mecânico, se aplicável (ver 8.2.1);	IK08
l) tipo de construção - fixa ou com partes removíveis (ver 8.5.1 e 8.5.2.);	Fixa
m) natureza dos dispositivos de proteção contra curtos-circuitos (ver 9.3.2);	Icc 10 kA
n) medidas para proteção contra choques elétricos;	Possui proteção
o) dimensões externas (compreendendo as projeções, por exemplos, manoplas, tampas, portas), se solicitado;	300 x 300 x 200 mm
p) peso, se solicitado;	2.330 g
q) DBO do tipo a ou do tipo B (ver 3.1.102 e 3.1.103).	Tipo B

8.1.2 - Resistência à corrosão

Ensaio de severidade A:

O ensaio consiste em:

- Seis ciclos de 24 h cada para ensaio cíclico de calor úmido de acordo com a ABNT NBR IEC 60068-2-30 (Ensaio Db) a (40 ± 3) °C e umidade relativa de 95 %. e
- Dois ciclos de 24 h cada para ensaio de névoa salina de acordo com a ABNT NBR IEC 60068-2-11 (Ensaio Ka: Névoa salina), a uma temperatura de (35 ± 2) °C.

- **Encontrado:** Realizado conforme acima.

Ensaio de severidade B:

O ensaio inclui dois períodos idênticos de 12 dias.

Cada período de 12 dias inclui:

- Cinco ciclos de 24 h cada, para ensaio cíclico de calor úmido de acordo com a ABNT NBRIEC 60068-2-30 (Ensaio Db) a uma temperatura de (40 ± 3) °C e a uma umidade relativa de 95 %. e
- Sete ciclos de 24 h cada, para ensaio de névoa salina de acordo com a ABNT NBR IEC 60068-2-11 (Ensaio Ka: Névoa salina), a uma temperatura de (35 ± 2) °C.

- **Encontrado:** Realizado conforme acima.

8.1.2 - Continuação:

- **Especificado:** A conformidade é verificada por inspeção visual para determinar que:

- Não há qualquer evidência de óxido de ferro, de fissura ou de outra deterioração superior à permitida pela ABNT NBR ISO 4628-3 para um grau de corrosão R_{i1} . Porém, a deterioração de superfície do revestimento de proteção é permitida. Em caso de dúvida referente às pinturas e ao verniz, deve ser feita referência à ABNT NBR ISO 4628-3 para verificar se as amostras estão conforme ao corpo de prova R_{i1} ;
- a integridade mecânica não esteja prejudicada;
- as vedações não estejam danificadas;
- as portas, as dobradiças, as fechaduras e os meios de fixações funcionem sem esforço anormal.

- **Encontrado:**

Após os ensaios,

- não ocorreu qualquer evidência de óxido de ferro, de fissura ou de outra deterioração superior à permitida pela ABNT NBR ISO 4628-3 para um grau de corrosão R_{i1} ;
- a integridade mecânica não foi prejudicada;
- as vedações não foram danificadas;
- as portas, as dobradiças, as fechaduras e os meios de fixações funcionam sem esforço anormal.

8.1.3 - Propriedades de materiais isolantes**8.1.3.1 - Estabilidade térmica** (Conforme 10.2.3.1).**10.2.3.1 - Verificação da estabilidade térmica dos invólucros:**

A estabilidade térmica dos invólucros fabricados em material isolante deve ser verificada pelo ensaio de calor seco. O ensaio deve ser realizado de acordo com a IEC 60068-2-2, Ensaio Bb, a uma temperatura de 70 °C, com circulação de ar natural, por uma duração de 168 h e com um tempo de restabelecimento de 96 h.

- **Especificado:**

O invólucro ou a amostra não podem apresentar nenhuma trinca visível com uma visão normal ou corrigida sem ampliação adicional e o material não pode ficar pegajoso ou gorduroso (Nenhum vestígio do pano deve permanecer na amostra, e o material do invólucro ou da amostra não pode aderir ao pano).

- **Encontrado:** A amostra não apresentou nenhuma trinca e o material não ficou pegajoso ou gorduroso.

8.1.3.2 - Resistência dos materiais isolantes ao calor e ao fogo (Conforme 10.2.3.2).**10.2.3.2 - Verificação da resistência de materiais isolantes ao calor anormal e ao fogo devido aos efeitos elétricos internos:**

Os princípios de ensaio de fio incandescente da ABNT NBR IEC 60695-2-10 e os detalhes dados na ABNT NBR IEC 60695-2-11 devem ser utilizados para verificar a adequação de materiais utilizados:

- a) sobre as partes do CONJUNTOS, ou
- b) sobre as partes retiradas das partes do CONJUNTOS.

A temperatura da ponta do fio incandescente deve ser conforme a seguir:

- 960 °C para as partes necessárias para manter na posição as partes condutoras de corrente;
- 850 °C para invólucros destinados para montagem em paredes ocas;
- 650 °C para todas as outras partes, inclusive partes necessárias para suportar o condutor de proteção.

- **Especificado:**

Considera-se que o corpo-de-prova superou o ensaio de fio incandescente se:

- não existir chama visível e nenhuma incandescência sustentada;
- as chamas e incandescência do corpo-de-prova extinguirem dentro de 30 s após a remoção do fio incandescente.

Não deve haver nenhuma ignição do papel de seda ou queima da placa de madeira.

Resultados encontrados:

Local de aplicação:	Temperatura do fio (°C):	Chama ou incandescência (máx. 30 s):	Papel de seda e placa de pinho:
Caixa	650	<30 s	Não inflamou/ chamoscou

8.1.4 - Resistência à radiação ultravioleta (UV)

Ensaio UV de acordo com a ISO 4892-2 Método A, Ciclo 1, com um período de ensaio total de 500 h.

Para invólucros em materiais isolantes, a conformidade é assegurada pela verificação da resistência à flexibilidade (de acordo com a ISO 178) e impacto Charpy (de acordo com a ISO 179) de materiais isolantes que tenham retenção mínima de 70 %.

Resultados encontrados:**Resistência à flexibilidade:**

Amostras:	Média (MPa):	Retenção:
Original:	75,481	99,8 %
Envelhecido:	75,593	

Impacto Charpy (Realizado pelo laboratório AFINKO - AFK0537/20):

Amostras:	Média (kJ/m ²):	Retenção:
Original:	23,44	86,6 %
Envelhecido:	20,29	

Para a conformidade, os invólucros metálicos completamente revestidos por material sintético devem apresentar uma aderência do material sintético com uma retenção mínima de categoria 3 de acordo com a ISO 2409.

- Especificado:

As amostras não podem apresentar trincas ou deteriorações visíveis com uma visão normal ou corrigida sem ampliação adicional.

- Encontrado: As amostras não apresentaram trincas ou deteriorações visíveis.

8.1.5 - Funcionamento mecânico

Todos os invólucros ou divisórias, inclusive meios de fechamento e as dobradiças das portas, devem ter uma resistência mecânica suficiente para suportar os esforços aos quais eles podem ser submetidos em utilização normal e durante as condições de curto-circuito (ver também 10.13).

O funcionamento mecânico das partes removíveis, incluindo qualquer intertravamento de inserção, deve ser verificado por meio de ensaio de acordo com 10.13.

10.3 - Para as partes que precisam de verificação por ensaio (ver 8.1.5), o funcionamento mecânico satisfatório deve ser verificado após a instalação no CONJUNTO. O número de ciclos de manobra deve ser 50.

Ao mesmo tempo, o funcionamento dos mecanismos de intertravamento associados com estes movimentos deve ser verificado.

- Especificado: O ensaio é considerado como satisfatório se as condições de funcionamento do dispositivo, do intertravamento, do grau de proteção especificado etc. não tiverem sido prejudicadas e se o esforço requerido para o funcionamento for praticamente o mesmo que antes do ensaio.

Resultados encontrados:

Parte ensaiada:	Número de movimentos:	Descrição dos movimentos:	Resultado:
Tampa	50	Abertura e fechamento	Não sofreu danos, sendo que o esforço requerido para o funcionamento permaneceu praticamente o mesmo.

8.1.6 - Dispositivo de içamento

- Encontrado: Ensaio não aplicável.

8.2.3 - Conjunto com partes removíveis

- Encontrado: Ensaio não aplicável.

8.3 - Distância de isolamento no ar e distância de escoamento

8.3.1 - Distância de isolamento no ar:			
Ponto de medição:	Grau de poluição:	Especificado mínimo (mm):	Encontrado (mm):
Entre fases	1	8,0	9,1
8.3.2 - Distância de escoamento:			
Ponto de medição:	Grau de poluição:	Especificado mínimo (mm):	Encontrado (mm):
Entre fases	1	1,5	17,7

8.4 - Proteção contra choques elétricos

8.4.1 - Generalidades
8.4.2 - Proteção básica:
8.4.2.1 - Generalidades
8.4.2.2 - Isolação básica provida pelo material isolante As partes vivas perigosas devem ser completamente cobertas com isolamento que só pode ser removida por destruição ou por utilização de uma ferramenta. A isolamento deve ser feita de materiais apropriados capazes de resistir de forma durável aos esforços mecânicos, elétricos e térmicos para os quais a isolamento pode ser submetida em serviço. <i>NOTA - Exemplos são componentes elétricos embutidos na isolamento e condutores isolados.</i> Pinturas, vernizes e esmaltes, isoladamente, não são considerados para atenderem aos requisitos para isolamento básica.
- Encontrado: Partes vivas perigosas são completamente cobertas com isolamento que só pode ser removida por destruição ou por utilização de uma ferramenta. A isolamento resistiu aos ensaios elétricos e térmicos.
8.4.2.3 - Barreiras ou invólucros As partes vivas isoladas pelo ar devem estar no interior de invólucros ou atrás de barreiras providas pelo menos de um grau de proteção de IP XXB.
- Encontrado: Partes vivas localizadas no interior dos invólucros.
8.4.3 - Proteção de falta
8.4.3.1 a 8.4.3.2 - Ensaios não aplicáveis.
8.4.3.3 - Separação elétrica: A separação elétrica de circuitos individuais é destinada para prevenir choques elétricos por contato com partes condutivas expostas que podem estar sob tensão por uma falta na isolamento básica do circuito.
- Encontrado: Possui separação elétrica.
8.4.4 - Proteção por isolamento total
Para assegurar a proteção básica e a proteção em caso de falta, por isolamento total, os requisitos seguintes devem ser satisfeitos.
a) Os dispositivos devem ser completamente fechados em material isolante, equivalente à isolamento dupla ou reforçada. O invólucro deve portar o símbolo [□] que deve ser visível do exterior.
- Encontrado: Possui isolamento reforçada. Consta o símbolo na parte externa.
b) O invólucro não pode ser perfurado, em nenhum ponto, por partes condutoras, de maneira que haja a possibilidade que uma tensão de falta seja transferida para fora do invólucro.
- Encontrado: Invólucro não é perfurado conforme determinado.
c) O invólucro, quando o CONJUNTO estiver pronto para funcionar e conectado à alimentação, deve envolver todas as partes vivas, as partes condutivas expostas e as partes que pertencem a um circuito de proteção, de tal maneira que elas não possam ser tocadas. O invólucro deve garantir pelo menos um grau de proteção IP 2XC (ver ABNT NBR IEC 60529).
- Encontrado: Invólucro envolve todas as partes de tal maneira que elas não possam ser tocadas. Ensaios de IP não foram realizados.
d) Partes condutivas expostas no interior do CONJUNTO não podem ser conectadas ao circuito de proteção, isto é, elas não podem ser incluídas em uma medida de proteção envolvendo o uso de um circuito de proteção. Isto também se aplica a um componente, mesmo que ele tenha um borne de conexão para um condutor de proteção.
- Encontrado: Partes condutivas não são conectadas ao circuito de proteção.

8.4.4 - Continuação:

e) Se as portas ou os fechamentos do invólucro puderem ser abertos sem o uso de uma chave ou de uma ferramenta, deve ser provida uma barreira de material isolante, que proporcione proteção contra contato acidental não somente com as partes vivas acessíveis, mas também com as partes condutivas expostas que ficam acessíveis só após o fechamento ter sido removido; entretanto, esta barreira não pode ser removível, exceto com o uso de uma ferramenta.

- **Encontrado:** NA

8.4.5 - Limitação da corrente de contato permanente e das cargas elétricas

- **Encontrado:** Ensaio não aplicáveis.

8.4.6 - Condições de funcionamento e manutenção

8.4.6.1 - Dispositivos que podem ser utilizados ou componentes que podem ser substituídos por pessoas comuns

- **Encontrado:** NA

8.4.6.2 - Requisitos relativos à acessibilidade em serviço por pessoas autorizadas

8.4.6.2.1 - Generalidades

8.4.6.2.2 - Requisitos relativos à acessibilidade para inspeção e operações similares

O CONJUNTO deve ser construído de tal modo que certas operações podem ser executadas, conforme acordo entre o montador do CONJUNTO e o usuário, quando o CONJUNTO estiver em serviço e sob tensão.

Estas operações podem consistir de:

- inspeção visual de
 - dispositivos de manobra e outros dispositivos,
 - ajustes e indicações de relês e disparadores,
 - conexões dos condutores e marcações;
- ajustagem de relês, disparadores e dispositivos eletrônicos;
- substituição de elementos fusíveis;
- substituição de lâmpadas de sinalização;
- certas operações para localização de faltas, por exemplo, medição de tensão e de corrente com dispositivos adequadamente projetados e isolados.

- **Encontrado:** As opções de “inspeção visual de dispositivos de manobra e outros dispositivos”, “inspeção visual de conexões dos condutores e marcações” e “certas operações para localização de faltas, por exemplo, medição de tensão e de corrente com dispositivos adequadamente projetados e isolados”, podem ser executadas quando a amostra está em serviço e sob tensão. Demais opções são não aplicáveis.

8.4.6.2.3 - Requisitos relativos à acessibilidade para inspeção e operações similares

- **Encontrado:** Ensaio não aplicáveis.

8.4.6.2.4 - Requisitos relativos à acessibilidade para extensão do CONJUNTO sob tensão

- **Encontrado:** Ensaio não aplicáveis.

8.4.6.2.5 - Obstáculos

Os obstáculos devem impedir:

- aproximação não intencional às partes vivas, ou
- contato não intencional com as partes vivas do equipamento energizado em serviço normal.

Os obstáculos podem ser removidos sem o uso de uma chave ou ferramenta, mas devem estar fixados de maneira que impeça a remoção não intencional. A distância entre um obstáculo condutivo e as partes vivas que eles protegem não pode ser inferior aos valores especificados para as distâncias de isolamento no ar e distâncias de escoamento em 8.3.

- **Encontrado:** Os obstáculos impedem aproximação não intencional às partes vivas.

8.5 - Incorporação de dispositivos de manobra**8.5.1 - Partes fixas**

Onde um obstáculo condutivo estiver separado das partes vivas perigosas somente por proteção básica, constitui uma parte condutiva exposta e medidas para proteção contra as faltas também devem ser aplicadas.

- **Encontrado:** NA

Para as partes fixas (ver 3.2.1), as conexões dos circuitos principais (ver 3.1.3) só devem ser conectadas ou desconectadas quando o CONJUNTO não estiver sob tensão.

- **Encontrado:** Não é possível conectar ou desconectar quando está sob tensão.

Em geral, a remoção e a instalação de partes fixas requerem o uso de uma ferramenta.

- **Encontrado:** Requerido o uso de ferramenta.

A desconexão de uma parte fixa deve requerer o seccionamento do CONJUNTO completo ou parte dele.

- **Encontrado:** Requer o seccionamento da amostra.

Para prevenir uma manobra não autorizada, o dispositivo de manobra pode ser equipado de meios para mantê-lo em uma ou mais de suas posições.

- **Encontrado:** NA

8.5.2 - Partes removíveis

- **Encontrado:** Ensaio não aplicável.

8.5.3 - Seleção de dispositivos de manobra e de componentes

Os dispositivos de manobra e componentes incorporados em CONJUNTOS devem cumprir os requisitos das IEC pertinentes.

- **Encontrado:** Dispositivo de manobra e componentes em conformidade.

Os dispositivos de manobra e componentes devem ser apropriados para aplicação particular com respeito à apresentação externa do CONJUNTO (por exemplo, tipo aberto ou fechado), as suas tensões nominais, correntes nominais, frequência nominal, vida útil, capacidades de estabelecimento e de interrupção, corrente suportável de curto-circuito etc.

- **Encontrado:** Os dispositivos de manobra e componentes são apropriados para aplicação particular com respeito à apresentação externa da amostra.

A tensão nominal de isolamento e a tensão nominal de impulso suportável dos dispositivos instalados no circuito devem ser superiores ou iguais ao valor das tensões do circuito correspondente. Neste caso, a proteção contra as sobretensões pode ser necessária, por exemplo, para os equipamentos de categoria de sobretensão II (ver 3.6.11).

- **Encontrado:** A tensão nominal de isolamento e a tensão nominal de impulso suportável dos dispositivos instalados no circuito são iguais ao valor das tensões do circuito correspondente.

Os dispositivos de manobra e componentes que têm uma corrente suportável de curto-circuito e/ou uma capacidade de interrupção que é insuficiente para resistir aos esforços suscetíveis de ocorrerem no ponto de sua instalação devem ser protegidos por meio de dispositivos de proteção limitadores de corrente, por exemplo, fusíveis ou disjuntores.

- **Encontrado:** NA

Na seleção de dispositivos de proteção limitadores de corrente para os dispositivos de manobra incorporados, devem ser levados em conta os valores máximos admissíveis especificados pelo fabricante do dispositivo, levando em consideração a coordenação (ver 9.3.4).

- **Encontrado:** NA

A coordenação de dispositivos de manobra e componentes, por exemplo, coordenação de partida de motor com dispositivos de proteção contra curto-circuito, deve atender às IEC pertinentes.

- **Encontrado:** NA

8.5.4 - Instalação de dispositivos de manobra e de componentes

Os dispositivos de manobra e os componentes devem ser instalados e conectados no CONJUNTO conforme instruções fornecidas pelo fabricante e de maneira que o seu bom funcionamento não seja prejudicado pelas influências, como: o calor, os arcos elétricos, as vibrações e os campos eletromagnéticos, que estão presentes em serviço normal.

- **Encontrado:** Dispositivos de manobra e os componentes são instalados e conectados de forma adequada.

No caso de conjuntos eletrônicos, pode ser necessária uma separação ou blindagem de todos os circuitos eletrônicos de tratamento de sinais.

- **Encontrado:** NA

8.5.4 - Continuação:

Quando fusíveis forem instalados, o fabricante original deve informar o tipo e as características nominais dos fusíveis a serem utilizados.

- **Encontrado:** NA

8.5.5 - Acessibilidade

Dispositivos com ajustes e rearme, que devem ser operados no interior do CONJUNTO, devem ser facilmente acessíveis.

- **Encontrado:** Facilmente acessíveis.

Unidades funcionais montadas no mesmo suporte (placa de montagem, estrutura de montagem) e seus bornes para condutores externos devem ser dispostos de maneira que sejam acessíveis para montagem, instalação elétrica, manutenção e substituição. Salvo acordo em contrário entre o montador do CONJUNTO e o usuário, os seguintes requisitos de acessibilidade associados aos CONJUNTOS montados sobre o piso devem ser aplicados:

- Os bornes, exceto os bornes para condutores de proteção, devem estar situados pelo menos 0,2 m acima da base dos CONJUNTOS e além disso, devem ser colocados de forma que os cabos possam ser conectados facilmente a eles;

- Os instrumentos de indicação que precisam ser lidos pelo operador devem estar localizados entre 0,2 m e 2,2 m da base do CONJUNTO;

- Os elementos de comando como alavancas, botões de pressão ou elementos similares devem estar localizados a uma altura que eles possam ser facilmente manobrados; isto significa que a linha de centro deve ficar entre 0,2 m e 2 m acima da base do CONJUNTO. Os dispositivos que são manobrados com pouca frequência, por exemplo, menos de uma vez por mês, podem ser instalados a uma altura de até 2,2 m;

- Os elementos de comando dos dispositivos de manobra de emergência (ver 536.4.2 da IEC 60364-5-53:2001) devem estar acessíveis entre 0,8 m e 1,6 m acima da base do CONJUNTO.

- **Encontrado:** NA

8.5.6 - Barreiras

- **Encontrado:** Ensaio não aplicável.

8.5.7 - Sentido de manobra e indicação de posições de comando

- **Encontrado:** Ensaio não aplicável.

8.5.8 - Lâmpadas de sinalização e botões de comando

- **Encontrado:** Ensaio não aplicável.

8.6 - Circuitos elétricos internos e conexões**8.6.1 - Circuitos principais:**

Os barramentos (nus ou isolados) devem estar dispostos de tal forma que um curto-circuito interno não seja esperado. Eles devem ser dimensionados pelo menos em conformidade com as informações relativas à corrente suportável de curto-circuito (ver 9.3) e projetados para suportar pelo menos os esforços da corrente de curto-circuito limitada pelo(s) dispositivo(s) de proteção instalados no lado da alimentação dos barramentos.

No interior de uma coluna, os condutores (inclusive barramentos de distribuição) entre os barramentos principais e o lado de alimentação das unidades funcionais, bem como os componentes incluídos nestas unidades, podem ser dimensionados com base nos esforços da corrente de curto-circuito reduzida que ocorre no lado da carga do respectivo dispositivo de proteção contra curto-circuito no interior de cada unidade, contanto que estes condutores sejam dispostos de forma que, sob condições normais de funcionamento, um curto-circuito interno entre fases e/ou entre fase e terra não seja(m) esperado(s) (ver 8.6.4).

- **Encontrado:** NA

Salvo acordo em contrário entre o montador do CONJUNTO e o usuário, a seção mínima do neutro em um circuito trifásico e neutro deve ser:

- Para circuitos com uma seção de condutor de fase até e inclusive 16 mm², 100 % das fases correspondentes.

- Para circuitos com uma seção de condutor de fase acima de 16 mm², 50 % das fases correspondentes com um mínimo de 16 mm².

É assumido que as correntes de neutro não excedem 50 % das correntes de fase.

O PEN deve ser dimensionado como especificado em 8.4.3.2.3.

- **Encontrado:** É possível conectar condutores de 16 mm².

8.6 - Continuação:**8.6.2 - Circuitos auxiliares:**

O projeto dos circuitos auxiliares deve levar em conta o esquema de aterramento da alimentação e assegurar que uma falta a terra ou uma falta entre uma parte viva e uma parte condutiva exposta não cause funcionamento perigoso não intencional.

Em geral, os circuitos auxiliares devem ser protegidos contra os efeitos de curtos-circuitos.

Porém, um dispositivo de proteção contra curto-circuito não pode ser aplicado se o seu funcionamento estiver sujeito a causar perigo. Neste caso, os condutores dos circuitos auxiliares devem ser dispostos de tal maneira que não sejam esperados curtos-circuitos (ver 8.6.4).

- Encontrado: NA

8.6.3 - Condutores nus e isolados:

As conexões das partes condutoras de corrente não podem sofrer alterações indevidas, como resultado da elevação da temperatura normal, do envelhecimento dos materiais isolantes e das vibrações que ocorrem em funcionamento normal. Em particular, os efeitos da dilatação térmica e da ação eletrolítica, no caso de metais diferentes, e os efeitos da resistência dos materiais para as temperaturas atingidas devem ser considerados.

- Encontrado: NA

Conexões entre partes condutoras de corrente devem ser estabelecidas por meios que assegurem uma pressão de contato suficiente e durável.

- Encontrado: Estabelecidas por meios que assegurem uma pressão de contato suficiente e durável.

Se a verificação de elevação de temperatura for realizada com base em ensaios (ver 10.10.2), a seleção de condutores e as seções deles utilizados no interior do CONJUNTO devem ser de responsabilidade do fabricante original.

- Encontrado: Ver item 10.10.2.

Se a verificação de elevação de temperatura for feita segundo as regras de 10.10.3, os condutores devem ter uma seção mínima conforme a IEC 60364-5-52.

- Encontrado: NA

Exemplos sobre a maneira de adaptar esta Norma para as condições internas de um CONJUNTO são indicados nas tabelas incluídas no Anexo H. Além da capacidade condutora de corrente, a seleção leva em conta:

- os esforços mecânicos aos quais o CONJUNTO pode ser submetido;

- o método utilizado para acomodar e fixar os condutores;

- o tipo de isolamento;

- os tipos de componentes que são conectados (por exemplo, dispositivos de manobra e comando conforme a série IEC 60947; dispositivos ou equipamentos eletrônicos).

- Encontrado: NA

No caso de condutores isolados sólidos ou flexíveis:

- eles devem ser dimensionados pelo menos em função da tensão nominal de isolamento (ver 5.2.3) do circuito considerado.

- os condutores que conectam dois pontos de terminação não podem ter junção intermediária, por exemplo, uma emenda ou uma solda.

- os condutores com somente isolamento básica devem ser impedidos de entrar em contato com partes vivas nuas de potenciais diferentes.

- contato de condutores com arestas vivas deve ser evitado.

- condutores de alimentação de dispositivos e instrumentos de medição montados em fechamentos

- condutores de alimentação de dispositivos e instrumentos de medição montados em fechamentos ou portas devem ser instalados de maneira que nenhum dano mecânico possa ocorrer aos condutores, como resultado de movimento destes fechamentos ou portas.

- conexões soldadas ao dispositivo devem ser permitidas em CONJUNTOS somente em casos onde exista preparação para este tipo de conexão e o tipo especificado de condutor for utilizado.

8.6.3 - Continuação:

- para os dispositivos diferentes daqueles mencionados anteriormente, terminais dos condutores soldados ou extremidades de condutores retorcidas soldadas não são aceitáveis sob condições de fortes vibrações. Em locais onde existam fortes vibrações durante o serviço normal, por exemplo, no caso de operação de escavadeira e guindaste, operação a bordo de navios, equipamento de transporte e locomotivas, é conveniente que seja dada atenção para a sustentação dos condutores.

- na forma usual, só um condutor deveria ser conectado a um borne; a conexão de dois ou mais condutores em um borne é permissível somente naqueles casos em que os bornes forem projetados para este fim.

- **Encontrado:** NA

O dimensionamento da isolamento sólida entre circuitos distintos deve ser baseado no circuito de tensão nominal de isolamento mais elevado.

- **Encontrado:** NA

8.6.4 - Seleção e instalação de condutores vivos não protegidos para reduzir a possibilidade de curtos-circuitos:

Condutores vivos em um CONJUNTO, que não sejam protegidos por dispositivos de proteção contra curto-circuito (ver 8.6.1 e 8.6.2) devem ser selecionados e instalados ao longo de todo CONJUNTO de tal maneira que um curto-circuito interno entre fases ou entre fase e terra seja uma possibilidade remota.

Exemplos de tipos de condutores e requisitos de instalação são dados na Tabela 4.

Os condutores vivos não protegidos selecionados e instalados conforme a Tabela 4 devem ter um comprimento total não excedendo 3 m entre o barramento principal e cada DPCC.

- **Encontrado:** NA

8.6.5 - Identificação dos condutores de circuitos principais e auxiliares:

Com a exceção dos casos mencionados em 8.6.6, o método e a extensão da identificação de condutores, por exemplo, por disposição, por cores ou por símbolos, nos bornes aos quais eles são conectados ou na(s) extremidade(s) dos condutores em si, é de responsabilidade do montador do CONJUNTO e deve estar de acordo com as indicações nos esquemas de ligações e desenhos. Onde apropriado, a identificação de acordo com a IEC 60445 deve ser aplicada.

- **Encontrado:** NA

8.6.6 - Identificação do condutor de proteção (PE, PEN) e do condutor neutro (N) dos circuitos principais:

O condutor de proteção deve ser facilmente distinguível pela localização e/ou pela marcação ou pela cor. Se for utilizada a identificação pela cor, a cor deve ser verde ou verde e amarela (dupla cor), que são estritamente reservadas para o condutor de proteção.

- **Encontrado:** Cor verde.

Quando o condutor de proteção é um cabo isolado de único núcleo, esta identificação de cor deve ser utilizada, de preferência, por toda a extensão.

- **Encontrado:** NA

Todo condutor de neutro do circuito principal deve ser facilmente distinguível pela localização e/ou pela marcação ou pela cor (ver IEC 60445 que exige o azul claro).

- **Encontrado:** Cor azul.

8.7 - Refrigeração

- **Encontrado:** Ensaio não aplicável.

8.8 - Bornes para condutores externos

O montador do CONJUNTO deve indicar se os bornes são apropriados para conexão de condutores de cobre ou de alumínio, ou ambos. Os bornes devem ser tais que os condutores externos possam ser conectados por meios (parafusos, conectores etc.) que assegurem que a pressão de contato necessária correspondente à corrente nominal e à corrente de curto-circuito do dispositivo ao circuito seja mantida.

- **Encontrado:** Bornes asseguram que os condutores possam ser conectados com pressão de contato adequada.

Na ausência de um acordo especial entre o montador do CONJUNTO e o usuário, os bornes devem ser capazes de acomodar condutores da menor à maior seção correspondente à corrente nominal (ver Anexo A).

- **Encontrado:** Bornes acomodam condutores de menor e maior seção.

Onde forem utilizados condutores de alumínio, o tipo, as dimensões e o método de terminação dos condutores devem estar conforme acordado entre o montador do CONJUNTO e o usuário.

No caso onde os condutores externos para circuitos eletrônicos com baixos níveis de correntes e tensões (menos que 1 A e menos de 50 V ca. ou 120 V c.c.) tenham que ser conectados a um CONJUNTO, a Tabela A.1 não se aplica.

- **Encontrado:** NA

O espaço disponível para ligações elétricas deve permitir conexão adequada dos condutores externos do material indicado e, no caso de cabos com múltiplos condutores, acomodação adequada dos condutores.

- **Encontrado:** Espaço permite a conexão adequada dos condutores.

Os condutores não podem ser submetidos a esforços que podem reduzir sua expectativa de vida normal.

- **Encontrado:** Não são submetidos a esforços que podem reduzir sua expectativa de vida normal.

Salvo acordo em contrário entre o montador do CONJUNTO e o usuário, em circuitos trifásicos e com neutro, os bornes do condutor neutro devem permitir a conexão de condutores de cobre que tenham uma seção mínima:

- Igual à metade da seção do condutor de fase, com um mínimo de 16 mm², se a seção do condutor de fase excede 16 mm²;

- Igual à seção do condutor de fase, se a seção do último for menor ou igual a 16 mm².

- **Encontrado:** Bornes asseguram que os condutores possam ser conectados com pressão de contato adequada.

Se forem providos meios de conexão de neutro de entrada e de saída, de condutores de proteção e de condutores PEN, eles devem ser dispostos próximos dos bornes dos condutores de fase correspondentes.

- **Encontrado:** Dispostos próximos dos bornes dos condutores de fase correspondentes.

Aberturas para cabos de entrada, placas de fechamento etc, devem ser projetadas de tal forma que, quando os cabos forem instalados corretamente, as medidas de proteção especificadas contra contato e grau de proteção devem ser obtidas. Isto implica na seleção de meios de entrada apropriados para a aplicação, como especificado pelo montador do CONJUNTO.

- **Encontrado:** Quando os cabos são instalados corretamente, as medidas de proteção especificadas são obtidas.

Os bornes para condutores de proteção externos devem ser marcados de acordo com a IEC 60445. Como um exemplo, ver símbolo gráfico N° 5019 da IEC 60417. Este símbolo não é requerido onde é pretendido que o condutor de proteção externo seja conectado a um condutor de proteção interno, que é claramente identificado com as cores verde ou verde e amarela.

- **Encontrado:** Possui símbolo de terra conforme especificado.

Os bornes para condutores de proteção externos (PE, PEN) e blindagem de metal de cabos de conexão (eletroduto de aço etc.) devem, onde exigido, ser nus e, salvo especificação em contrário, apropriados para a conexão de condutores de cobre. Um borne separado de tamanho adequado deve ser provido para o(s) condutor(es) de proteção de saída de cada circuito.

- **Encontrado:** Bornes nus, apropriados para a conexão de condutores de cobre.

Salvo acordo em contrário entre o montador do CONJUNTO e o usuário, os bornes para condutores de proteção devem permitir a conexão de condutores de cobre que tenham uma seção que depende da seção dos condutores de fase correspondentes de acordo com a Tabela 5.

- **Encontrado:** Bornes permite a conexão de condutores de cobre que tenham uma seção que depende da seção dos condutores de fase correspondentes de acordo com a Tabela 5.

No caso de invólucros e condutores de alumínio ou liga de alumínio, deve ser dada consideração particular ao perigo de corrosão eletrolítica. Os meios de conexão para assegurar a continuidade das partes condutivas com condutores de proteção externos não podem ter nenhuma outra função.

- **Encontrado:** NA

8.8 - Continuação:

A identificação dos bornes deve obedecer à IEC 60445 a menos que seja declarado em contrário.

- **Encontrado:** Possui identificação adequada.

Um DBO deve ter ao menos um borne de neutro para cada circuito de saída que necessite de um borne de neutro.

- **Encontrado:** Bornes neutros adequados.

Estes bornes devem estar localizados ou identificados na mesma sequência que seus respectivos bornes de condutores de fase.

- **Encontrado:** Localização é indiferente.

Os DBO devem ter um mínimo de dois bornes para os condutores de equipotencialização de proteção da instalação elétrica.

- **Encontrado:** NA

9.1 - Propriedades dielétricas**Aplicação de tensão:**

- **Especificado:** O relê de sobrecorrente não pode atuar e não pode ocorrer nenhuma descarga disruptiva durante os ensaios.

Resultados encontrados:

Parte sob ensaio:	Tensão aplicada:	Encontrado:
Circuito principal e dispositivo de abertura da porta	1.890 V	Suportou o ensaio, sem falhas
Entre cada parte viva de diferente potencial de circuito principal e as outras partes vivas	1.890 V	Suportou o ensaio, sem falhas

Aplicação de tensão de impulso suportável:

- **Especificado:** Para que o resultado seja aceitável, não pode haver descarga disruptiva durante os ensaios.

Resultados encontrados:

Parte sob ensaio:	Tensão aplicada:	Encontrado:
Circuito principal e dispositivo de abertura da porta	9.300 V	Suportou o ensaio, sem falhas
Entre cada parte viva de diferente potencial de circuito principal e as outras partes vivas	9.300 V	Suportou o ensaio, sem falhas

Ensaio dos invólucros de material isolante:

- **Especificado:** Para que o resultado seja aceitável, não pode haver descarga disruptiva durante os ensaios.

Resultados encontrados:

Parte sob ensaio:	Tensão aplicada:	Encontrado:
Invólucro	2.835 V	Suportou o ensaio, sem falhas

9.2 - Limites de elevação de temperatura

Corrente de ensaio: 63 A / **Duração do ensaio até estabilização:** 4 horas / **Condutor utilizado:** 16 mm²

Local de medição:	Especificado (ΔT máximo)	Temperatura média (°C)	
		Estabilização:	ΔT
Borne (R)	70 °C	73,4	52,7
Borne (S)	70 °C	77,3	56,6
Borne (T)	70 °C	76,7	56,1
Elemento de comando	25 °C	31,5	10,6
Tampa	40 °C	30,1	9,4

10.2.7 - Marcação

As marcações por moldagem, impressão, gravação ou processo similar, inclusive as etiquetas munidas de revestimento plástico, não podem ser submetidas ao seguinte ensaio.

- **Encontrado:** Após o ensaio, a marcação deve ser legível com uma visão normal ou corrigida sem ampliação adicional.

- **Encontrado:** Após o ensaio, a marcação permaneceu legível.

“As opiniões e interpretações, expressas abaixo, não fazem parte do escopo da acreditação deste laboratório”.

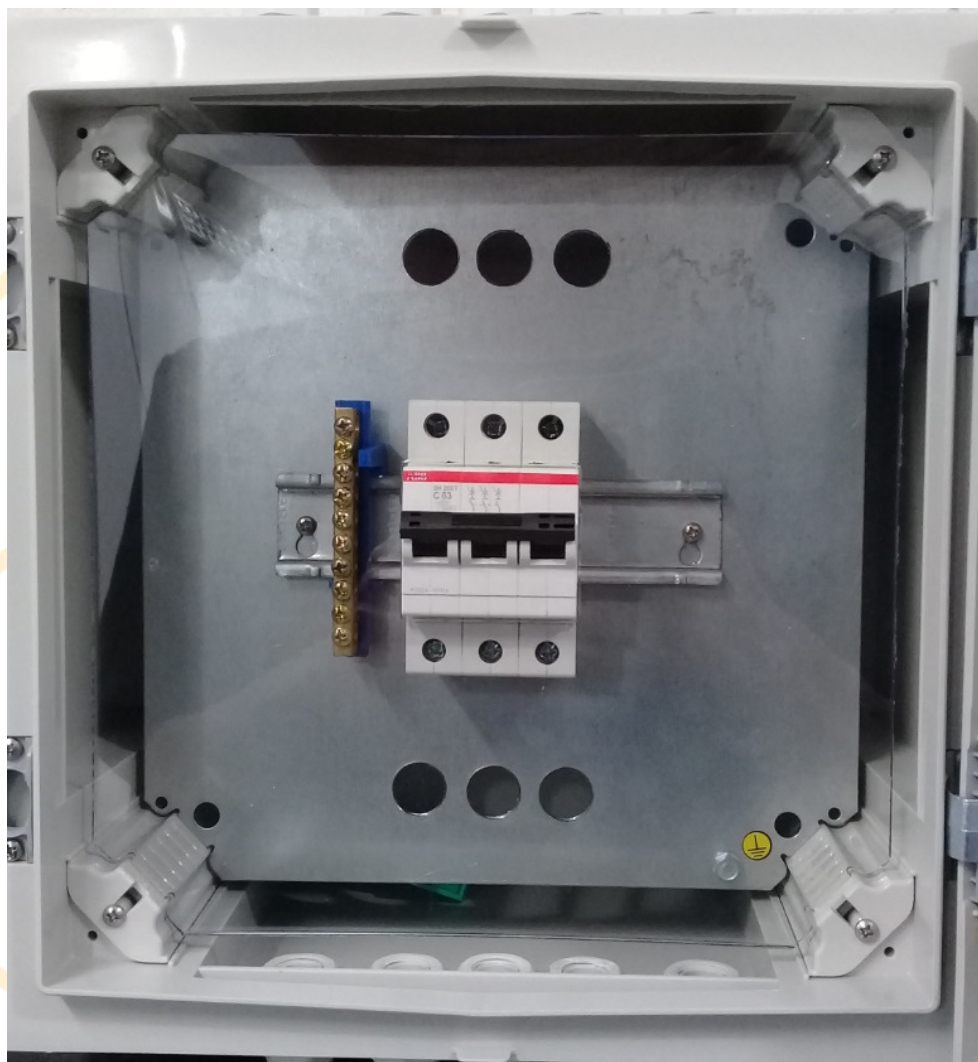
Observações finais: Sem observações.


RICHARD ALBERT SILVA
LABORATÓRIO DE ENSAIOS


JOSÉ A. SEIXAS
DIRETOR TÉCNICO
CREA 0601383350

ITEN

Anexo: Foto representativa das amostras ensaiadas



FE 20150

Fechadura-eletrôímã

A fechadura FE 20150 tem tração de 150 kgf, é compatível com controladores de acesso e se adapta a todos os tipos de porta (madeira, alumínio, aço e vidro), inclusive quando há desníveis de até 20 mm. Para instalações em portas de vidro, é necessário adquirir o suporte para porta de vidro (SV 20150) ou a fita dupla face indicada pela Intelbras.

Características

- » Acabamento na cor prata
- » Facilidade de instalação
- » Compatível com controladores de acesso
- » Disponível nas versões com e sem sensor de porta aberta
- » Compatível com portas com abertura para dentro e para fora do ambiente



Especificações técnicas

Modelo	FE 20150
Tensão	12 a 16 Vdc
Corrente de operação	400 mA
Potência	4,8 W
Dimensões (L x A x P)	145 x 47 x 28 mm
Temperatura de operação	0 °C ~ 60 °C



MH 104 A

Mola Hidráulica Aérea

A Mola Hidráulica Aérea é para uso em portas/portões de madeira ou metal. É fabricada em alumínio, podendo ser instaladas em portas com abertura direita ou esquerda.

- » 2 Ajustes de velocidade de fechamento
- » Acabamento na cor prata



Especificações técnicas

Regulagem de fechamento	180° a 20° e 20° a 0°
Modo de funcionamento	Mecânico hidráulico
Temperatura de operação	-10 °C ~ 50 °C
Instalação reversível	Direita/ Esquerda
Potência	F4
Peso da porta	Até 85 Kg
Largura da porta	≤ 1100 mm
Peso do produto	1782 g
Dimensão do produto (L X A X P)	44 x 73 x 206 mm



Digicon (<https://www.digicon.com.br>)

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☰ MENU

Aeroespacial (<https://www.digicon.com.br/aeroespacial/>)

Mobilidade (<https://www.digicon.com.br/mobilidade/>)

Controle de acesso (<https://www.digicon.com.br/controle-de-acesso/>)

Características (<https://www.digicon.com.br/controle-de-ponto/>) **Opcionais** [Contato](https://www.digicon.com.br/contato/) (<https://www.digicon.com.br/contato/>)

- Controladora com processador Power PC – 48 Mhz – Risc Motorola
- Solução possui Sistema Operacional Linux.
- Equipamento possui 8 Mb Mem. Flash.
- Equipamento possui 32 Mb Mem. Ram.
- Conexão de Rede TCP/IP – Nativo base 10T.
- Tecnologia desenvolvida pela Digicon, integrando sistemas de acesso e projetos de bilhetagem e transportes com tecnologia Mifare como plataforma.
- Possui três entradas para leitores Mifare.
- Possui três entradas para leitores de Proximidade RFID.
- Possui duas entradas para leitores Código de Barras.
- Equipamento contém quatro entradas digitais para sensores diversos.
- Equipamento possui três saídas para catraca ou portas.
- Equipamento possui oito saídas digitais para acionamentos diversos.
- Possui duas portas seriais RS-232.

- Leitor de código de barras com fenda para passagem de crachá.
- Leitor de código de barras com multifeixe – aproximação do ingresso.
- Leitor de código 2D (bidimensional).
- Leitor proximidade Wiegand/Abatrack
- HID/Indala/Acura.
- Leitor Mifare.
- Leitor biométrico.
- Fonte full range 90 a 240 vac.
- Nobreak.

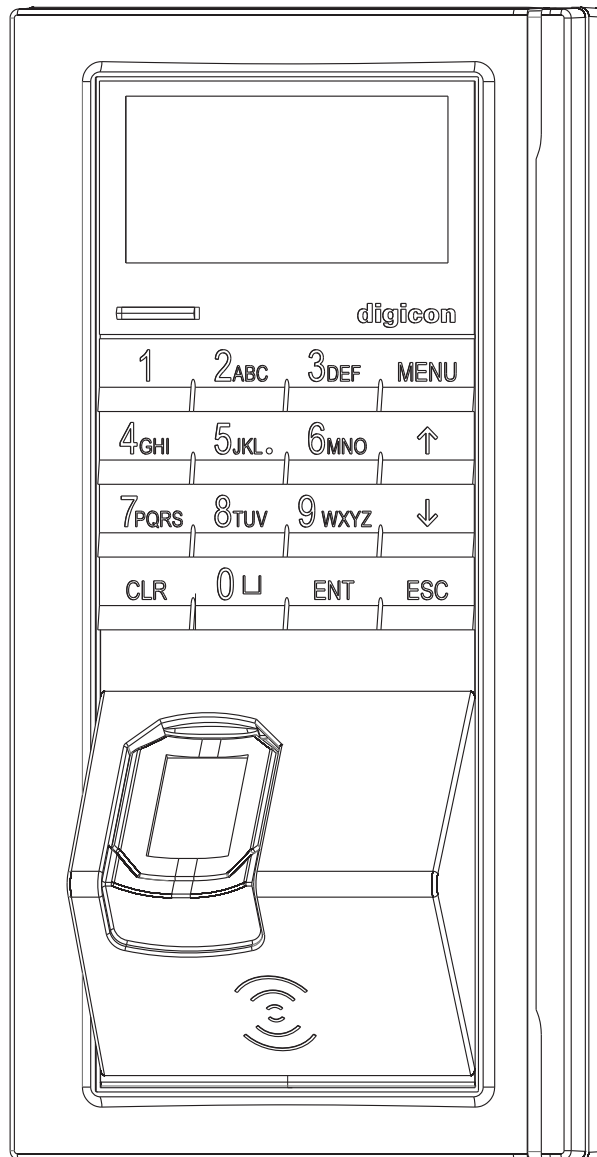
MCA Painei

Terminal sem display, teclado e gabinete, a MCA Painei pode ser instalada em local não aparente sendo conectada apenas as leitoras e dispositivos de acionamento, como o controle de cancelas e acesso restrito a portas com instalação apenas das leitoras.

Q

Área
Acesso
Cliente

mcanet II



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Controle Eletrônico para Mecânica

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Código: 069.31.169
Versão: 06

Este manual foi elaborado por: Digicon S.A. Controle Eletrônico para Mecânica
Setor de documentação - EDS

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1. Instruções Importantes

Segue abaixo os símbolos que aparecerão ao decorrer do manual, indicando momentos importantes. É essencial prestar muita atenção neles.



DICA: Vai lhe indicar algo que a Digicon considera importante.



CUIDADO: Indica o momento que deverá ter muita cautela ao manusear o equipamento/produto.



ATENÇÃO: Mostra o momento que sua postura de observador deve ser a mais produtiva possível.



INFORMAÇÃO: Apresenta curiosidades sobre o produto adquirido.



QR CODE: Apresenta informações adicionais ou links que detalham melhor o texto apresentado.

2. Orientações

- Leia atentamente as informações e instruções constantes neste manual antes de utilizar o produto. Isso vai garantir o uso correto do equipamento e o aproveitamento máximo de seus recursos técnicos, além de prolongar sua vida útil.
- Este produto não apresenta vedação contra chuva, ou seja, é projetado para uso em ambientes cobertos.
- Guarde este manual para futuras consultas.
- A Digicon se reserva o direito de modificar as características de seus produtos a qualquer momento para adaptá-los a desenvolvimentos tecnológicos mais recentes.
- A Digicon se reserva o direito de alterar as informações contidas neste manual sem notificação prévia.
- A Digicon não dá qualquer garantia contratual no que diz respeito às informações contidas neste manual e não poderá ser tida como responsável por erros que ele possa conter nem por problemas causados por sua utilização.
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3. Apresentação

O sistema de Acesso **MCANet II** é uma solução completa para o controle de acesso a ambientes, possuindo várias formas de acesso sofisticadas e de fácil utilização, como:

- Entrada de senha via teclado;
- Reconhecimento biométrico (digitais);
- Leitura de cartões sem contato (MIFARE e RFID);
- Cartão com contato com código de barras;

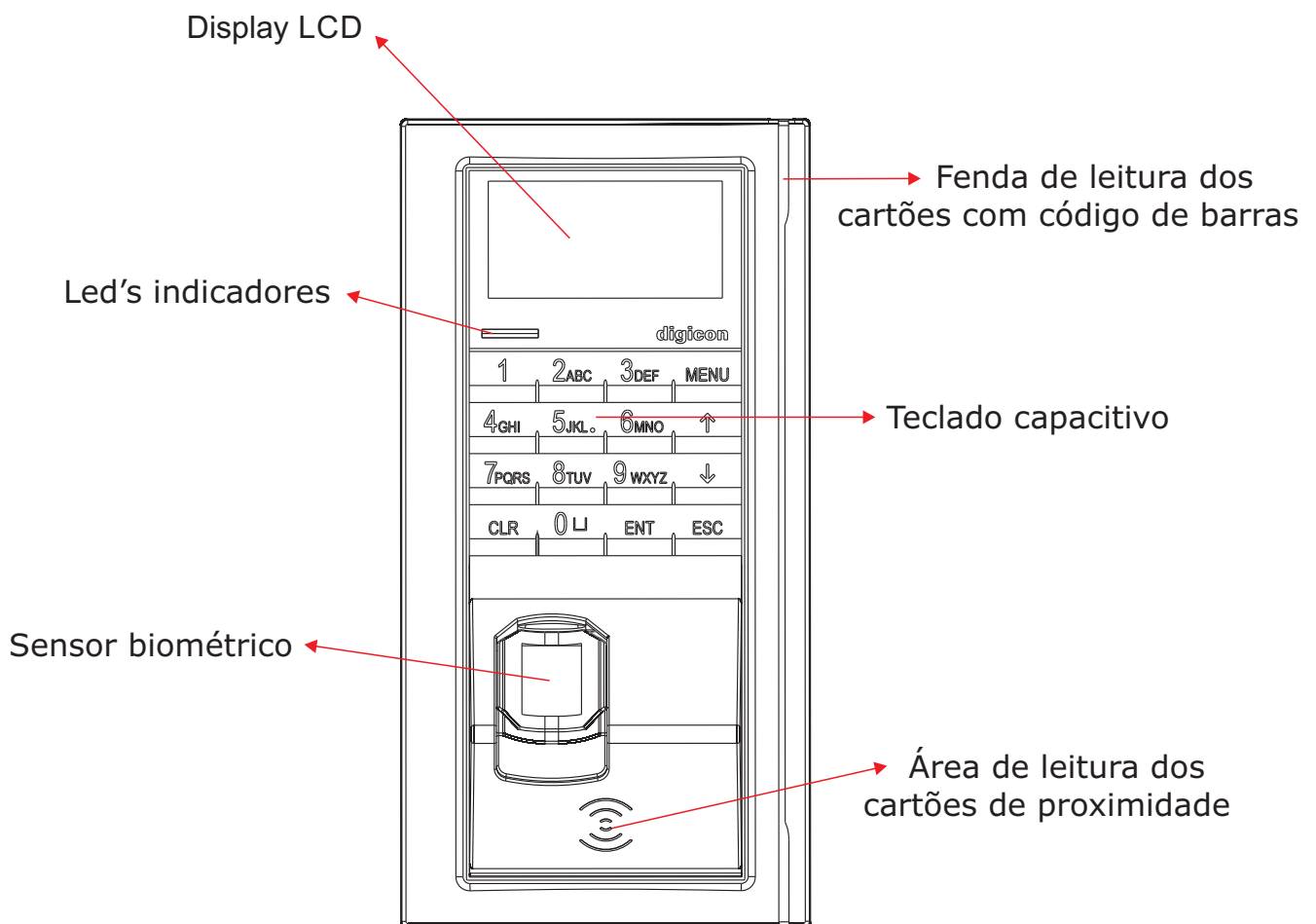
De fácil utilização e de simples instalação ele lhe oferece maior segurança e administração dos locais desejados gerando um banco de dados contendo informações sobre a entrada de indivíduos na localidade monitorada e armazenamento de eventos relativos ao uso do dispositivo.



4. Características da MCANet II

Possuindo um formato moderno e prático o **MCANet II** possui um *display* de 128x64 pontos (LCD), teclado alfanumérico capacitivo para maior sensibilidade, 6 teclas de comando, sensor biométrico para leitura de digitais, leitor de cartões de proximidade (MIFARE e RFID) e um leitor de código de barras.

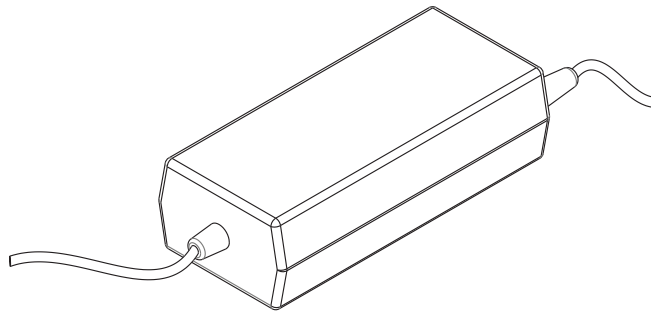
Os dispositivos presentes podem variar, adequando-se á necessidade do usuário.



4.1 Conjunto Fonte

O conjunto fonte foi desenvolvido especialmente para a **MCANet II**. Dentre suas principais vantagens está a sua capacidade de adaptação às variações de voltagem frequentemente encontradas nos locais de instalação (a tensão de entrada pode variar entre 100 a 240 Vca).

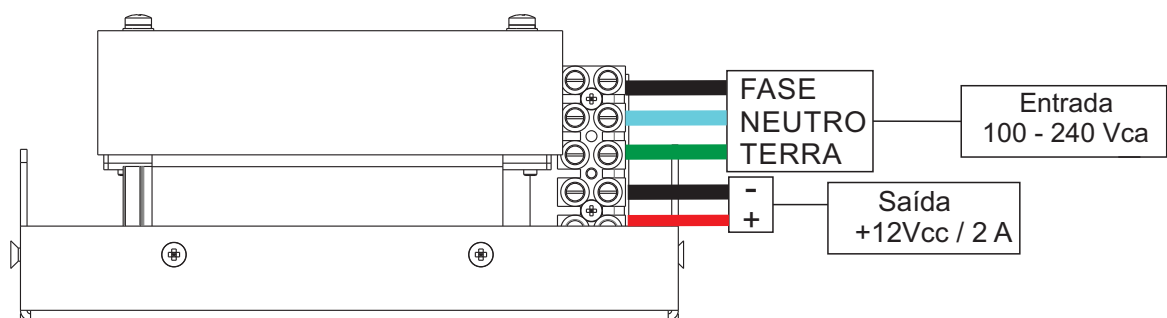
As características técnicas, proteções e dimensões específicas deste conjunto foram testadas e aprovadas em condições extremas de temperatura e ambiente, o que permite garantir uma alimentação adequada ao funcionamento do equipamento.



4.2 Conjunto No-break

O circuito de no-break é responsável pela manutenção da alimentação da **MCANet II** mesmo sem energia elétrica. O No-break possui uma bateria de 12Vcc/1,3A, proporcionando uma autonomia de até 5 horas (no caso falta de energia elétrica).

As características técnicas, proteções e dimensões específicas deste conjunto foram testadas e aprovadas em condições extremas de temperatura e ambiente, o que permite garantir uma alimentação adequada ao funcionamento do equipamento.



INFORMAÇÃO: A Autonomia do no-break citada acima, refere-se apenas ao consumo da **MCANet II** na versão sem biometria. Este tempo é menor ainda quando o equipamento está conectado a uma carga (eletroímã, solenóide, entre outros).

5. Funcionamento da MCA Net II

5.1 Utilizando os dispositivos de autorização

Os vários dispositivos de autorização utilizados pelo Sistema de Acesso **MCA Net II** são listados nas seções a seguir, juntamente com seus modos de utilização.

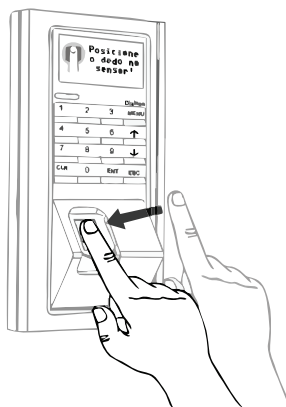
Para auxiliar o usuário o display irá sempre mostrar as instruções a serem seguidas em cada passo da autenticação ou cadastro de pessoal.



INFORMAÇÃO: *Este sistema pode variar de acordo com o software escolhido/instalado na **MCA Net II**.*

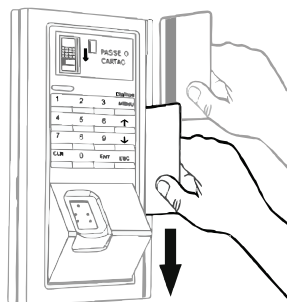
5.1.1 Sensor biométrico de digitais

O sensor biométrico é um dispositivo projetado para a identificação de pessoas, através do escaneamento de suas digitais e comparação com dados previamente coletados durante o cadastro. Sistemas que utilizam este tipo de identificação são mais seguros e também mais cômodos, não necessitando que o usuário carregue qualquer outro tipo de identificação. Para utilizar o sensor biométrico, basta posicionar o dedo desejado para cadastro ou identificação no mesmo após a luz se acender. O fim do cadastro ou identificação chegará ao fim, quando a luz se apagar, até que isto ocorra o usuário deve manter o dedo na posição de identificação indicada na figura.



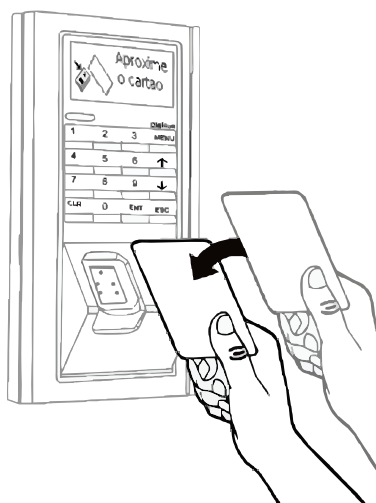
5.1.2 Leitor de código de barras:

A utilização do leitor de código de barras consiste simplesmente na passagem do cartão pelo vão de leitura até o fim, com a tarja de barras voltada para o lado do display. É um procedimento rápido e simples e largamente utilizado no mercado atualmente.



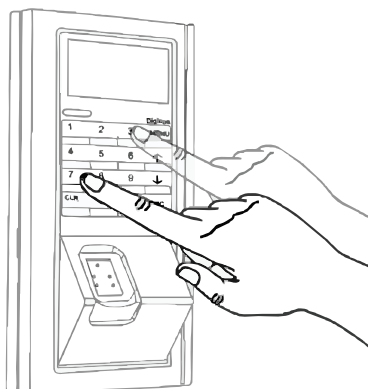
5.1.3 Leitor do cartão Mifare

Os leitores de cartão sem contato MIFARE e RFID são utilizados aproximando-se o cartão da área de leitura. Em ambos os casos o leitor fica na mesma posição.



5.1.4 Teclado capacitivo

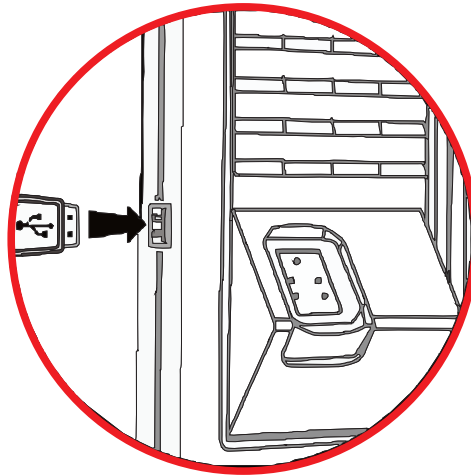
O teclado do **MCANet II** é um teclado sensível ao toque, o que lhe possibilita um maior tempo de utilização bem como o acionamento de teclas sem esforço, simplesmente com a aproximação da ponta do dedo na tecla desejada e também é mais protegido de poeiras e da chuva.



ATENÇÃO: O funcionamento do teclado depende da aplicação instalada no equipamento.

5.1.5 Entrada USB

O dispositivo possui ainda uma entrada USB, utilizada para coleta de dados e/ou atualização do firmware.



ATENÇÃO: A utilização do cabo USB depende da aplicação instalada no equipamento.

6. Instalação e montagem

No interior da caixa, será encontrado um suporte liso para fixação do dispositivo em uma parede ou suporte e uma caixa metálica (item opcional) para instalação utilizando eletrodutos. Recomenda-se que o usuário primeiramente faça a fixação dos suportes do modo apropriado para depois proceder com o cabeamento.

O **MCANet II** possui um sensor de violação, não permitindo que o mesmo funcione caso o sensor esteja violado ou fora de seu suporte.



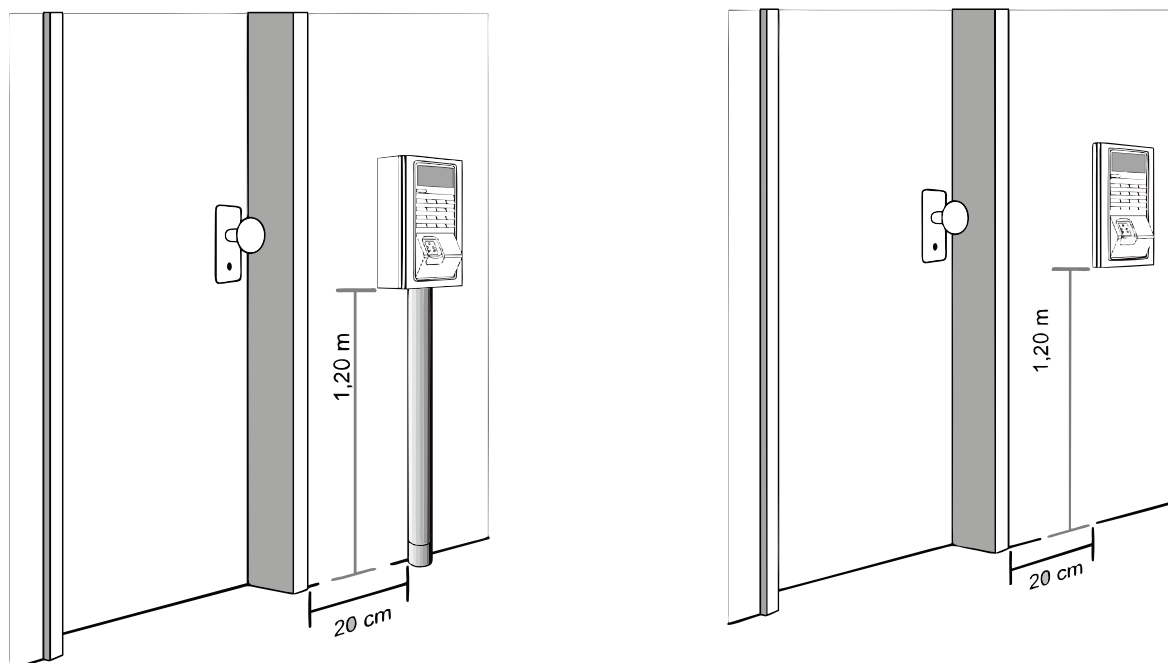
DICA: Recomenda-se que o usuário configure o dispositivo após sua devida fixação e instalação dos cabos.

6.1 Instalação física

Para melhor utilização do dispositivo, é recomendado que o usuário siga as recomendações abaixo.

Na instalação do dispositivo devem ser seguidas algumas distâncias de segurança, para conforto quando forem efetuadas as operações de autorização, navegação e utilização da porta USB.

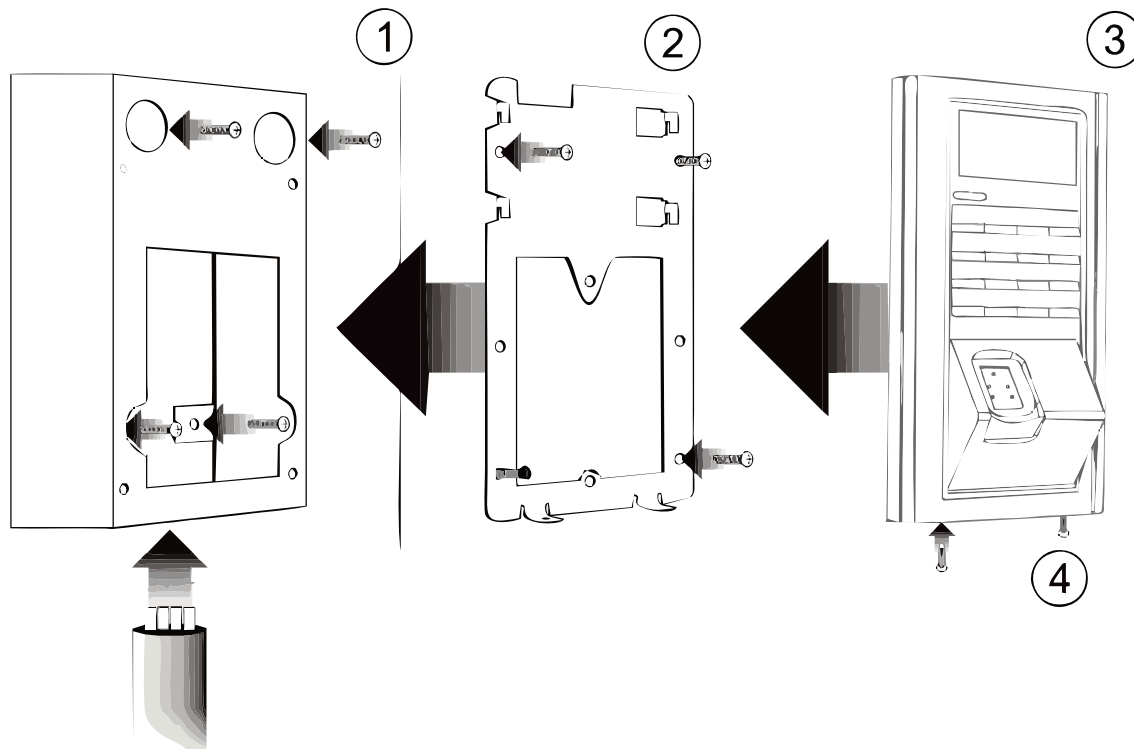
As distâncias recomendadas são a 1,20 m de altura e 20 cm de distância da porta onde será instalado o equipamento, com o ilustrado abaixo:



A instalação do dispositivo pode ser feita de duas maneiras como citado acima:

- Utilizando a caixa metálica, para instalação em locais aonde não há a possibilidade de utilização de cabeamento estruturado, e os cabos são passados através de eletrodutos.
- Utilizando a abertura da caixa de embutir 2x4 para passagem de cabeamento estruturado.

6.1.1 Fixação utilizando caixa metálica



Abaixo são detalhados cada um dos passos:

1. Instalação da caixa metálica que servirá de apoio ao suporte liso, aonde estarão presentes os cabos para conexão no dispositivo (alimentação, ethernet, conexões da fechadura e auxiliar, etc...). Na parte posterior da caixa existem 4 furos para os parafusos, utilizados para fixação da caixa na parede. Os parafusos estarão incluídos no kit da caixa metálica.

2. Instalação do suporte liso para encaixe do MCANet II: A instalação do suporte liso consiste somente em seu encaixe e fixação dos parafusos nos quatro furos da caixa metálica, indicados na figura a cima.

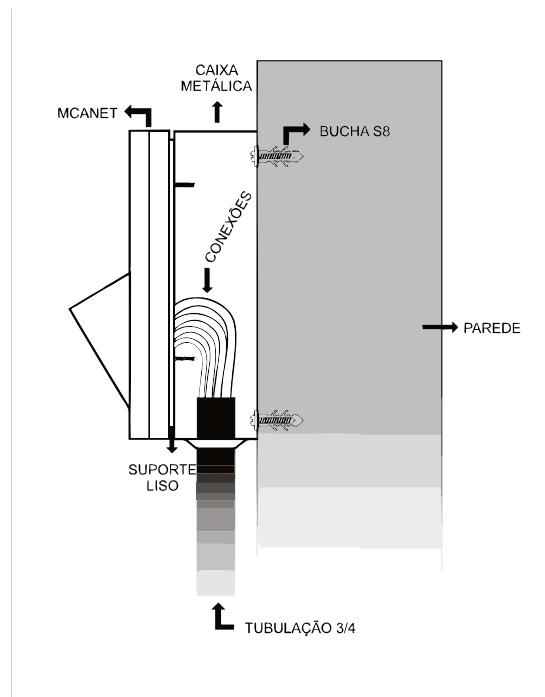
3. Encaixe do MCANet II no suporte liso: Para colocar o **MCANet II** no suporte liso, basta inseri-lo no mesmo e encaixa-lo empurrando-o para cima. A fixação do mesmo será feita no próximo passo.

4. Fixação do MCANet II no suporte liso: Existem na parte de baixo do **MCANet II**, dois furos para inserção dos parafusos de fixação do suporte liso. Após o encaixe do **MCANet II**, basta fixar os dois parafusos na parte de baixo do dispositivo.



CUIDADO: *Certifique-se de que o **MCANet II** se encontra bem encaixado para evitar o acionamento do sensor de violação, caso isto aconteça o dispositivo ficará travado, impedindo sua utilização.*

A seguir vemos como ficaria em perfil a fixação da caixa na parede:



6.1.2 Fixação utilizando caixa 2x4

A instalação do dispositivo com a utilização da caixa pode ser feita em 4 passos:

- 1. Instalação do cabeamento:** estruturado com as conexões do dispositivo (alimentação, ethernet, conexões da fechadura e auxiliar, etc...).
- 2. Instalação do suporte liso para encaixe do MCANet II:** A instalação do suporte liso consiste somente em seu encaixe e fixação dos parafusos nos dois furos indicados na figura acima.
- 3. Encaixe do MCANet II no suporte liso:** Para colocar o **MCANet II** no suporte liso, basta inseri-lo no mesmo e encaixa-lo empurrando-o para cima.
- 4. Fixação do MCANet II no suporte liso:** Existem na parte de baixo do **MCANet II**, dois furos para inserção dos parafusos de fixação do suporte liso. Após o encaixe do **MCANet II**, basta fixar os dois parafusos na parte de baixo do dispositivo.



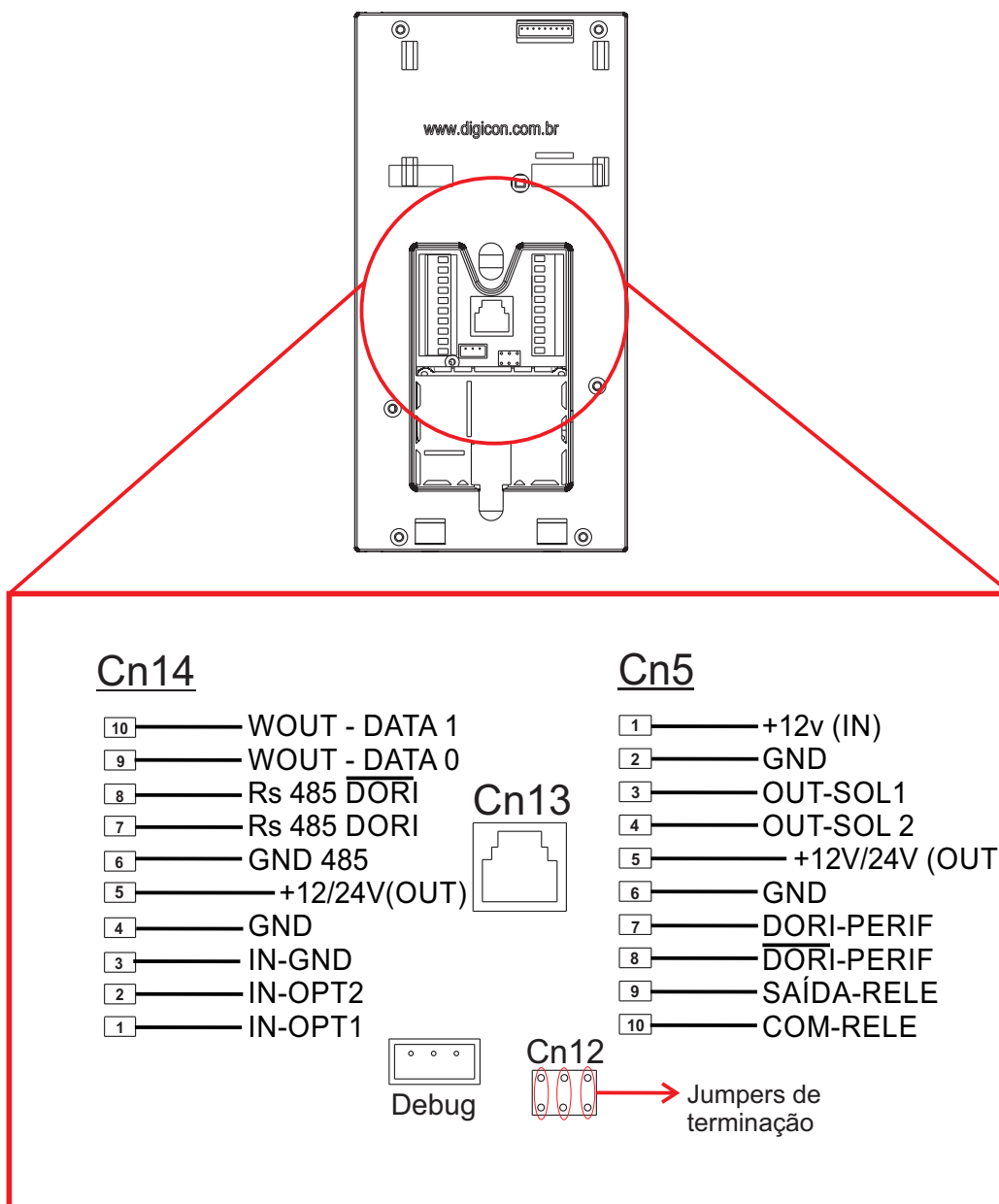
CUIDADO: *Certifique-se de que o **MCANet II** se encontra bem encaixado para evitar o acionamento do sensor de violação, caso isto aconteça o dispositivo ficará travado, impedindo sua utilização.*

6.2 Instalação Elétrica

O equipamento **MCANet II** possui entradas e saídas para ligação de dispositivos de controle (botoeira, eletroímã, fechos, etc.).

Neste capítulo, serão apresentadas as ligações elétricas da alimentação e de cada periférico do **MCANet II**.

Segue abaixo desenho com a identificação dos conectores existentes na parte traseira do **MCANet II**:

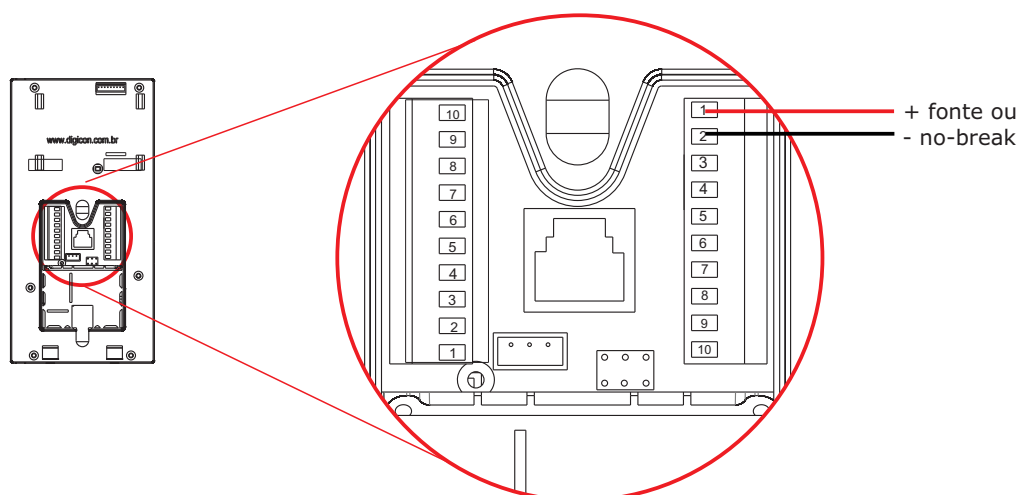


ATENÇÃO: Alguns dos sinais acima necessitam de software aplicativo específico para serem utilizados.

6.2.1 Alimentação

O equipamento **MCANet II** possui duas formas de alimentação: via borneira (fonte ou no-break) ou via cabo ethernet (POE).

Para alimentar o **MCANet II** através da borneira, efetuar as ligações conforme o desenho a seguir:



Para uso de alimentação via cabo ethernet (POE), basta apenas conectar o cabo ethernet no **MCANet II** (ver capítulo 6.2.4).

Para esta opção de alimentação funcionar corretamente, exige-se:

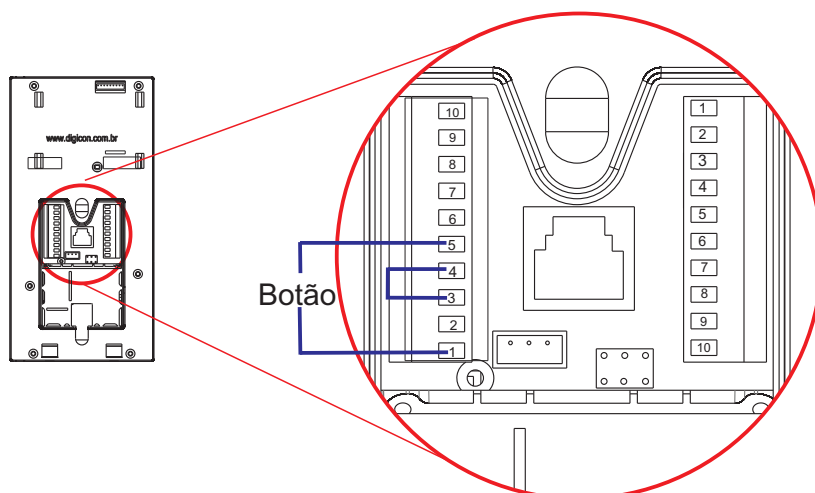
- A porta do switch em que o **MCANet II** estiver conectado deve fornecer pelo menos 12,95W (norma IEEE802.3af).
- Não conectar fonte de alimentação externa na borneira.



ATENÇÃO: Para alimentar o **MCANet II** deve-se utilizar sempre apenas uma das opções de alimentação (borneira ou ethernet). O uso de alimentações simultâneas irá comprometer o funcionamento do **MCANet II**.

6.2.2 Botoeira

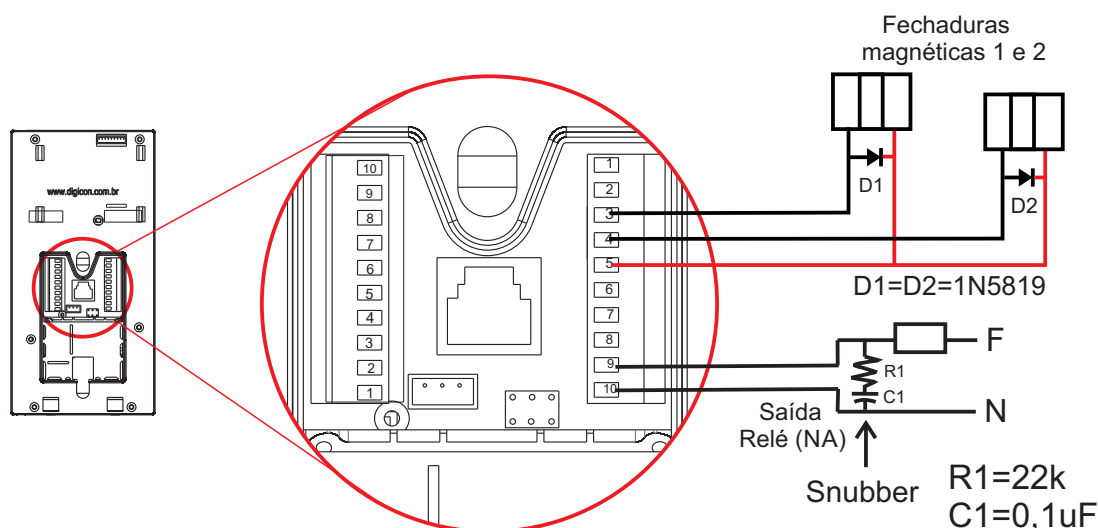
Para ligar o circuito da botoeira, ou botão, utilizar o esquema de ligação abaixo:



Como mostrado na figura, deve-se colocar em curto os contatos **3 ((-) entradas) e 4 ((-) saída 12V)** e ligar cada contato do botão com um dos contatos indicados - **1 ((+) entrada 0) e 5 ((+) saída 12V)**.

6.2.3 Acionamentos

Podem ser ligados duas fechaduras magnéticas ao **MCANet II**, para o controle de portas. As fechaduras magnéticas devem ser ligadas do modo mostrado abaixo:



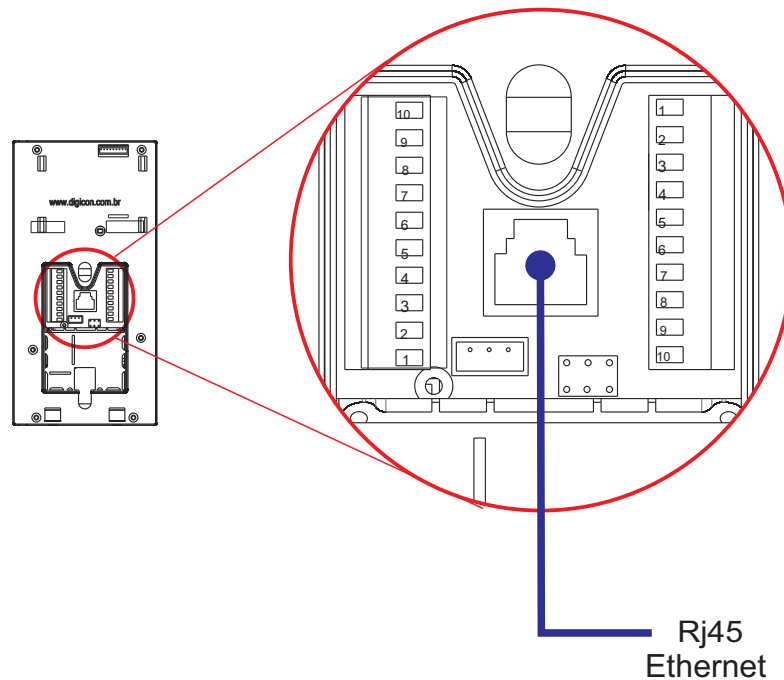
- A fechadura magnética 1 deve ter a entrada de +12V ligada ao contato **5 ((+) saída 12V)**, e o GND ligado ao contato **3 (OUT_SOL 1)**.
- A fechadura magnética 2 deve ter a entrada de +12V ligada ao contato **5 ((+) saída 12V)**, e o GND ligado ao contato **4 (OUT_SOL 2)**. Recomenda-se conectar junto à fechadura magnética diodos (D1 e D2) em anti-paralelo para evitar que a corrente reversa no indutor danifique o **MCANet II**.
-
-
- No caso de haver necessidade de acionamento via contato seco, pode-se utilizar a saída relé. Se a saída relé for utilizada para acionamento de dispositivos de corrente alternada (campainha, cigarra, motor, ...), recomenda-se adicionar um circuito snubber (capacitor + resistor) para proteger o **MCANet II**.



ATENÇÃO: Quando utilizada alimentação via cabo ethernet (POE), a corrente máxima para acionamentos em SOL1 e SOL2 não deve ultrapassar 500mA. Caso a corrente exigida ultrapasse este valor, o circuito de proteção interno do **MCANet II** irá reiniciar o equipamento.

6.2.4 Cabo Ethernet

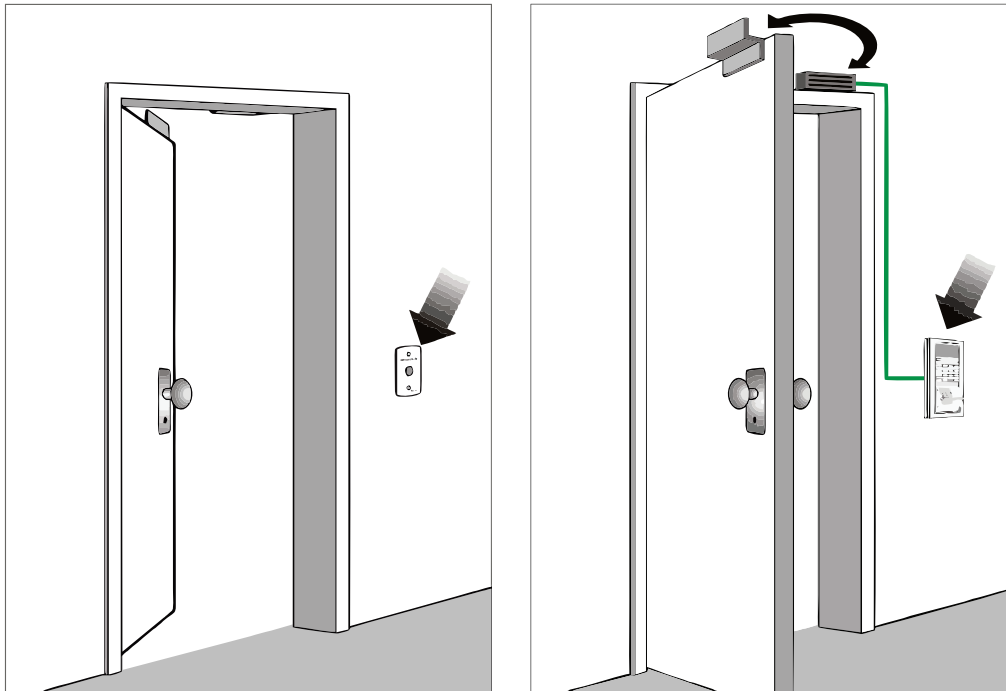
O cabo ethernet deve ser conectado ao conector tipo RJ45, localizado no verso do dispositivo, indicado na figura:



ATENÇÃO: O **MCANet II** possui a opção de ser alimentado via o cabo ethernet (POE). Caso o **MCANet II** seja alimentado pela borneira, certificar-se que o switch não esteja fornecendo energia via o cabo ethernet.

6.2.5 Exemplo de instalação Fechadura e botão

Abaixo temos um exemplo de como deve ser instalada a fechadura e também da utilização do botão:



Duas das saídas da **MCANet II**, podem ser ligadas aos contatos da fechadura magnética, de modo que quando o dispositivo efetuar a permissão de um usuário a saída configurada para fechadura seja acionada, permitindo o acesso.

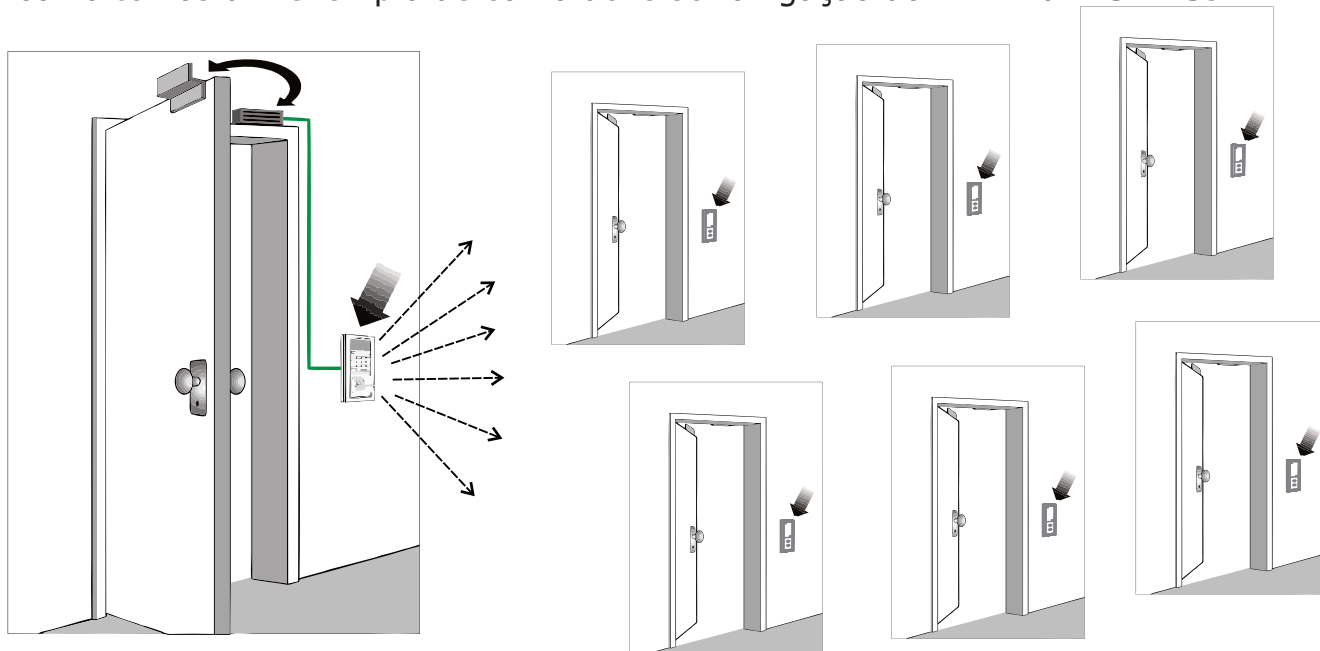
O botão serve para liberar o acesso do lado oposto ao lado controlado pelo **MCANet II**, permitindo a saída sem a necessidade do processo de autorização, para utilização por exemplo em ambientes com uma única porta para acesso.



INFORMAÇÃO: *Caso sua fechadura magnética seja normalmente fechada, durante o desacionamento, ou seja, liberação via crachá ou biometria, ocorre uma desenergização da fechadura (eletroímã), liberando assim o acesso.*

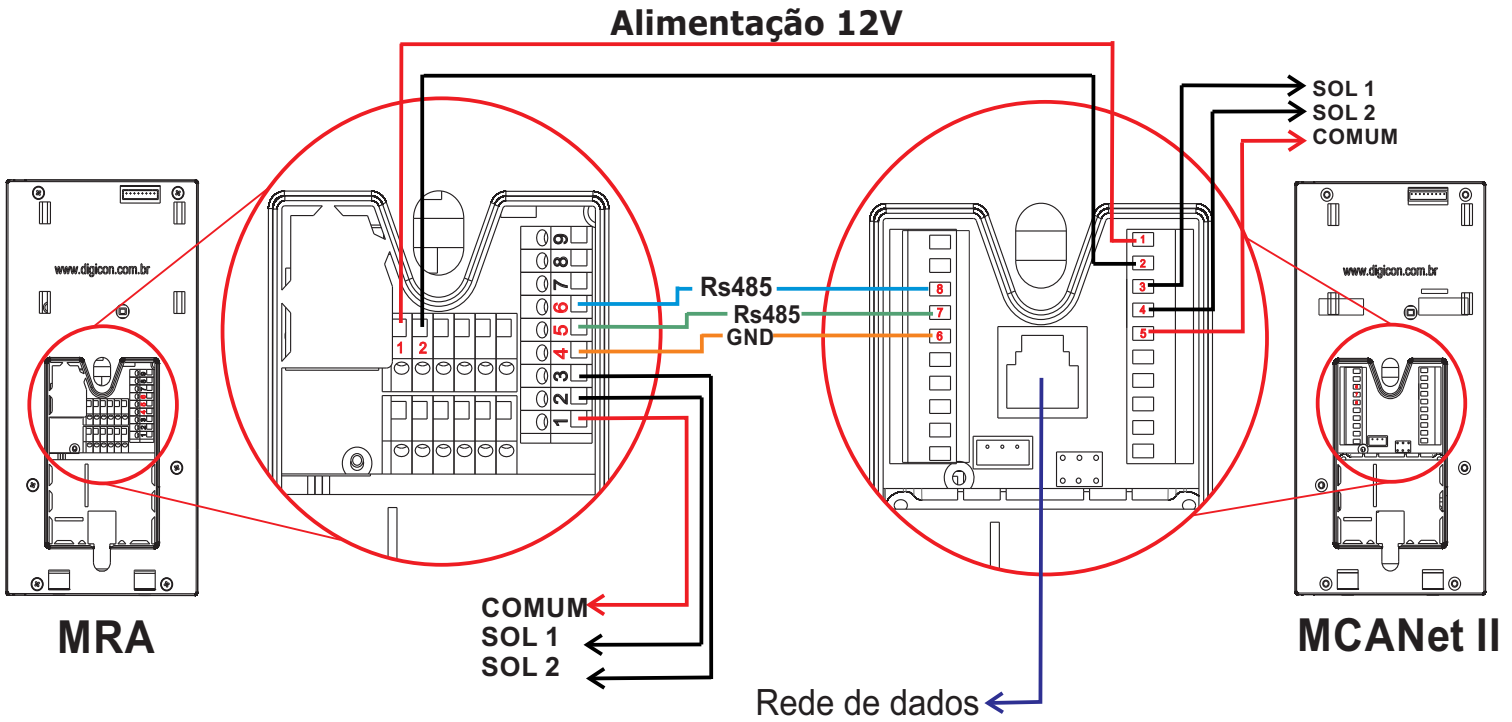
6.2.6 Exemplo de instalação MRA

Abaixo temos um exemplo de como deve ser a ligação do MRA na **MCANet II**:

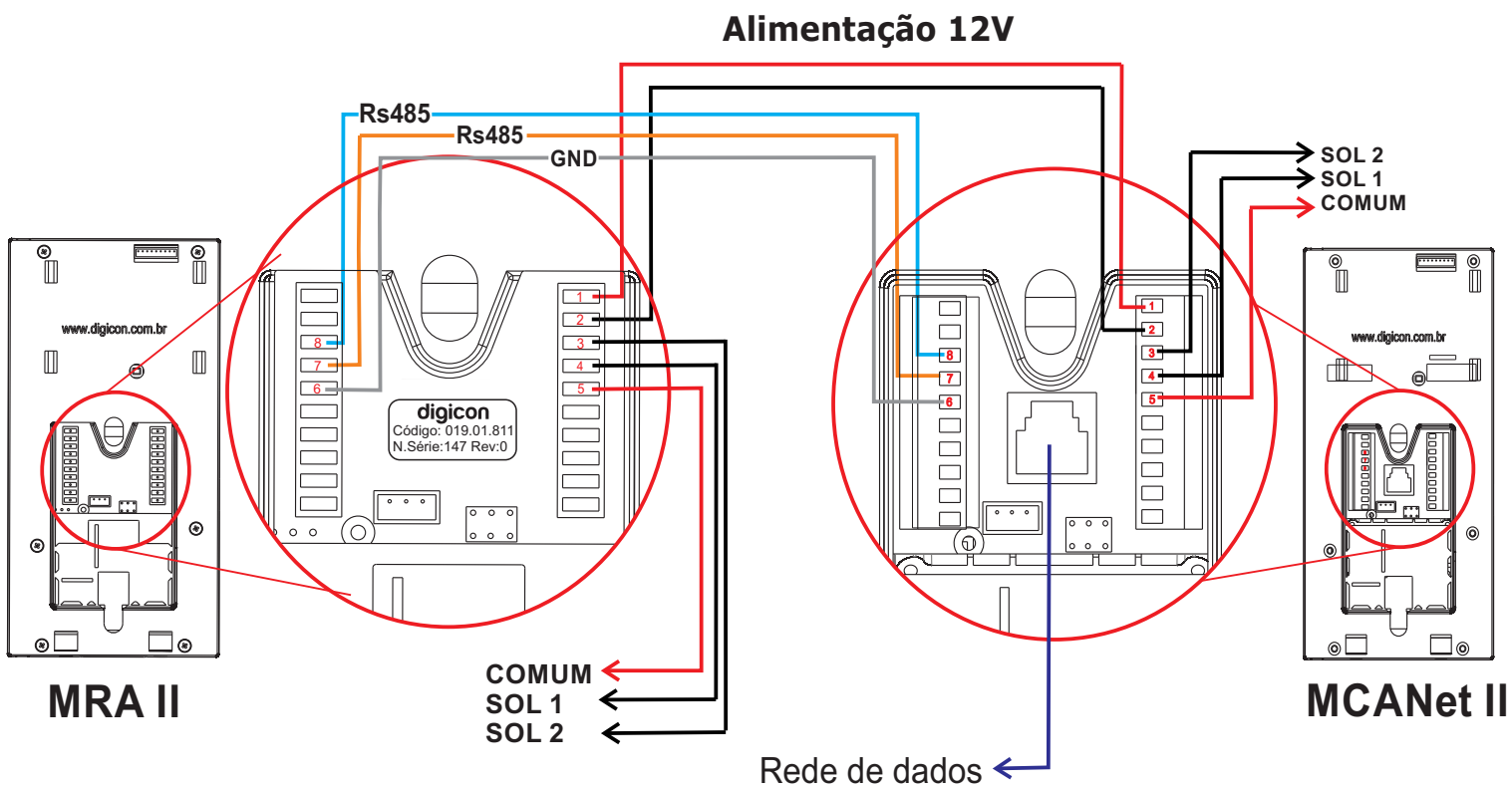


O **MRA** serve como um expensor de leitores do MCANet II. Uma MCANet II pode controlar até seis MRA's, eles são interligadas via rede Rs485 e servem para abrir portas mediante a validação em conjunto com o MCANet II.

6.4.1 Ligação elétrica MRA I com MCANet II:

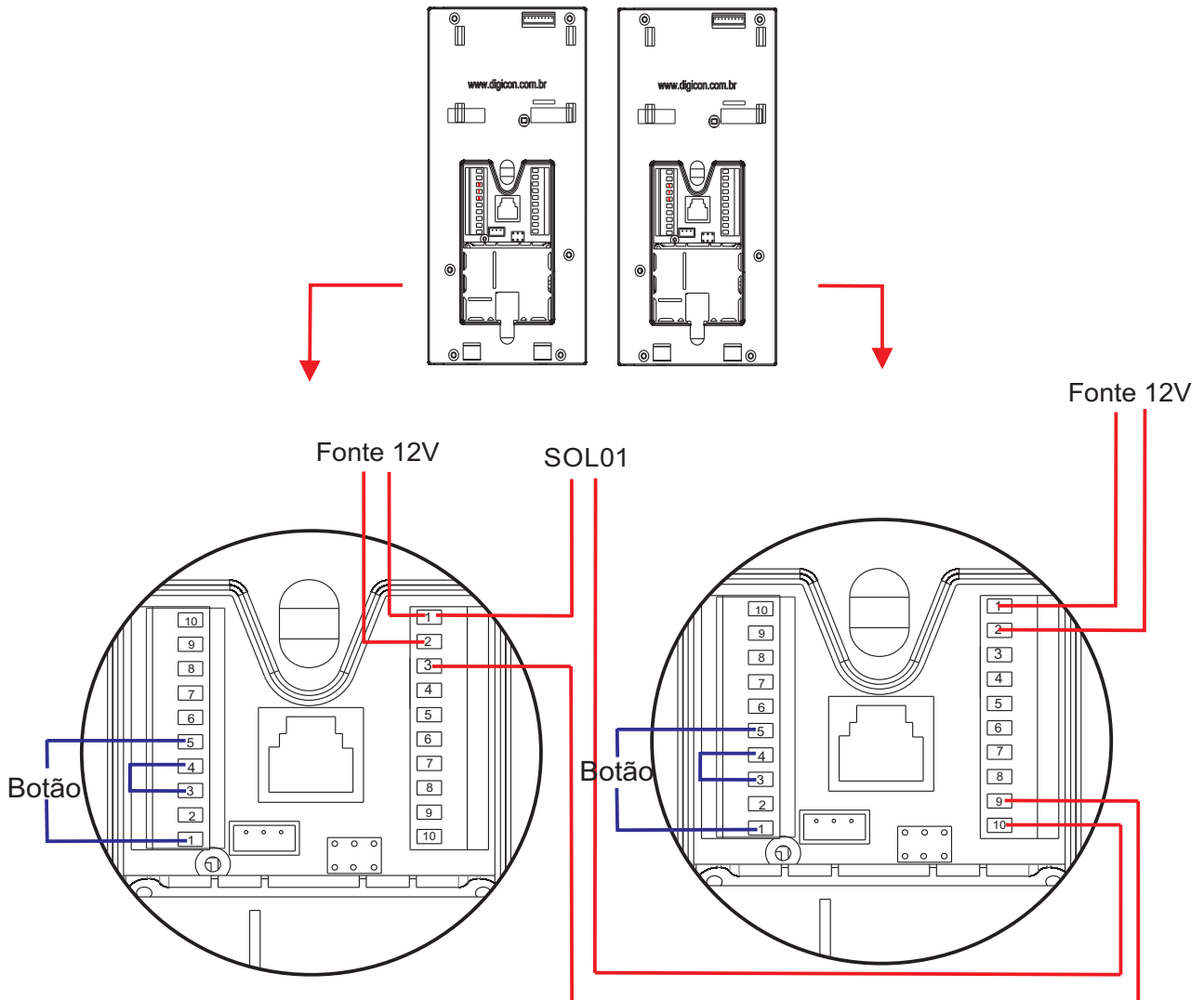


6.4.2 Ligação elétrica MRA II com MCANet II:



6.2.7 Exemplo de instalação com duas MCANet II:

CERTO: Duas **MCANet II** interligadas acionando a mesma carga.



7. Ligando a MCANet II

A **MCANet II** possui uma conexão fast ethernet de 100 Mbits/s, utilizada para a comunicação com o sistema gerenciador de acesso.



ATENÇÃO: *Faz-se necessário que a MCANet II esteja ligada à rede corporativa.*

Neste capítulo são abordados os procedimentos de inicialização e as configurações da **MCANet II**, necessárias para a comunicação com o sistema gerenciador.

7.1. Iniciando a MCANet II

A **MCANet II** possui um dispositivo visual, o display, que também é utilizado para identificação da correta inicialização do sistema.

Durante o processo de inicialização, o display fica ligado.

Deve ser observadas as seguintes sinalizações:

- a) Ao ligar o **MCANet II**, o pictograma do teclado liga na cor laranja e após, aproximadamente, 8 segundos apaga, e simultaneamente, acende o backlight do display.
- b) O pictograma do teclado pisca uma única vez.
- c) Após, aproximadamente, 30 segundos, é apresentada uma contagem regressiva no display.

Configuração
Tempo: 03



INFORMAÇÃO: *Durante esta contagem é possível configurar a rede da MCANet II. Ver capítulo 7.2.*

- d) A mensagem de inicialização do firmware.

BLOQUEADO
21/02/13 14:57



ATENÇÃO: Os itens "c" e "d" são pertinentes ao **Firmware Digicon**. Caso o equipamento tenha outro firmware, consultar o fabricante / desenvolvedor do mesmo para saber quais as mensagens apresentadas na inicialização da aplicação.

7.2. Configurando o Firmware Digicon

Ligar a **MCANet II** e quando aparecer a contagem regressiva no display (verificar capítulo 7.1), pressionar a tecla "ENT" para acessar as configurações de rede da **MCANet II**. Utilizar as teclas numéricas para entrar com os valores desejados e confirmar a configuração com a tecla ENT. Para corrigir um valor digitado erroneamente, pressionar a tecla CLR. Os parâmetros solicitados durante a configuração são os seguintes:

- a) Identificação = número de até 9 (nove) dígitos que deve representar identificação única na rede para relacionamento do cadastrado do dispositivo no sistema.

Identificador:
0 0 0 0 0 0 0 0 0

- b) Modo de configuração de IP na rede (1) fixo ou (2) DHCP.

1 - IP FIXO 2 - DHCP
0

Se a escolha for fixo:

1. IP do Dispositivo = IP no formato XXX.XXX.XXX.XXX. Exemplo: caso o IP for 10.10.5.120, informar "010.010.005.120";

Endereco IP
000.000.000.000

2. Máscara da sub-rede;

Mascara Rede
000.000.000.000

3. Gateway da rede.

Gateway
000.000.000.000

- c) IP Servidor.

IP Servidor
000.000.000.000

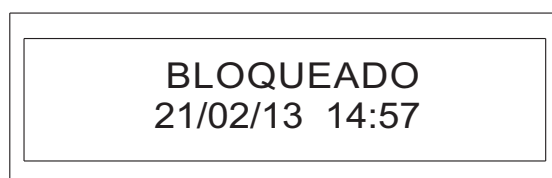
- d) Porta de comunicação.

Porta Servidor
00000

e) Confirmação das configurações, sendo (1) OK e (2) Cancelar.



f) Ao finalizar as configurações, a seguinte mensagem será apresentada:



INFORMAÇÃO: Quando apresentar BLOQUEADO significa que está faltando configuração do software de supervisão/configuração ou foi enviado um comando de bloqueio.



DICA: Quando a MCANet'S estiver controlando MRA's não deve ter funções cadastradas, pois esta funcionalidade afetará o desempenho.



DICA: Quando a MCANet controlar MRA's deve ser avaliado o desempenho no intuito de definir o modo de operação adequado, (modo remoto ou local) atualização x velocidade.

8 Manutenção

8.1 Manutenção corretiva e preventiva:

- **Leitor Biométrico**

O bom funcionamento do leitor biométrico da **MCANet II** depende de dois fatores importantes:

1. Nível de luminosidade incidente sobre o sensor;
2. Limpeza da superfície do sensor.

Procure instalar a **MCANet II** em um local onde não incida luz solar ou mesmo artificial de forte intensidade diretamente sobre o sensor biométrico. Isto reduzirá a sua capacidade de identificação.

Poeira, graxas, oleosidade da pele, líquidos e outros contaminantes reduzem a capacidade do sensor biométrico. Faça uma limpeza periódica do sensor utilizando apenas um pano macio levemente umedecido com água e sabão neutro ou umedecido com água morna. Seque-o com um lenço de papel macio para evitar arranhões. Recomenda-se uma limpeza a cada 1000 utilizações. **Nunca utilize álcool ou abrasivos.**

- **No-break**

Para manutenção da vida útil da bateria , o circuito de no-break protege a bateria para a mesma não ser descarregada totalmente. A bateria do no-break sai de fábrica completamente carregada e recomenda-se ligar o equipamento em um prazo máximo de 3 meses, após a data de fabricação.

Características elétricas do no-break:

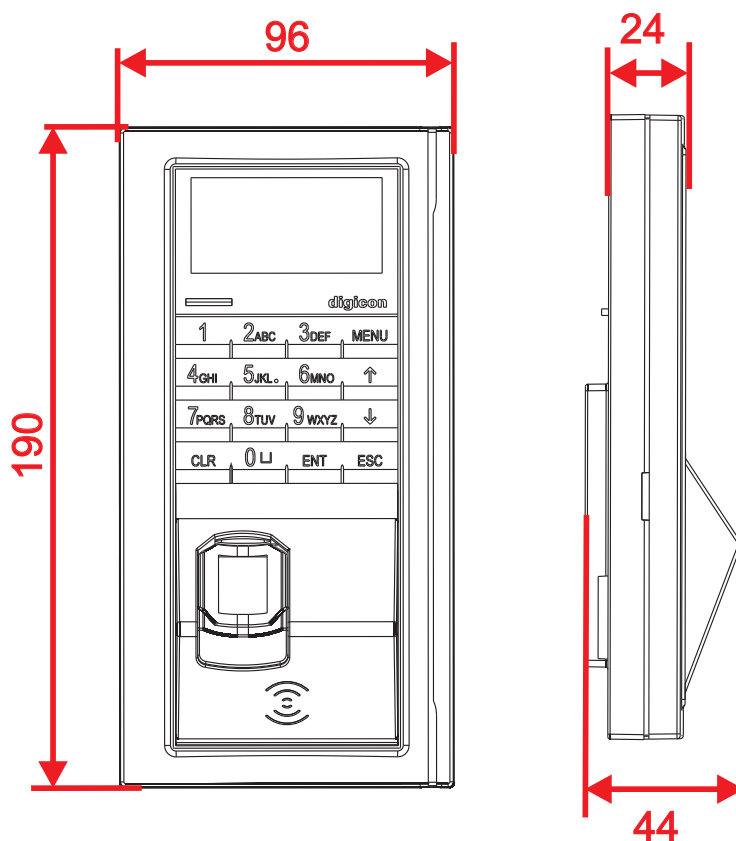
1. Autonomia da **MCANet II** : 5hs, aproximadamente.
2. Tempo estimado de carga total da bateria: 15hs, aproximadamente.

8.2 Resolução de Problemas

Defeito	Possíveis causas	Ação
<ul style="list-style-type: none"> • MCANet II não liga. 	<ul style="list-style-type: none"> • Cabo de alimentação mal conectado; • Fonte de energia desconectada da rede elétrica ou no-break com bateria sem carga. 	<ul style="list-style-type: none"> • Verifique se o dispositivo se encontra devidamente ligado á fonte de energia; • Verifique se a fonte de energia está ligada; • Se o problema persistir contate a assistência técnica.
<ul style="list-style-type: none"> • O acionamento das saídas não funcionam. 	<ul style="list-style-type: none"> • Ligação errada na borneira do MCANet II; • Dispositivo (fechadura magnética, fecho, entre outros) com defeito. 	<ul style="list-style-type: none"> • Verificar se as conexões para o acionamento desejado estão corretas; • Verificar se está conectado na saída desejada; • Se o problema persistir, contate a assistência técnica.
<ul style="list-style-type: none"> • O botão conectado na borneira do MCANet II não funciona 	<ul style="list-style-type: none"> • Ligação errada na borneira do MCANet II. • Botão com defeito. 	<ul style="list-style-type: none"> • Verificar se as conexões estão corretas; • Verificar se o botão está funcionando; • Se o problema persistir, contate a assistência técnica.
<ul style="list-style-type: none"> • O Acesso é permitido, mas a porta não abre. 	<ul style="list-style-type: none"> • Ligação errada na borneira do MCANet II; • Dispositivo (fechadura magnética, fecho, entre outros) com defeito. 	<ul style="list-style-type: none"> • Verificar se a saída correta está conectada à fechadura; • Se o problema persistir, contate a assistência técnica.
<ul style="list-style-type: none"> • Display acende apenas o backlight. 	<ul style="list-style-type: none"> • Defeito no display; • Firmware não inicializou. 	<ul style="list-style-type: none"> • Desligar e ligar novamente o MCANet II; • Se o problema persistir, contate a assistência técnica.

Caso o dispositivo apresente algum problema não listado nesta seção em seu funcionamento, favor contatar a assistência técnica.

9. Características técnicas



INFORMAÇÃO: As medidas informadas neste manual são aproximadas e em milímetros.

Outras informações	
Peso bruto:	Aproximadamente 2kg (COM EMBALAGEM)
Consumo do MCANet II	5W (versão Mifare + biometria 1:N)
Fonte de alimentação (opcional)	Entrada: 100 - 240Vca 50 - 60Hz Saída: 12Vcc \pm 5% / 2 A Dimensões: 53 x 36,5 x 141 mm
No-break (opcional)	Entrada: 100 - 240Vca 50 - 60Hz Saída: 12Vcc \pm 5% / 2 A Tempo de carga: 5 horas (aproximadamente) Autonomia: 15Wh Dimensões: 88 x 128 x 153 mm
Processador	ARM 9 - 150MHz
Memória flash interna	8 MB
Memória ram	32 MB
Capacidade da memória	Até 60.000 cartões (listas de liberação ou bloqueio), e 5.000 digitais cadastradas (de acordo com a licença).
POE	12,95 W - carga de até 0,5 A
Saídas	SOL 1 e SOL 2 12V 0,5 A

10. Garantia e Assistência Técnica

A Digicon se responsabiliza pelo projeto, boa qualidade de mão-de-obra e materiais utilizados na fabricação de seus produtos, garantindo que os equipamentos e todas as suas partes estão livres de defeitos ou vícios de material e fabricação. A Digicon se compromete a substituir ou reparar, a seu exclusivo critério, em sua fábrica de Gravataí ou em sua filial em São Paulo, qualquer peça ou equipamento que apresentar defeito de fabricação, sem ônus para o comprador, dentro das condições abaixo estipuladas:

- 1.** Ficam a cargo do comprador as despesas de transporte de ida e volta do produto para a fábrica de Gravataí ou para a filial em São Paulo.
- 2.** O prazo de garantia é contado a partir da emissão da nota fiscal de venda e compreende:
 - a) 12 (doze) meses para os equipamentos, acessórios, partes e peças, incluindo o período de garantia legal de 90 (noventa) dias.

Garantia Legal:

O consumidor tem o prazo de 90 (noventa) dias, contados a partir da data de emissão da nota fiscal de compra, para reclamar de irregularidades (vícios) aparentes, de fácil e imediata observação no produto, como os itens que constituem a parte externa e qualquer outra acessível ao usuário, assim como, peças de aparência e acessórios em geral.

b) 90 (noventa) dias para consertos e assistência técnica.

3. A garantia será prestada ao comprador somente mediante apresentação de nota fiscal (original ou cópia).

4. A garantia não se aplica nos seguintes casos e condições:

- a) defeitos e avarias causados por acidentes, negligência ou motivo decorrente de força maior;
- b) defeitos e avarias causados por armazenagem inadequada ou por falta de utilização prolongada;
- c) defeitos e avarias atribuíveis ao mau uso do equipamento;
- d) defeitos e avarias causados por operação ou instalação indevida do equipamento.
- e) decorrentes de vandalismo.
- f) efeitos da natureza (queda de raio, inundação, etc.).
- g) decorrentes de fundamento dos equipamentos em condições anormais de temperatura, tensão frequência ou umidade fora da faixa especificada no manual de instalação e operação do equipamento, desde que comprovados.
- h) recondicionamento, cromagem, niquelagem e pintura.

5. A garantia estará automaticamente cancelada para o equipamento que:

- a) sofrer modificações, adaptações ou quaisquer alterações realizadas pelo cliente ou por terceiros sem o consentimento expresso da Digicon;
- b) sofrer manutenção ou reparos executados por pessoal não autorizado pela Digicon;
- c) sofrer alteração de seu número de série ou violação da etiqueta de identificação;
- d) não for pago nas condições, quantidades e prazos indicados na nota fiscal.

6. A Digicon não se responsabiliza por prejuízos eventuais decorrentes da paralisação dos equipamentos.

7. O conserto do equipamento em garantia será prestado nas instalações da Digicon.



Matriz/RS

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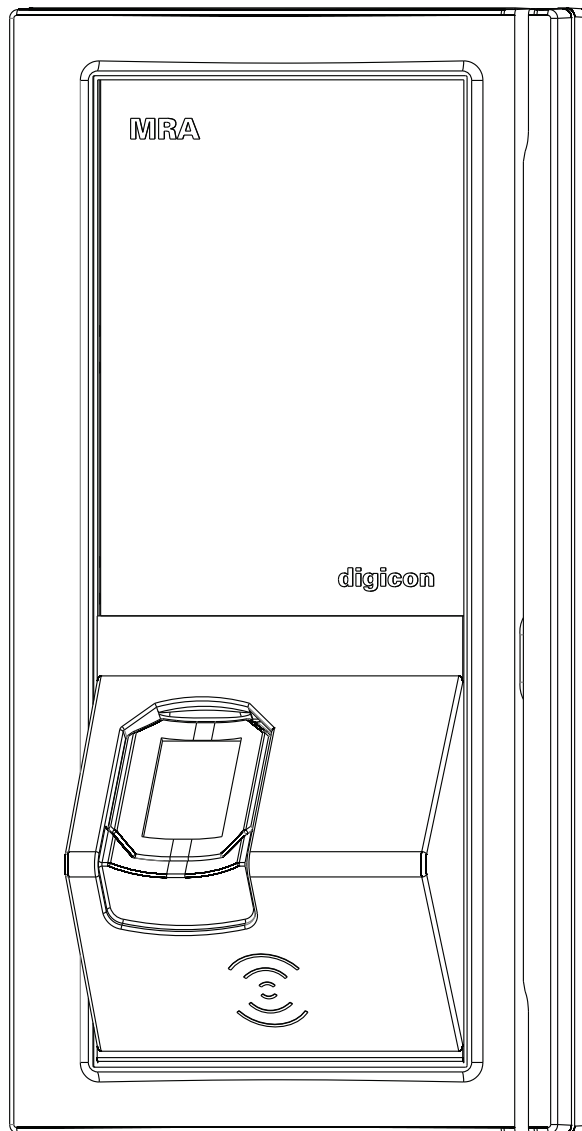
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E-mail: vendas.aceso@digicon.com.br

Home page: www.digicon.com.br



MRA



digicon

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Controle Eletrônico para Mecânica – 2014**

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Código: 069.31.171
Versão: 04

Este manual foi elaborado por: Digicon S.A. Controle Eletrônico para Mecânica
Setor de documentação - EDS

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1. Instruções Importantes

Segue abaixo os símbolos que aparecerão ao decorrer do manual, indicando momentos importantes. É essencial prestar muita atenção neles.



DICA: Vai lhe indicar algo que a Digicon considera importante.



CUIDADO: Indica o momento que deverá ter muita cautela ao manusear o equipamento/produto.



ATENÇÃO: Mostra o momento que sua postura de observador deve ser a mais produtiva possível.



INFORMAÇÃO: Apresenta curiosidades sobre o produto adquirido.



QR CODE: Apresenta informações adicionais ou links que detalham melhor o texto apresentado.

2. Orientações

- Leia atentamente as informações e instruções constantes neste manual antes de utilizar o produto. Isso vai garantir o uso correto do equipamento e o aproveitamento máximo de seus recursos técnicos, além de prolongar sua vida útil.
- Este produto não apresenta vedação contra chuva, ou seja, é projetado para uso em ambientes cobertos.
- Guarde este manual para futuras consultas.
- A Digicon se reserva o direito de modificar as características de seus produtos a qualquer momento para adaptá-los a desenvolvimentos tecnológicos mais recentes.
- A Digicon se reserva o direito de alterar as informações contidas neste manual sem notificação prévia.
- A Digicon não dá qualquer garantia contratual no que diz respeito às informações contidas neste manual e não poderá ser tida como responsável por erros que ele possa conter nem por problemas causados por sua utilização.
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3. Apresentação

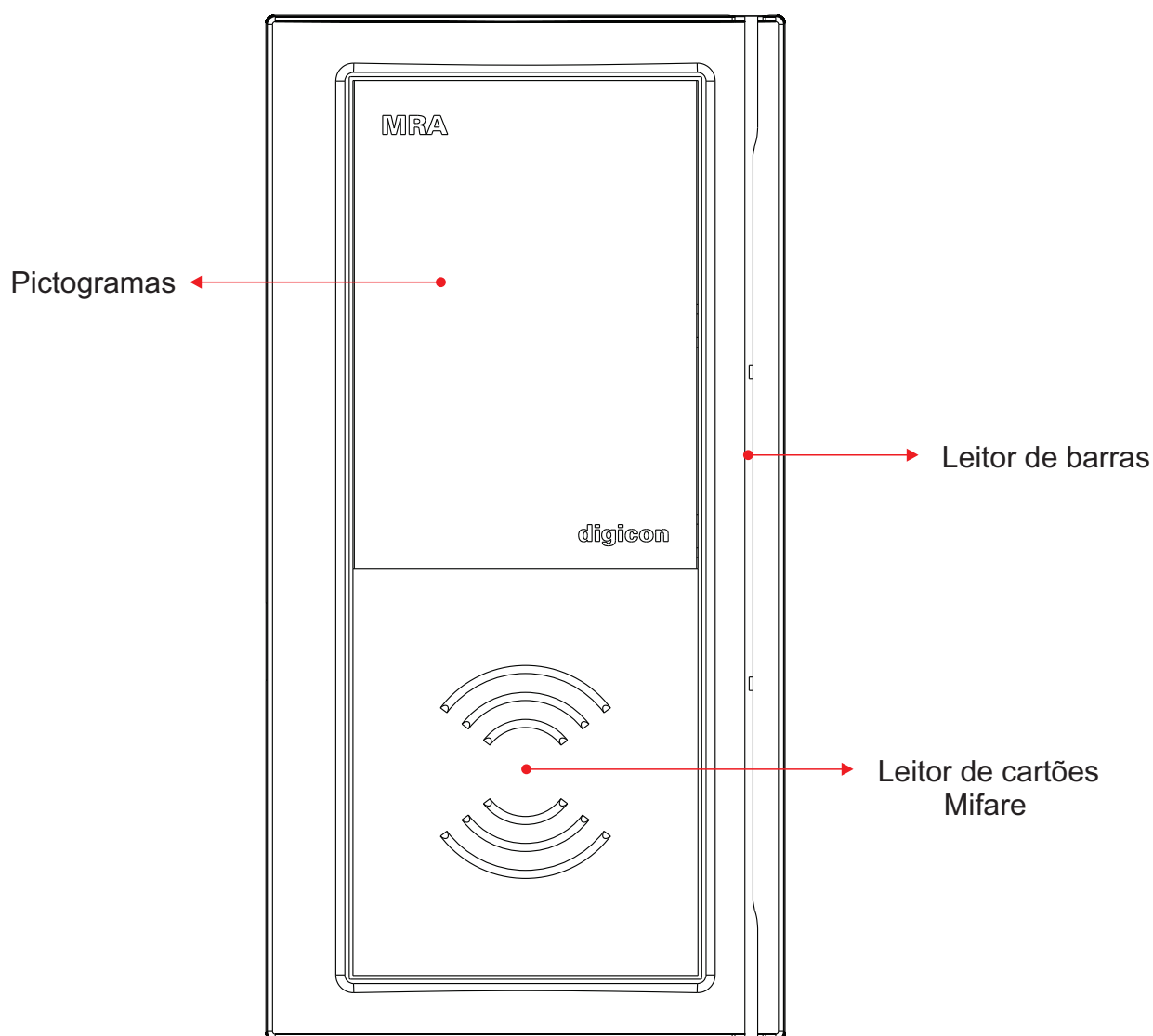
O **MRA** é um leitor inteligente, ideal para integrar à MCAnet em sistemas de controle de acesso complexos, que exijam robustez e performance. O MRA se comunica com a MCAnet através de uma rede RS-485, capaz de controlar até 6 dispositivos ao mesmo tempo, sem comprometer a velocidade de transferência de dados.

O dispositivo conta com diversas configurações e combinações de leitores, tais como: SmartCard (Mifare ISO14443A), código de barras, RFID e impressão digital. Possui beep e pictogramas para interface com o usuário e capacidade de acionar fechaduras elétricas, fechos magnéticos, cancelas e monitorar sensores.

4. Características da MRA

Possuindo um formato moderno e prático o **MRA** possui pictogramas de sinalização de livre acesso ou acesso negado, sensor biométrico para leitura de digitais, leitor de cartões de proximidade (MIFARE e RfId) e um leitor de código de barras.

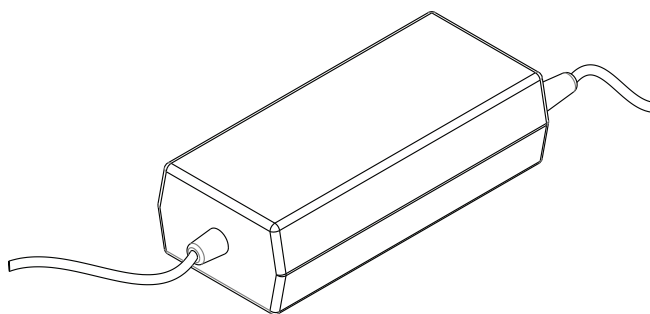
Os dispositivos presentes podem variar, adequando-se á necessidade do usuário.



4.1 Conjunto Fonte

O conjunto fonte foi desenvolvido especialmente para o **MRA**. Dentre suas principais vantagens está a sua capacidade de adaptação às variações de voltagem frequentemente encontradas nos locais de instalação (a tensão de entrada pode variar entre 100 a 240 Vca).

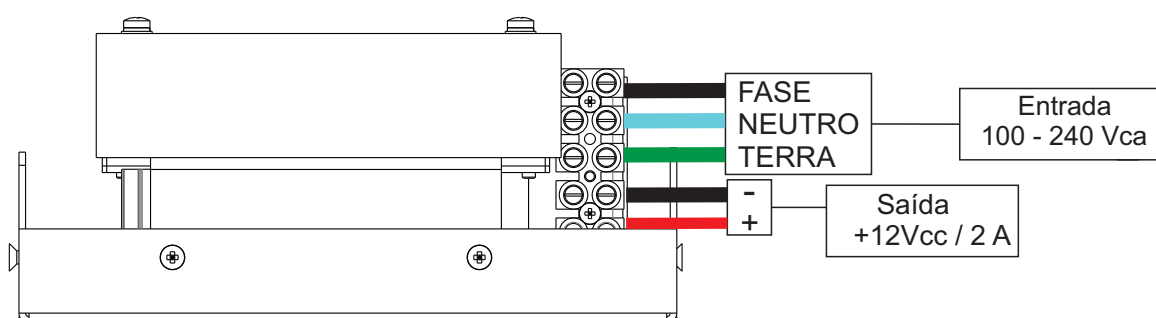
As características técnicas, proteções e dimensões específicas deste conjunto foram testadas e aprovadas em condições extremas de temperatura e ambiente, o que permite garantir uma alimentação adequada ao funcionamento do equipamento.



4.2 Conjunto No-break

O circuito de no-break é responsável pela manutenção da alimentação do **MRA** mesmo sem energia elétrica. O No-break possui uma bateria de 12Vcc/1,3A, proporcionando uma autonomia de até 5 horas (no caso falta de energia elétrica).

As características técnicas, proteções e dimensões específicas deste conjunto foram testadas e aprovadas em condições extremas de temperatura e ambiente, o que permite garantir uma alimentação adequada ao funcionamento do equipamento.



INFORMAÇÃO: Quando **MRAs** compartilham a mesma porta, podem dividir a mesma fonte de alimentação e no-break. Quando a configuração for, **MRA** de um lado e botão de outro, esta deve ser instalada individualmente.

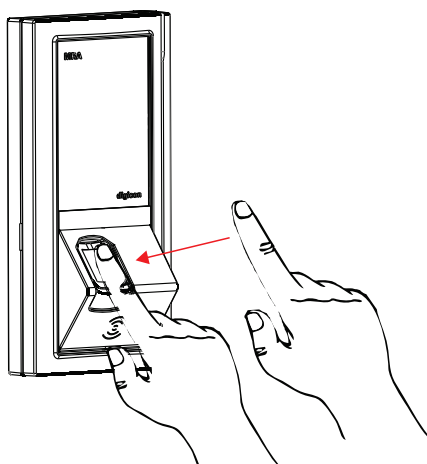
5. Funcionamento da MRA

5.1 Utilizando os dispositivos de autorização

Os vários dispositivos de autorização utilizados pelo Sistema de Acesso **MRA** são listados nas seções a seguir, juntamente com seus modos de utilização.

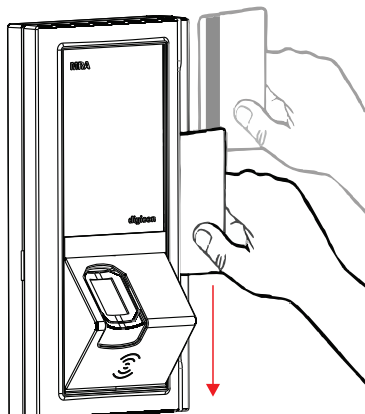
5.1.1 Sensor biométrico de digitais

O sensor biométrico é um dispositivo projetado para a identificação de pessoas, através do escaneamento de suas digitais e comparação com dados previamente coletados durante o cadastro. Sistemas que utilizam este tipo de identificação são mais seguros e também mais cômodos, não necessitando que o usuário carregue qualquer outro tipo de identificação.



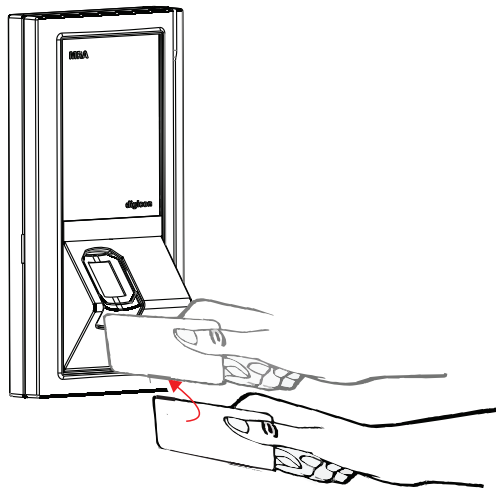
5.1.2 Leitor de código de barras:

A utilização do leitor de código de barras consiste simplesmente na passagem do cartão pelo vão de leitura até o fim, com a tarja de barras voltada para o lado do display. É um procedimento rápido e simples e largamente utilizado no mercado atualmente.



5.1.3 Leitor de proximidade Mifare e RFID

Os leitores de cartão sem contato MIFARE e RFID são utilizados aproximando-se o cartão da área de leitura. Em ambos os casos o leitor fica na mesma posição.



6. Instalação e montagem

No interior da caixa, será encontrado um suporte liso para fixação do dispositivo em uma parede ou suporte e uma caixa metálica (item opcional) para instalação utilizando eletrodutos. Recomenda-se que o usuário primeiramente faça a fixação dos suportes do modo apropriado para depois proceder com o cabeamento.

O **MRA** possui um sensor de violação, não permitindo que o mesmo funcione caso o sensor esteja violado ou fora de seu suporte.



DICA: *Recomenda-se que o usuário configure o dispositivo após sua devida fixação e instalação dos cabos.*

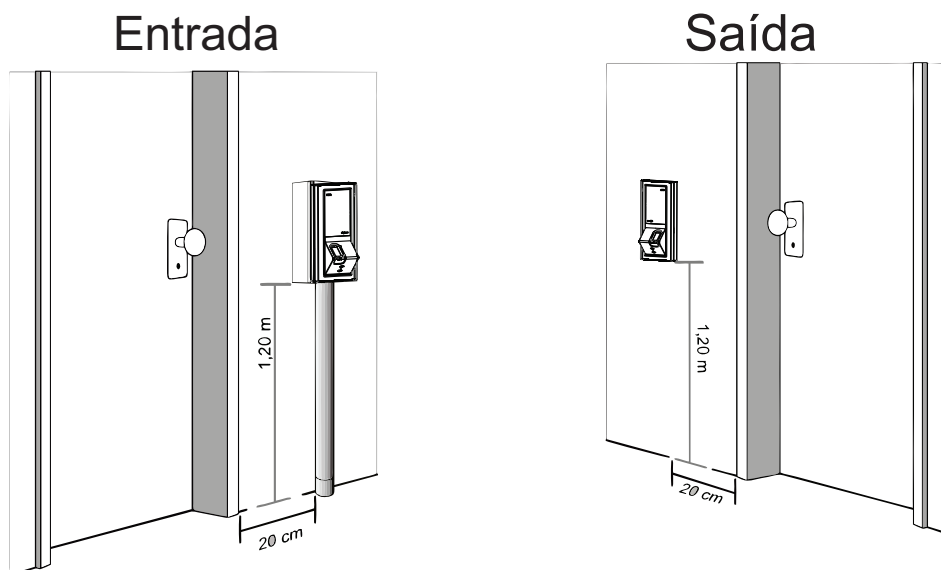
6.1 Instalação física

Para melhor utilização do dispositivo, é recomendado que o usuário siga as recomendações abaixo.

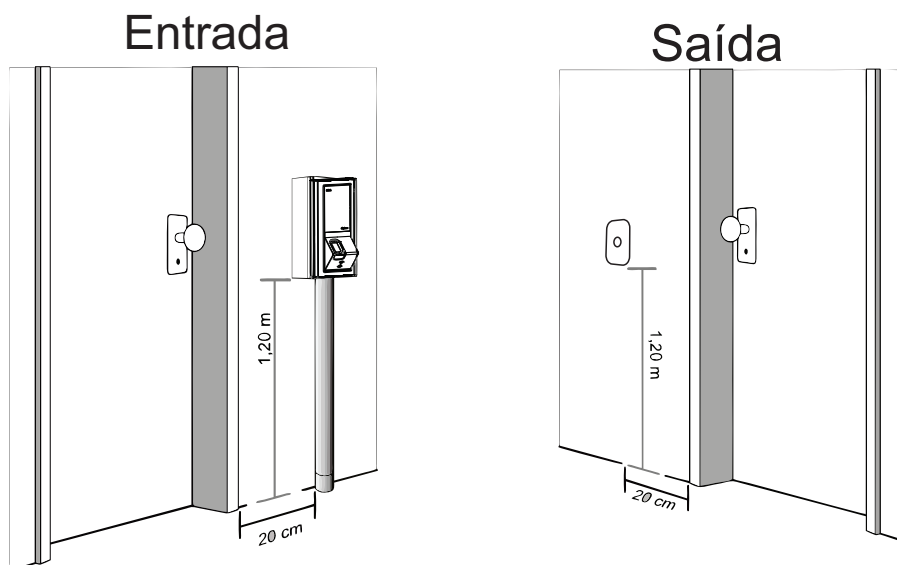
Na instalação do dispositivo devem ser seguidas algumas distâncias de segurança, para conforto quando forem efetuadas as operações de autorização, navegação e utilização da porta USB.

As distâncias recomendadas são a 1,20 m de altura e 20 cm de distância da porta onde será instalado o equipamento, com o ilustrado abaixo:

Ex1:



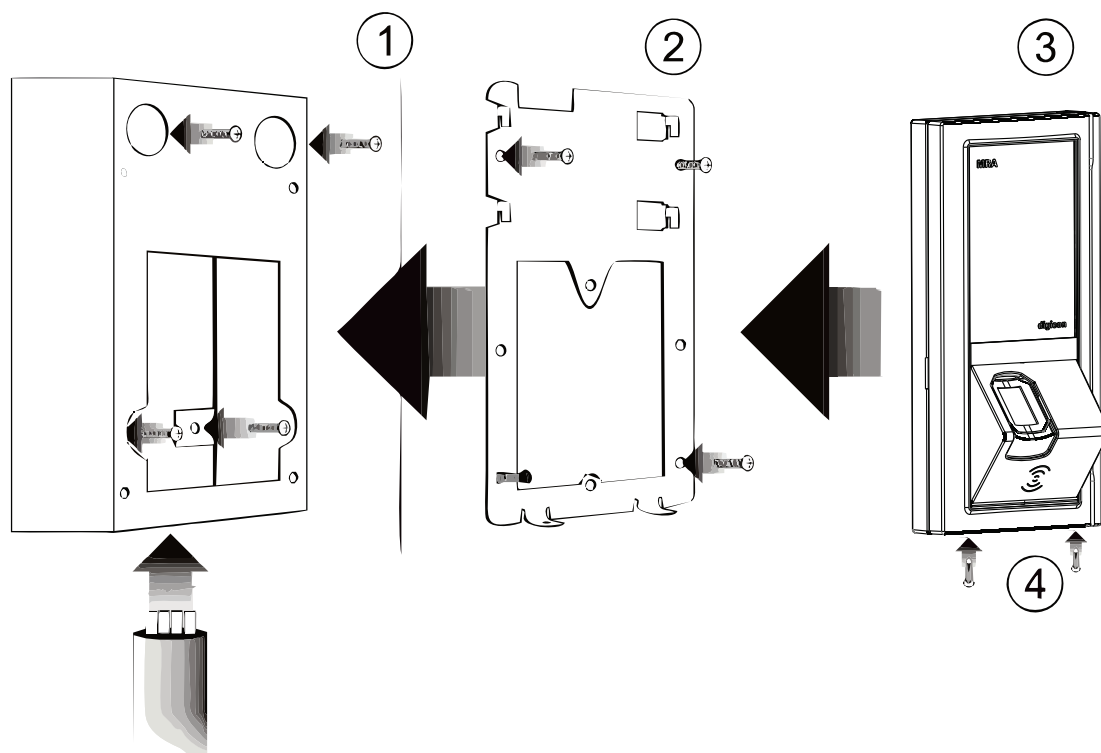
Ex2:



A instalação do dispositivo pode ser feita de duas maneiras como citado acima:

- Utilizando a caixa metálica, para instalação em locais aonde não há a possibilidade de utilização de cabeamento estruturado, e os cabos são passados através de eletrodutos.
- Utilizando a abertura da caixa de embutir 2x4 para passagem de cabeamento estruturado.

6.2 Fixação utilizando caixa metálica



Abaixo são detalhados cada um dos passos:

1. Instalação da caixa metálica que servirá de apoio ao suporte liso, aonde estarão presentes os cabos para conexão no dispositivo (alimentação, ethernet, conexões da fechadura e auxiliar, etc...). Na parte posterior da caixa existem 4 furos para os parafusos, utilizados para fixação da caixa na parede. Os parafusos estarão incluídos no kit da caixa metálica.

2. Instalação do suporte liso para encaixe do MRA: A instalação do suporte liso consiste somente em seu encaixe e fixação dos parafusos nos quatro furos da caixa metálica, indicados na figura a cima.

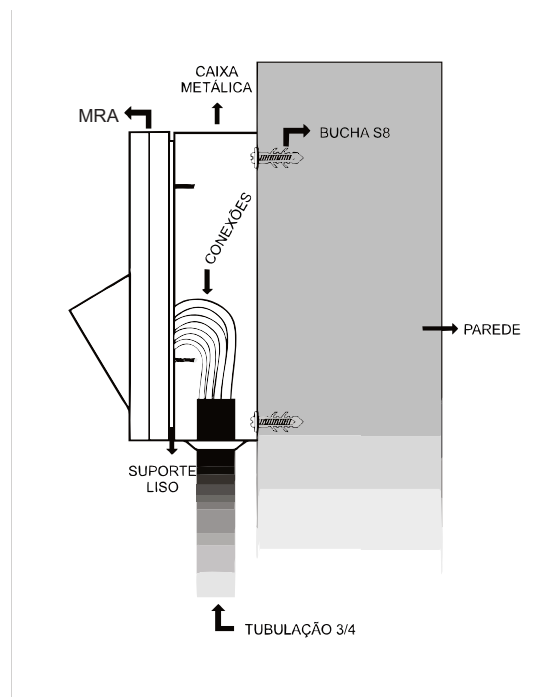
3. Encaixe do MRA no suporte liso: Para colocar o **MRA** no suporte liso, basta inseri-lo no mesmo e encaixa-lo empurrando-o para cima. A fixação do mesmo será feita no próximo passo.

4. Fixação do MRA no suporte liso: Existem na parte de baixo do **MRA**, dois furos para inserção dos parafusos de fixação do suporte liso. Após o encaixe do **MRA**, basta fixar os dois parafusos na parte de baixo do dispositivo.



CUIDADO: Certifique-se de que o **MRA** se encontra bem encaixado para evitar o acionamento do sensor de violação, caso isto aconteça o dispositivo ficará travado, impedindo sua utilização.

A seguir vemos como ficaria em perfil a fixação da caixa na parede:



6.3 Fixação utilizando caixa 2x4

A instalação do dispositivo com a utilização da caixa pode ser feita em 4 passos:

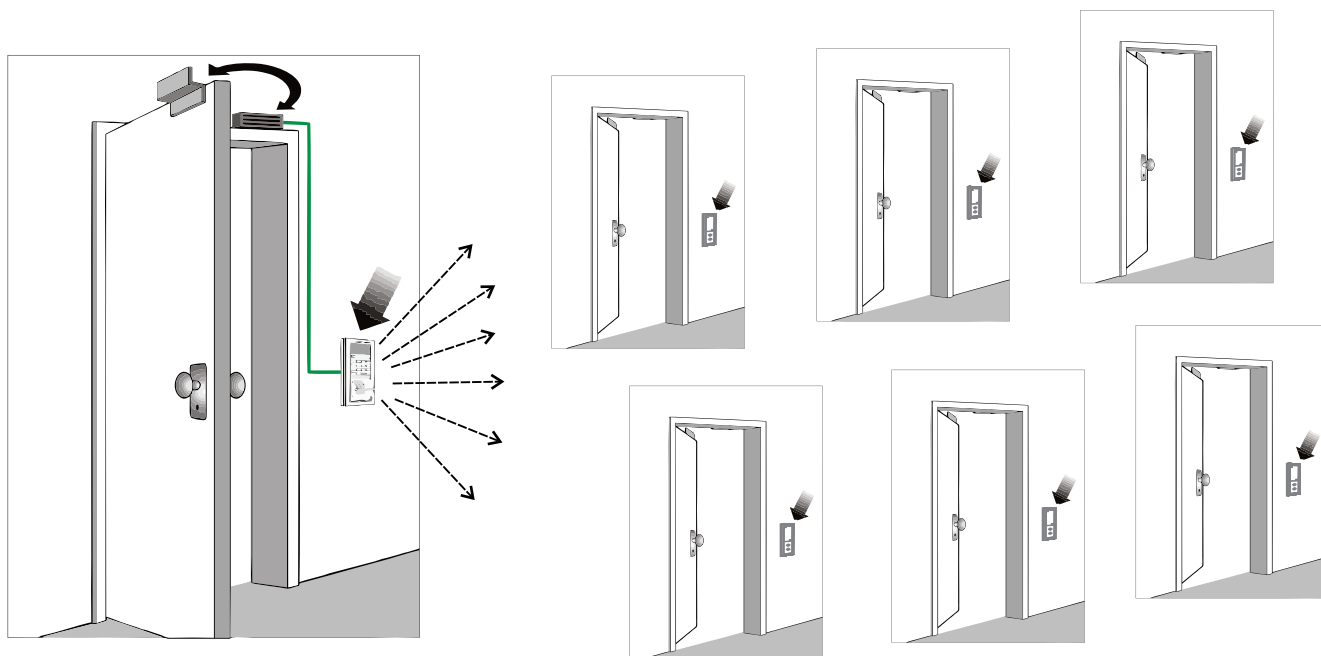
- 1. Instalação do cabeamento:** estruturado com as conexões do dispositivo (alimentação, ethernet, conexões da fechadura e auxiliar, etc...).
- 2. Instalação do suporte liso para encaixe do MRA:** A instalação do suporte liso consiste somente em seu encaixe e fixação dos parafusos nos dois furos indicados na figura acima.
- 3. Encaixe do MRA no suporte liso:** Para colocar o **MRA** no suporte liso, basta inseri-lo no mesmo e encaixa-lo empurrando-o para cima.
- 4. Fixação do MRA no suporte liso:** Existem na parte de baixo do **MRA**, dois furos para inserção dos parafusos de fixação do suporte liso. Após o encaixe do **MRA**, basta fixar os dois parafusos na parte de baixo do dispositivo.



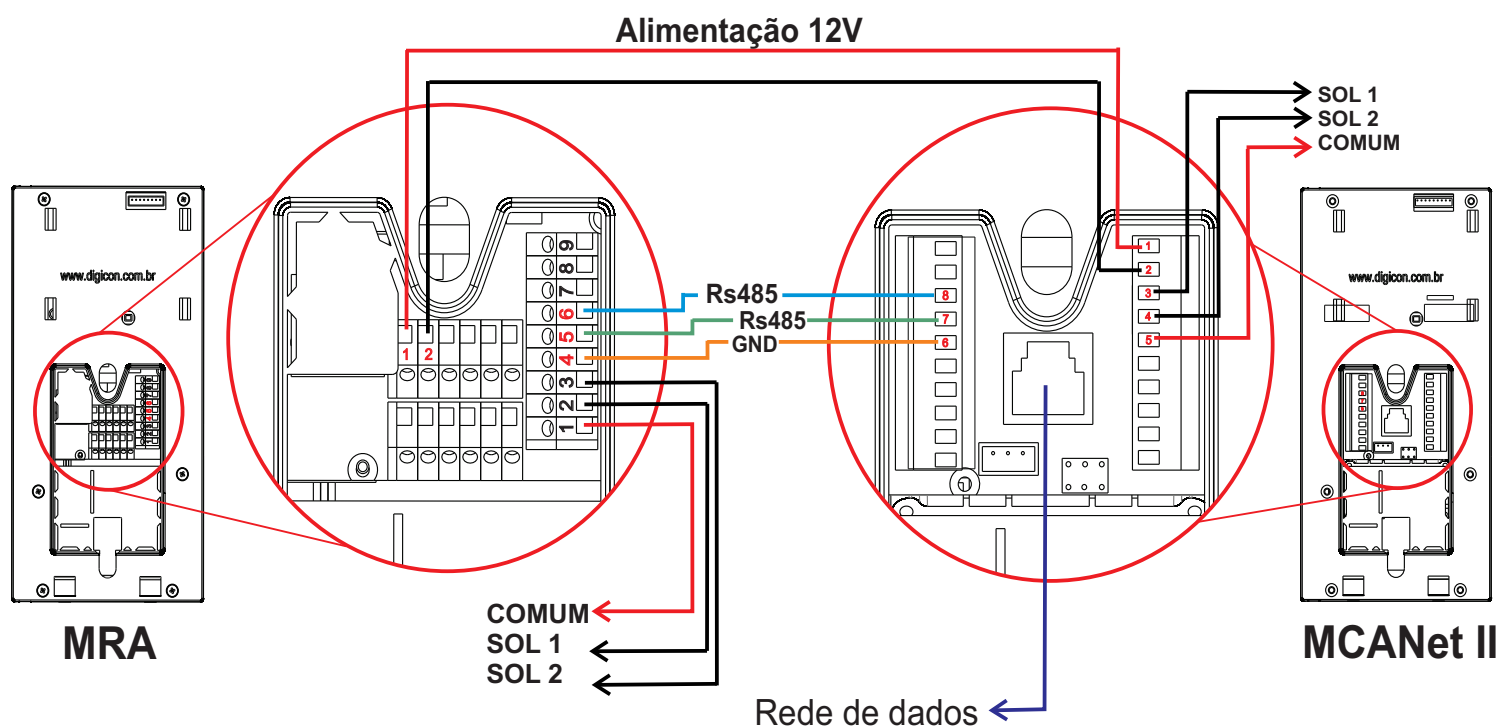
CUIDADO: *Certifique-se de que o **MRA** se encontra bem encaixado para evitar o acionamento do sensor de violação, caso isto aconteça o dispositivo ficará travado, impedindo sua utilização.*

6.4 Modelo de instalação MRA

Abaixo temos um exemplo de como deve ser a ligação do **MRA** na MCANet II:

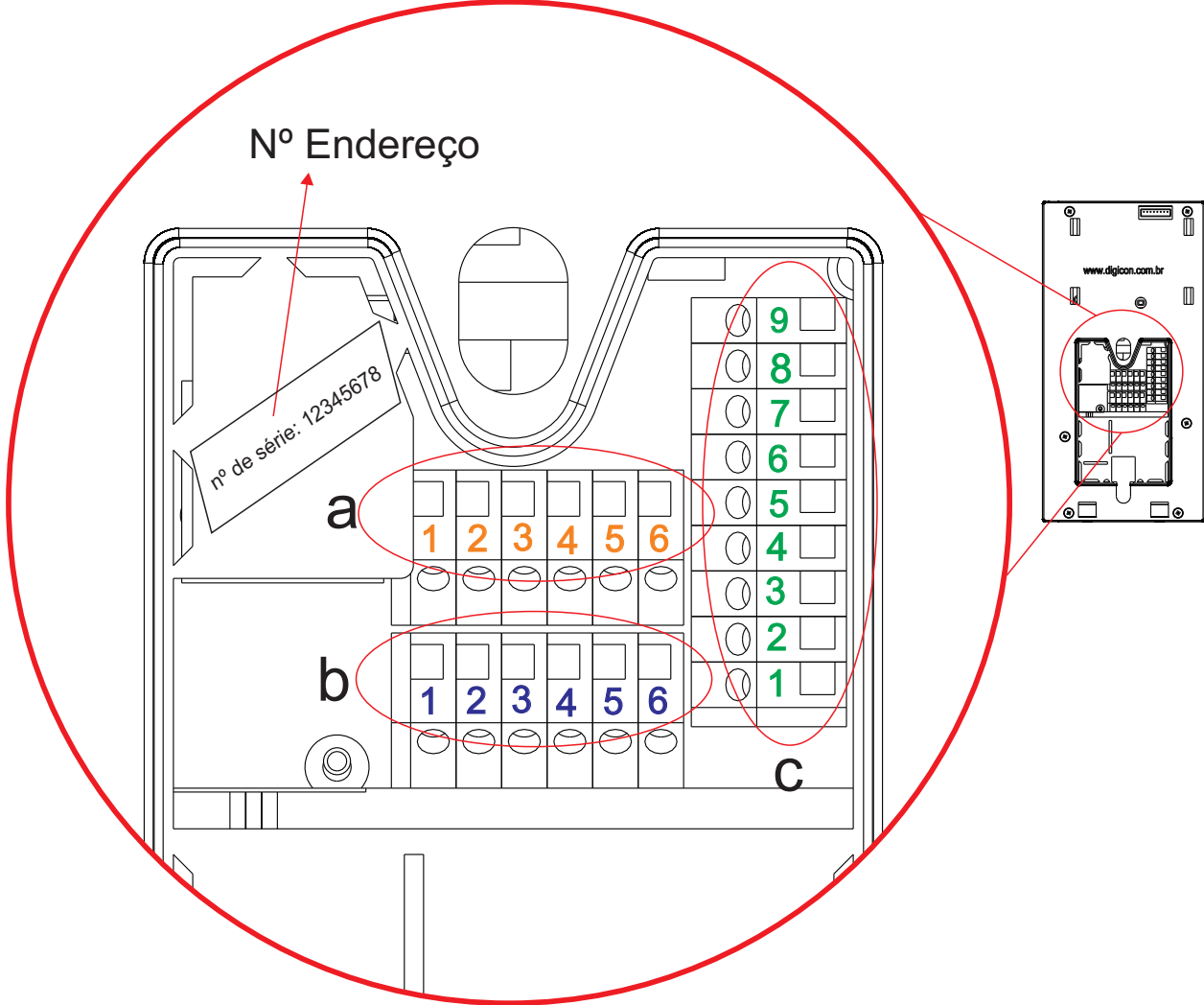


O **MRA** serve como um expensor de leitores da MCANet II. Uma MCANet II pode controlar até seis MRA's, elas são interligadas via rede Rs485 e servem para abrir portas mediante a validação em conjunto com a MCANet II.



6.5. Identificação dos conectores do MRA:

Segue abaixo uma demonstração dos conectores. Observando esse desenho fica fácil de entender onde conectar cada cabo.
 Também, na parte de trás do **MRA** está o número de série, este número de série é o número do endereço de cada **MRA**. Endereço é a identificação do **MRA** na rede Rs485.



Conectores a:

- 1 - FONTE +
- 2 - FONTE -
- 3 - RESERVA
- 4 - RESERVA
- 5 - RESERVA
- 6 - RESERVA

Conectores b:

- 1 - RELÉ - COMUM
- 2 - RELÉ - N.A.
- 3 - ENTRADA 1
- 4 - ENTRADA 2
- 5 - 12 Vcc
- 6 - GND DAS ENTRADAS

Conectores c:

- 1 - 12 Vcc
- 2 - SAÍDA 1
- 3 - SAÍDA 2
- 4 - GND
- 5 - RS 485 +
- 6 - RS 485 -
- 7 - RESERVA
- 8 - RESERVA
- 9 - RESERVA

7 Manutenção

7.1 Manutenção corretiva e preventiva:

- **Leitor Biométrico**

O bom funcionamento do leitor biométrico do **MRA** depende de dois fatores importantes:

1. Nível de luminosidade incidente sobre o sensor;
2. Limpeza da superfície do sensor.

Procure instalar o **MRA** em um local onde não incida luz solar ou mesmo artificial de forte intensidade diretamente sobre o sensor biométrico. Isto reduzirá a sua capacidade de identificação.

Poeira, graxas, oleosidade da pele, líquidos e outros contaminantes reduzem a capacidade do sensor biométrico. Faça uma limpeza periódica do sensor utilizando apenas um pano macio levemente umedecido com água e sabão neutro ou umedecido com água morna. Seque-o com um lenço de papel macio para evitar arranhões. Recomenda-se uma limpeza a cada 1000 utilizações. **Nunca utilize álcool ou abrasivos.**

- **No-break**

Para manutenção da vida útil da bateria , o circuito de no-break protege a bateria para a mesma não ser descarregada totalmente. A bateria do no-break sai de fábrica completamente carregada e recomenda-se ligar o equipamento em um prazo máximo de 3 meses, após a data de fabricação.

Características elétricas do no-break:

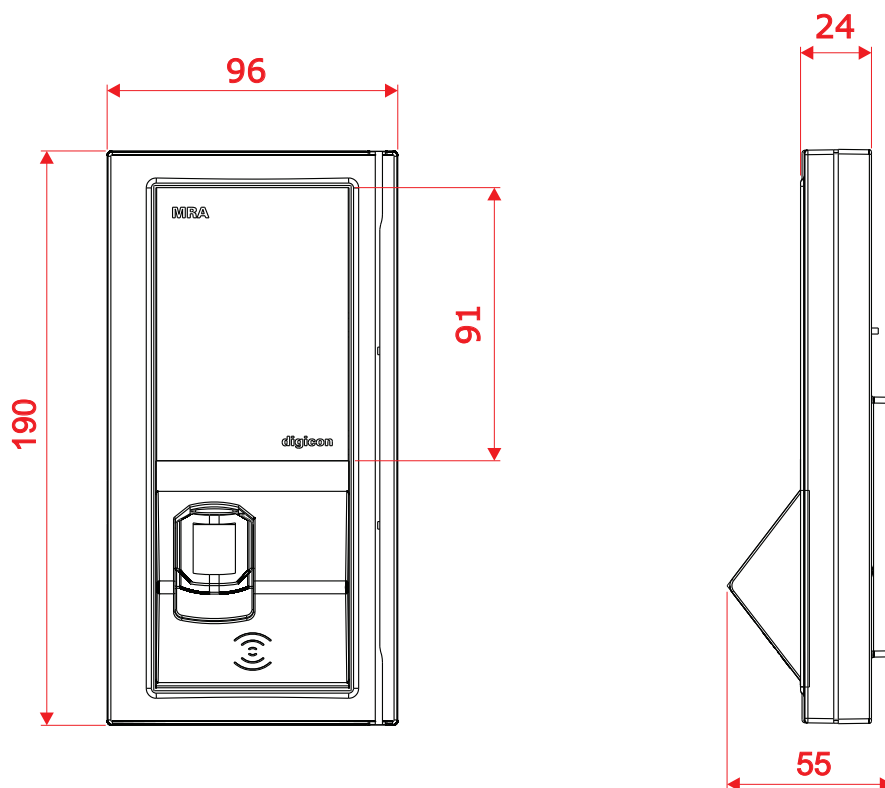
1. Autonomia da **MRA**: 5hs, aproximadamente.
2. Tempo estimado de carga total da bateria: 15hs, aproximadamente.

7.2 Resolução de Problemas

DEFEITO	POSSÍVEIS CAUSAS	AÇÃO
<ul style="list-style-type: none"> • MRA não liga. 	<ul style="list-style-type: none"> • Cabo de alimentação mal conectado; • Fonte de energia desconectada da rede elétrica ou no-break com bateria sem carga. 	<ul style="list-style-type: none"> • Verifique se o dispositivo se encontra devidamente ligado à fonte de energia; • Verifique se a fonte de energia está ligada; • Se o problema persistir contate a assistência técnica.
<ul style="list-style-type: none"> • O acionamento das saídas não funcionam 	<ul style="list-style-type: none"> • Ligação errada na borneira do MRA; • Dispositivo (fechadura magnética, fecho, entre outros) com defeito. • Configuração do endereçamento do dispositivo errado. 	<ul style="list-style-type: none"> • Verificar se as conexões para o acionamento desejado estão corretas; • Verificar se está conectado na saída desejada; • Verificar a configuração de endereçamento do software de controle do MRA. • Se o problema persistir, contate a assistência técnica.
<ul style="list-style-type: none"> • O botão conectado na borneira do MRA não funciona 	<ul style="list-style-type: none"> • Ligação errada na borneira do MRA. • Botão com defeito. • Configuração do endereçamento do dispositivo errado. 	<ul style="list-style-type: none"> • Verificar se as conexões estão corretas; • Verificar se o botão está funcionando; • Verificar a configuração de endereçamento do software de controle do MRA. • Se o problema persistir, contate a assistência técnica.
<ul style="list-style-type: none"> • O Acesso é permitido, mas a porta não abre. 	<ul style="list-style-type: none"> • Ligação errada na borneira do MRA; • Dispositivo (fechadura magnética, fecho, entre outros) com defeito. • Configuração do endereçamento do dispositivo errado. 	<ul style="list-style-type: none"> • Verificar se a saída correta está conectada à fechadura; • Verificar a configuração de endereçamento do software de controle do MRA. • Se o problema persistir, contate a assistência técnica.
<ul style="list-style-type: none"> • O MRA liga mas falha a comunicação 	<ul style="list-style-type: none"> • Conexão invertida; • Cabos mal conectados. 	<ul style="list-style-type: none"> • Verificar integridade e a ligação dos cabos. • Se o problema persistir, contate a assistência técnica.

Caso o dispositivo apresente algum problema não listado nesta seção em seu funcionamento, favor contatar a assistência técnica.

8. Dimensões:



9. Características técnicas:

Peso bruto:	Aproximadamente 2kg (COM EMBALAGEM)
Alimentação do MRA	+12Vcc \pm 5% / 0,4A (máx.)
Fonte de alimentação (opcional)	Entrada: 100 - 240Vca 50 - 60Hz Saída: 12Vcc \pm 5% / 2 A Dimensões: 53 x 36,5 x 141 mm
No-break (opcional)	Entrada: 100 - 240Vca 50 - 60Hz Saída: 12Vcc \pm 5% / 2 A Tempo de carga: 15 horas (aproximadamente) Autonomia: 5 horas * Dimensões: 88 x 128 x 153 mm
Processador	ARM 9 - 200MHz
Memória flash interna	8 MB
Memória ram	32 MB

10. Garantia e Assistência Técnica

A Digicon se responsabiliza pelo projeto, boa qualidade de mão-de-obra e materiais utilizados na fabricação de seus produtos, garantindo que os equipamentos e todas as suas partes estão livres de defeitos ou vícios de material e fabricação. A Digicon se compromete a substituir ou reparar, a seu exclusivo critério, em sua fábrica de Gravataí ou em sua filial em São Paulo, qualquer peça ou equipamento que apresentar defeito de fabricação, sem ônus para o comprador, dentro das condições abaixo estipuladas:

1. Ficam a cargo do comprador as despesas de transporte de ida e volta do produto para a fábrica de Gravataí ou para a filial em São Paulo.
2. O prazo de garantia é contado a partir da emissão da nota fiscal de venda e compreende:
 - a) 12 (doze) meses para os equipamentos, acessórios, partes e peças, incluindo o período de garantia legal de 90 (noventa) dias.

Garantia Legal:

O consumidor tem o prazo de 90 (noventa) dias, contados a partir da data de emissão da nota fiscal de compra, para reclamar de irregularidades (vícios) aparentes, de fácil e imediata observação no produto, como os itens que constituem a parte externa e qualquer outra acessível ao usuário, assim como, peças de aparência e acessórios em geral.

- b) 90 (noventa) dias para consertos e assistência técnica.
3. A garantia será prestada ao comprador somente mediante apresentação de nota fiscal (original ou cópia).
 4. A garantia não se aplica nos seguintes casos e condições:
 - a) defeitos e avarias causados por acidentes, negligência ou motivo decorrente de força maior;
 - b) defeitos e avarias causados por armazenagem inadequada ou por falta de utilização prolongada;
 - c) defeitos e avarias atribuíveis ao mau uso do equipamento;
 - d) defeitos e avarias causados por operação ou instalação indevida do equipamento.
 - e) decorrentes de vandalismo.
 - f) efeitos da natureza (queda de raio, inundação, etc.).
 - g) decorrentes de fundamento dos equipamentos em condições anormais de temperatura, tensão frequência ou umidade fora da faixa especificada no manual de instalação e operação do equipamento, desde que comprovados.
 - h) recondicionamento, cromagem, niquelagem e pintura.
 5. A garantia estará automaticamente cancelada para o equipamento que:
 - a) sofrer modificações, adaptações ou quaisquer alterações realizadas pelo cliente ou por terceiros sem o consentimento expresso da Digicon;
 - b) sofrer manutenção ou reparos executados por pessoal não autorizado pela Digicon;
 - c) sofrer alteração de seu número de série ou violação da etiqueta de identificação;
 - d) não for pago nas condições, quantidades e prazos indicados na nota fiscal;
 - e) for aberto por pessoas não autorizadas pela Digicon.

6. A Digicon não se responsabiliza por prejuízos eventuais decorrentes da paralisação dos equipamentos.

7. O conserto do equipamento em garantia será prestado nas instalações da Digicon.



Matriz/RS

Fábrica, Assistência Técnica e Vendas

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Home page: www.digicon.com.br



São Paulo, 31 de outubro de 2024.

À
ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

Ref.: Pregão Eletrônico nº 50/2024

DECLARAÇÃO

A **Axis Communications Ltda.**, situada na Avenida Paulista, 37, 3º andar, no bairro Bela Vista, na cidade de São Paulo, inscrita sob CNPJ 09.214.906/0001-83, na condição de fabricante de câmeras e soluções de vídeo vigilância, declara que:

Os equipamentos listados abaixo foram descontinuados e substituídos por modelos equivalentes ou superiores:

Equipamentos descontinuados:

- P1375-E
- P1377-LE
- P1378-LE

Equipamentos substitutos:

- P1385-E
- P1387-LE
- P1388-LE

Apesar de descontinuados, pode haver disponibilidade em nossos distribuidores para entrega imediata. Mesmo sendo descontinuado, o produto permanece com garantia do fabricante por 5 (cinco) anos.

Para mais informações sobre os modelos substitutos, acesse nosso site.

Atenciosamente,

Márcia Oliveira

Regional Controller – LATAM

Email: marcia.oliveira@axis.com

Axis Communications

Axis Communications Ltda. Av. Paulista, 37, 3. Andar, São Paulo – SP - Brasil. Tel: +55 11 3050-6600, www.axis.com

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- Marcia Regina De Oliveira (Signatário) - 075.746.198-08 em 31/10/2024 14:23 UTC-03:00

Tipo: Certificado Digital



AXIS P1378-LE Network Camera

Detalhes excelentes em 4K para ambientes ao ar livre

Com design robusto, a AXIS P1378-LE oferece detalhes excelentes em resolução 4K e é capaz de suportar temperaturas extremas que variam de -40 °C a 60 °C (-40 °F a 140 °F). Para garantir proteção adicional, uma proteção climática opcional está disponível. Ela oferece detalhes excelentes em condições de iluminação desafiadoras ou insuficiente e inclui o AXIS OptimizedIR para monitoramento na escuridão total. Desenvolvida para ser ostensiva, ela inclui estabilização eletrônica de imagem, detecção de impactos, alarme de violação e indicador de streaming de vídeo. A tecnologia Axis Zipstream oferece suporte a H.264/H.265, proporcionando economias excepcionais de largura de banda e armazenamento. Além disso, com o encaixe CS e suporte lentes i-CS motorizadas, você pode facilmente trocar a lente para atender às suas necessidades.

- > **Resolução 4K**
- > **OptimizedIR e Forensic WDR**
- > **Firmware assinado e inicialização segura**
- > **Estabilização eletrônica de imagem**
- > **Zipstream com suporte a H.264 e H.265**



AXIS P1378-LE Network Camera

Câmera

Sensor de imagem	CMOS RGB de 1/1,8 pol. com varredura progressiva
Lente	Correção de IR, lente com encaixe CS, P-iris Varifocal 3,9 – 10 mm, F1.5 Com proteção IK10 na janela frontal Campo de visão horizontal: 115°–45° Campo de visão vertical: 61°–25° Sem proteção IK10 na janela frontal Campo de visão horizontal: 119°–45° Campo de visão vertical: 62°–25°
Dia e noite	Filtro de bloqueio de infravermelho removível automaticamente
Iluminação mínima	4K a 25/30 fps com Forensic WDR e Lightfinder: Cor: 0,15 lux a 50 IRE F1.5 P/B: 0,03 lux a 50 IRE F1.5 0 lux com iluminação IR ativada
Velocidade do obturador	1/8500 s a 1/5 s

Sistema em um chip (SoC)

Modelo	ARTPEC-7
Memória	2 GB de RAM, 512 MB de flash
Recursos de computação	Unidade de processamento de aprendizado de máquina (MLPU)

Vídeo

Compactação de vídeo	H.264 (MPEG-4 Parte 10/AVC) perfis Baseline, Main e High H.265 (MPEG-H Parte 2/HEVC) Motion JPEG Taxa de quadros e largura de banda controláveis
Resolução	3840 x 2160 (4K) a 160 x 90
Taxa de quadros	25/30 fps (50/60 Hz)
Streaming de vídeo	Múltiplos streams configuráveis individualmente em H.264, H.265 e Motion JPEG Tecnologia Axis Zipstream em H.264 e H.265 Taxa de quadros e largura de banda controláveis VBR/ABR/MBR H.264/H.265 Modo de baixa latência Indicador de streaming de vídeo
Streaming multiexibição	Até 8 áreas de exibição recortadas individualmente.
Configurações da imagem	Saturação, contraste, brilho, nitidez, Forensic WDR: até 120 dB dependendo da cena, balanço de branco, limiar de chaveamento dia/noite, modo de exposição, zonas de exposição, contraste local, mapeamento de tons, compactação, orientação: auto 0°, 90°, 180°, 270°, incluindo Corridor Format, espelhamento de imagens, sobreposição dinâmica de texto e imagens, máscaras de privacidade, remoção de névoa, estabilização eletrônica de imagem, correção de distorção tipo barril, perfis de cena: forense, vívido, visão geral de tráfego
Pan/Tilt/Zoom	PTZ digital Driver de PTZ carregável (Pelco D pré-instalado)

Áudio

Streaming de áudio	Bidirecional, full duplex
Codificação de áudio	AAC LC 8/16/32/48 kHz, G.711 PCM 8 kHz, G.726 ADPCM 8 kHz, Opus 8/16/48 kHz, LPCM 8/16/32/48 kHz Taxa de bits configurável
Entrada/saída de áudio	Entrada para microfone externo, entrada de linha, entrada digital com ring power, saída de linha, controle de ganho automático

Rede

Protocolos de rede	IPv4, IPv6 USGv6, ICMPv4/ICMPv6, HTTP, HTTPS, HTTP/2, TLS, QoS Layer 3 DiffServ, FTP, CIFS/SMB, SMTP, mDNS (Bonjour), UPnP™, SNMP v1/v2c/v3 (MIB-II), DNS/DNSv6, DDNS, NTP, NTS, RTSP, RTP, SFTP, SRTP/RTSPS, TCP, UDP, IGMPv1/v2/v3, RTCP, ICMP, DHCPv4/v6, ARP, SSH, LLDP, CDP, MQTT v3.1.1, Syslog seguro (RFC 3164/5424, UDP/TCP/TLS), endereço Link-Local (configuração zero)
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Integração de sistemas

Interface de programação de aplicativo	API aberta para integração de software, incluindo VAPIX® e AXIS Camera Application Platform, especificações disponíveis em axis.com AXIS Video Hosting System (AVHS) com conexão em um clique One-Click Cloud Connection ONVIF® Profile G, ONVIF® Profile M, ONVIF® Profile S e ONVIF® Profile T, especificações disponíveis em onvif.org
Controles na tela	Estabilização eletrônica de imagem Alternância dia/noite Remoção de névoa Amplio alcance dinâmico
Acionadores de eventos	Análise, detecção de impactos, abertura da caixa, eventos de armazenamento de borda, entrada externa supervisionada, nível de áudio, cronogramas Assinatura MQT
Ações de eventos	Upload de arquivos: FTP, SFTP, HTTP, HTTPS, compartilhamento de rede e email Notificação: email, HTTP, HTTPS e TCP Ativação de saída externa Gravação de vídeo em armazenamento de borda, Reprodução de cliques de áudio Buffer de vídeo pré e pós-alarme Predefinições de PTZ, Guard tour, Sobreposição de texto Alternância dia/noite, Ativação do LED de status Publicação MQT Envio de interceptações SNMP
Auxílios de instalação integrados	Assistente de foco, contador de pixels, retrofoco remoto, rotação automática, foco e zoom remotos e com lente i-CS opcional.

Análise

Aplicativos	Incluídos AXIS Object Analytics, AXIS Scene Metadata, AXIS Live Privacy Shield ^a , AXIS Video Motion Detection Com suporte AXIS Perimeter Defender, AXIS License Plate Verifier Suporte à AXIS Camera Application Platform, possibilitando a instalação de aplicativos de outros fabricantes, consulte axis.com/acap
AXIS Object Analytics	Classes de objetos: pessoas, veículos Cenários: cruzamento de linhas, objeto na área, contagem de cruzamentos de linhas, tempo na área Até 10 cenários Outros recursos: objetos acionadores exibidos com trajetórias, caixas delimitadoras coloridas e tabelas Áreas de inclusão/exclusão poligonais Configuração de perspectivas Evento de ONVIF® Motion Alarm
Metadados de cena	Classes de objetos: pessoas, rostos, veículos (tipos: carros, ônibus, caminhões, bicicletas), placas de licença Confiança, posição

Segurança cibernética

Segurança de borda	Software: Sistema operacional assinado, proteção contra atrasos por força bruta, autenticação digest e OAuth 2.0 RFC6749 OpenID Authorization Code Flow para gerenciamento centralizado de contas ADFS, proteção por senha, criptografia de cartão SD AES-XTS-Plain64 de 256 bits Hardware: Inicialização segura
Segurança de rede	IEEE 802.1X (EAP-TLS, PEAP-MSCHAPv2), IEEE 802.1AE (MACsec PSK/EAP-TLS), HTTPS/HSTS, TLS v1.2/v1.3, Network Time Security (NTS), PKI de certificado X.509, firewall baseado em host
Documentação	<i>Guia de Fortalecimento do AXIS OS</i> <i>Política de gerenciamento de vulnerabilidades da Axis</i> <i>Modelo de desenvolvimento de segurança da Axis</i> Lista de materiais (SBOM) de software do AXIS OS Para baixar documentos, vá para axis.com/support/cybersecurity/resources Para saber mais sobre o suporte da Axis à segurança cibernética, acesse axis.com/cybersecurity

Geral	
Caixa	Gabinete de polímero resistente a impactos IK10 com classificações IP66, IP67 e NEMA 4X, base de alumínio e chave de alarme de invasão. Proteção climática com revestimento antirreflexo preto Cor: Branco NCS S 1002-B
Sustentabilidade	Sem PVC
Alimentação elétrica	12 – 28 VCC, máx. 25,5 W (incluindo aquecedor frontal), típico 11,1 W Power over Ethernet (PoE) IEEE 802.3af/802.3at Tipo 1 Classe 4, máx. 25,5 W (incluindo aquecedor frontal), típico 11,7 W Redundância de alimentação
Conectores	RJ45 10BASE-T/100BASE-TX/1000BASE-T E/S: bloco de terminais com 6 pinos de 2,5 mm para 2 entradas de alarme supervisionadas e 2 saídas RS485/RS422, 2 pçs. 2 pos, full duplex, bloco de terminais Entrada CC, bloco de terminais Entrada para microfone/áudio de 3,5 mm, saída de áudio de 3,5 mm Conector i-CS (compatível com P-Iris e DC-iris)
Iluminação IR	OptimizedIR com LEDs IR de 850 nm de longa duração e alta eficiência energética Alcance de 50 m (164 ft) ou mais dependendo da cena
Armazenamento	Suporte a cartões microSD/microSDHC/microSDXC Suporte a criptografia de cartões SD (AES-XTS-Plain64 256 bits) Suporte a gravação em armazenamento de rede (NAS) Para obter recomendações de cartões SD e NAS, consulte axis.com
Condições operacionais	-40 °C a 60 °C (-40 °F a 140 °F) Temperatura máxima de acordo com o padrão NEMA TS 2 (2.2.7): 74 °C (165 °F) Umidade relativa de 10 – 100% (com condensação) Carga eólica (estável): 55 m/s (123 mph)
Condições de armazenamento	-40 °C a 65 °C (-40 °F a 149 °F) Umidade relativa de 5 – 95% (sem condensação)

Aprovações**EMC**

EN 55032 Classe A, EN 50121-4, IEC 62236-4, EN 61000-3-2, EN 61000-3-3, EN 55024, EN 61000-6-1, EN 61000-6-2, FCC Parte 15 Subparte B Classe A, ICES-003 Classe A, VCCI Classe A, RCM AS/NZS CISPR 32 Classe A, KCC KN32 Classe A, KN35

Segurança

IEC/EN/UL 62368-1, CAN/CSA C22.2 No. 62368-1, IEC/EN/UL 60950-22, CAN/CSA-C22.2 No. 60950-22, IEC 62471, IS 13252

Ambiente

IEC/EN 60529 IP66/IP67, NEMA 250 Tipo 4X, NEMA TS 2 (2.2.7-2.2.9), IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-6, IEC 60068-2-14, IEC 60068-2-27, IEC 60068-2-78, IEC/EN 62262 IK10

Rede

NIST SP500-267

Dimensões

404 x 159 x 168 mm (15,9 x 6,3 x 6,6 pol.)

Peso

2,4 kg (5,3 lb)

Acessórios incluídos

Guia de Instalação, licença do decodificador Windows® para 1 usuário, suporte para parede, kit de conectores Ferramenta IK10
Chave de fenda Torx® T20, ponteira Torx® T30
AXIS P13 Weathershield Kit A
AXIS Fixed Box IR Illuminator Kit A pré-montado

Lentes opcionais

Lens CS 4-10 mm F0.9 P-Iris
Lens i-CS 3.9-10 mm F1.5 8 MP
Lens i-CS 9-50 mm F1.5 8 MP

Acessórios opcionais

Suportes Axis, lentes Axis, midspans Axis, microfones Axis
AXIS P13 Weathershield Extension A
AXIS T8355 Digital Microphone
AXIS T99A10 Positioning Unit 24 V AC/DC
Para obter mais informações sobre acessórios, consulte axis.com

Software de gerenciamento de vídeo

AXIS Companion, AXIS Camera Station e software de gerenciamento de vídeo de parceiros de desenvolvimento de aplicativos da Axis disponíveis em axis.com/vms

Idiomas

Inglês, alemão, francês, espanhol, italiano, russo, chinês simplificado, japonês, coreano, português, chinês tradicional, holandês, tcheco, sueco, finlandês, turco, tailandês, vietnamita

Garantia

Garantia Axis de 5 anos, consulte axis.com/warranty

a. Disponível para download

AXIS P1388-LE Box Camera

Monitoramento confiável em ambientes externos de 8 MP

Esta câmera robusta entrega excelente qualidade de imagem em 8 MP. Ela é capaz de operar em temperatura que variam de -40 °C a 60 °C (-40 °F a 140 °F). Um aquecedor frontal garante que a lente esteja livre de gelo e neblina. E a tecnologia Lightfinder 2.0, Forensic WDR e OptimizedIR oferecem cores reais e detalhes excepcionais independente das condições de iluminação. E os perfis de cena podem ser otimizados automaticamente para atender a cenários específicos. PoE e alimentação CC redundante garantem uma instalação flexível. Com uma DLPU, você pode executar recursos avançados e análises sofisticadas na borda. Além disso, o Axis Edge Vault protege seu dispositivo e protege informações confidenciais contra acesso não autorizado.

- > Excelente qualidade de imagem em 4K
- > -40 °C a 60 °C (-40 °F a 140 °F)
- > Design robusto e resistente a impactos
- > Análise com aprendizado profundo
- > Segurança cibernética integrada com o Axis Edge Vault



AXIS P1388-LE Box Camera

Câmara		Streaming de áudio	Duplex configurável: Unidirecional (simplex) Bidirecional (half duplex, full duplex)
Sensor de imagem	CMOS RGB de 1/1,8 pol. com varredura progressiva Tamanho do pixel 2,0 µm	Entrada de áudio	Entrada para microfone externo não equalizado, alimentação de 5 V para microfone opcional Entrada digital, ring power de 12 V opcional Entrada de linha não equalizada
Lente	Varifocal, 3,9 – 10 mm, F1.5 Campo de visão horizontal: 122°–46° Campo de visão vertical: 64°–26° Correção de IR, lente com encaixe CS, controle P-iris	Saída de áudio	Saída via pareamento de alto-falante
Dia e noite	Filtro de bloqueio de infravermelho removível automaticamente	Codificação de áudio	24bit LPCM, AAC-LC 8/16/32/48 kHz, G.711 PCM 8 kHz, G.726 ADPCM 8 kHz, Opus 8/16/48 kHz
Iluminação mínima	4K a 25/30 fps com Forensic WDR e Lightfinder 2.0: Cor: 0,13 lux a 50 IRE, F1.5 P/B: 0,03 lux a 50 IRE, F1.5 4K a 50/60 fps com Lightfinder 2.0: Cor: 0,3 lux a 50 IRE, F1.5 P/B: 0,06 lux a 50 IRE, F1.5 4K a 25/30 fps com Forensic WDR e Lightfinder 2.0: Com lente F0.9 opcional Cor: 0,05 lux a 50 IRE, F0.9 P/B: 0,011 lux a 50 IRE, F0.9 0 lux com iluminação IR ativada	Rede	Protocolos de rede IPv4, IPv6 USGv6, ICMPv4/ICMPv6, HTTP, HTTPS ^b , HTTP/2, TLS, QoS Layer 3 DiffServ, FTP, SFTP, CIFS/SMB, SMTP, mDNS (Bonjour), UPnP [®] , SNMP v1/v2c/v3 (MIB-II), DNS/DNSv6, DDNS, NTP, NTS, RTSP, RTP, SRTP/RTSPS, TCP, UDP, IGMPv1/v2/v3, RTCP, ICMP, DHCPv4/v6, ARP, SSH, LLDP, CDP, MQTT v3.1.1, Syslog seguro (RFC 3164/5424, UDP/TCP/TLS), endereço Link-Local (configuração zero), IEEE 802.1X (EAP-TLS), IEEE 802.1AR
Velocidade do obturador	1/66500 s a 2 s com 50 Hz 1/66500 s a 2 s com 60 Hz	Integração de sistemas	Interface de programação de aplicativo API aberta para integração de software, incluindo VAPIX [®] , metadados e AXIS Camera Application Platform (ACAP); especificações disponíveis em axis.com/developer-community . A ACAP inclui o Native SDK e o Computer Vision SDK. One-click Cloud Connection ONVIF [®] Profile G, ONVIF [®] Profile M, ONVIF [®] Profile S e ONVIF [®] Profile T, especificações disponíveis em onvif.org
Sistema em um chip (SoC)		Sistemas de gerenciamento de vídeo	Compatível com AXIS Companion, AXIS Camera Station, software de gerenciamento de vídeo de Parceiros de Desenvolvimento de Aplicativos Axis disponíveis em axis.com/vms
Modelo	ARTPEC-8	Controles na tela	Estabilização eletrônica de imagem Alternância dia/noite Remoção de névoa Amplio alcance dinâmico Indicador de streaming de vídeo Foco automático Máscaras de privacidade Clipe de mídia Aquecedor
Memória	2048 MB de RAM, 8192 MB de flash	Edge-to-edge	Pareamento de microfone Emparelhamento de alto-falantes
Recursos de computação	Unidade de processamento de aprendizado profundo (DLPU)	Condições de eventos	Áudio: detecção de áudio, reprodução de cliques de áudio Status do dispositivo: acima/abaixo/na temperatura de operação, remoção/bloqueio de endereço IP, endereço IP novo, perda de rede, sistema pronto, proteção contra sobrecorrente ring power, stream ao vivo ativo Status da entrada de áudio digital Armazenamento de borda: gravação em andamento, interrupção no armazenamento, problemas de integridade de armazenamento detectados E/S: entrada digital, saída digital, acionador manual, entrada virtual MQTT: stateless Agendados e recorrentes: cronograma Vídeo: degradação média da taxa de bits, modo dia/noite, violação
Vídeo		Ações de eventos	Cliques de áudio: reproduzir, parar Modo dia/noite E/S: alternar E/S uma vez, alternar E/S enquanto a regra está ativa. MQTT: publicar Notificação: HTTP, HTTPS, TCP e email Sobreposição de texto Gravações: gravar, gravar vídeo enquanto a regra está ativa Interceptações SNMP: enviar, enviar enquanto a regra está ativa LED de status: piscar, piscar enquanto a regra está ativa Upload de imagens ou cliques de vídeo: FTP, SFTP, HTTP, HTTPS, compartilhamento de rede e email Modo WDR
Compactação de vídeo	H.264 (MPEG-4 Parte 10/AVC) perfis Baseline, Main e High H.265 (MPEG-H Part 2/HEVC) perfil Main Motion JPEG		
Resolução	3840 x 2160 a 160 x 90		
Taxa de quadros	Com Forensic WDR: Até 25/30 fps (50/60 Hz) em todas as resoluções Sem WDR: Até 50/60 fps (50/60 Hz) em todas as resoluções		
Streaming de vídeo	Até 20 streams de vídeo únicos e configuráveis ^a Tecnologia Axis Zipstream em H.264 e H.265 Taxa de quadros e largura de banda controláveis VBR/ABR/MBR H.264/H.265 Modo de baixa latência Indicador de streaming de vídeo		
Relação sinal-ruído	> 55 dB		
WDR	Forensic WDR: até 120 dB, dependendo da cena		
Streaming multiexibição	Até 8 áreas de exibição recortadas individualmente.		
Redução de ruído	Filtro espacial (redução de ruído 2D) Filtro temporal (redução de ruído 3D)		
Configurações da imagem	Contraste, brilho, nitidez, balanço de branco, limite dia/noite, mapeamento de tons, modo de exposição, zonas de exposição, remoção de névoa, correção de distorção de barril, compactação, rotação: 0°, 90°, 180°, 270°, incluindo Formato Corredor, espelhamento, sobreposição de texto e imagens, sobreposição dinâmica de texto e imagens, máscaras de privacidade, máscara de privacidade poligonal, abertura-alvo Perfis de cena: forense, vivido, visão geral de tráfego		
Processamento de imagem	Axis Zipstream, Forensic WDR, Lightfinder 2.0, OptimizedIR		
Pan/Tilt/Zoom	PTZ digital, posições predefinidas Tour por posições predefinidas, fila de controle, indicador direcional na tela Guard tour (máx. 100)		
Áudio			
Recursos de áudio	Controle de ganho automático Emparelhamento de alto-falantes		

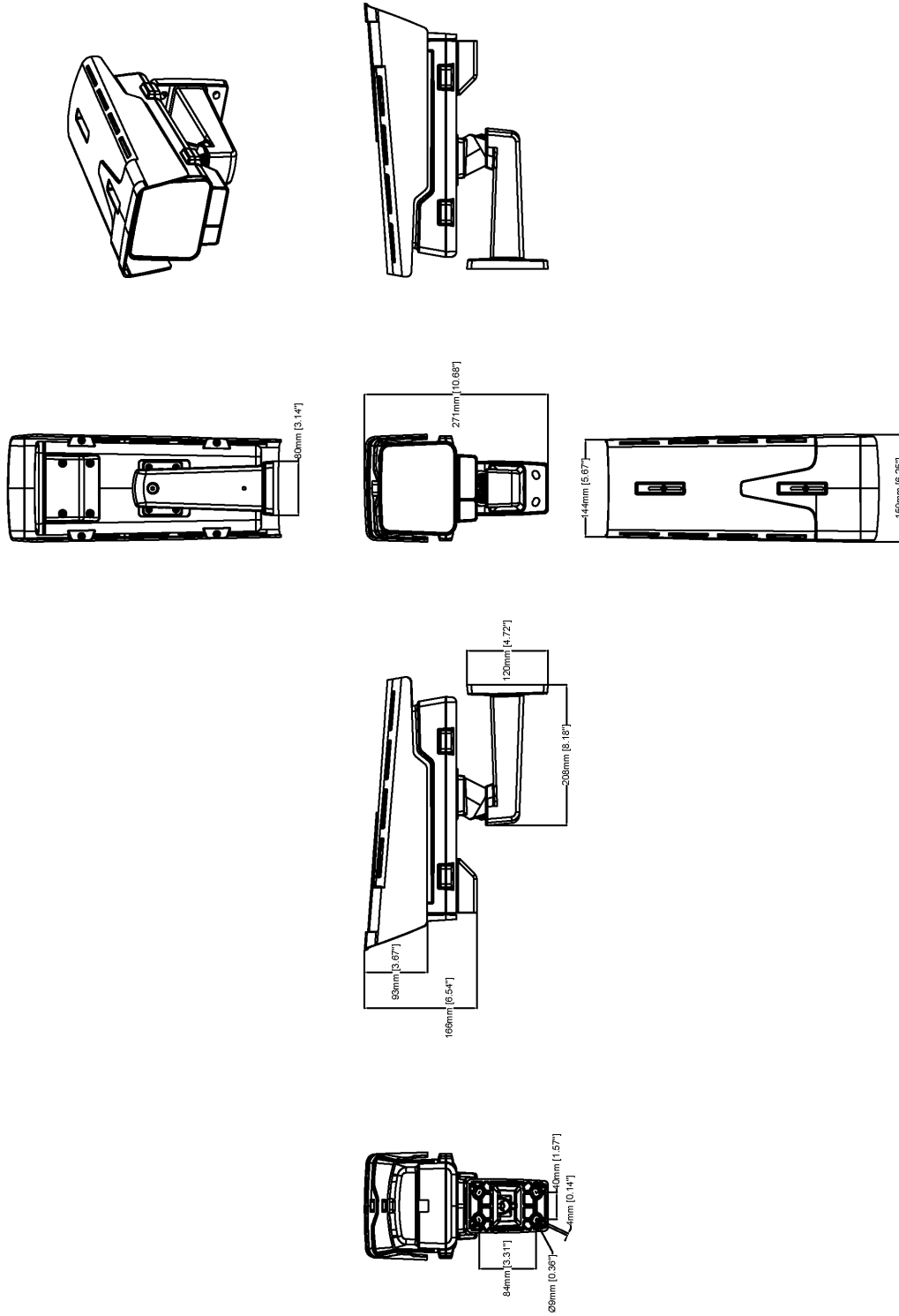
Auxílios de instalação integrados	Assistente de nivelamento, retrofoco remoto	Conectores	Rede: RJ45 10BASE-T/100BASE-TX/1000BASE-T PoE blindado E/S: Bloco terminal com 6 pinos de 2,5 mm para 2 entradas de alarme supervisionadas e 2 saídas (saída de 12 VCC, carga máxima de 50 mA) Áudio: Entrada de 3,5 mm para microfone/linha Comunicação serial: RS485/RS422, 2 pçs, 2 pos, full duplex, bloco de terminais Potência: Entrada CC, bloco de terminais Lente: Conector i-CS (compatível com P-Iris e DC-iris) AXIS T92G20 Connector
Análise		Iluminação IR	OptimizedIR com LEDs IR de 850 nm de longa duração e alta eficiência energética Alcance de 50 m (164 ft) ou mais, dependendo da cena
Aplicativos	Incluídos: Compatíveis: AXIS Perimeter Defender, AXIS License Plate Verifier, AXIS Speed Monitor Suporte à AXIS Camera Application Platform, possibilitando a instalação de aplicativos de outros fabricantes, consulte axis.com/acap	Armazenamento	Suporte a cartões microSD/microSDHC/microSDXC Suporte a criptografia de cartões SD (AES-XTS-Plain64 256 bits) Gravação em armazenamento de rede (NAS) Para obter recomendações de cartões SD e NAS, consulte axis.com
AXIS Object Analytics	Cenários: cruzamento de linhas, objeto na área, tempo na área, contagem de cruzamentos de linhas, ocupação na área Até 10 cenários Outros recursos: objetos acionadores exibidos com trajetórias, caixas delimitadoras coloridas e tabelas Áreas de inclusão/exclusão poligonais Configuração de perspectivas Evento de ONVIF® Motion Alarm	Condições operacionais	-40 °C a 60 °C (-40 °F a 140 °F) Umidade relativa de 10 – 100% (com condensação) Carga eólica (estável): 55 m/s (123 mph)
AXIS Scene Metadata	Classes de objeto: pessoas, rostos, veículos (tipos: carros, ônibus, caminhões, bicicletas), placas de licença Atributos do objeto: confiança, posição	Condições de armazenamento	-40 °C a 65 °C (-40 °F a 149 °F) Umidade relativa de 5 – 95% (sem condensação)
Aprovações		Dimensões	Para obter as dimensões gerais do produto, consulte os esquemas de dimensões nesta folha de dados. Área projetada efetiva (EPA): 0,06 m ² (0,20 ft ²)
Marcações de produtos	UL/cUL, UKCA, CE, KC, EAC, VCCI, RCM	Peso	3340 g (7,4 lb) incluindo suporte de parede 2460 g (5,4 lb) somente para a câmera
Cadeia de suprimentos	Compatível com TAA	Conteúdo da embalagem	Câmera, guia de instalação, conectores de bloco de terminais, AXIS TQ1003-E Wall Mount, chave de autenticação do proprietário
EMC	CISPR 35, CISPR 32 Classe A, EN 55035, EN 55032 Classe A, EN 50121-4, EN 61000-6-1, EN 61000-6-2 Japão: VCCI Classe A Coreia: KS C 9835, KS C 9832 Classe A EUA: FCC Parte 15 Subparte B Classe A	Acessórios opcionais	Microfones AXIS, Midspans AXIS AXIS T8415 Wireless Installation Tool AXIS Surveillance Cards Para mais acessórios, acesse axis.com/products/axis-p1388-le#accessories
Segurança	CAN/CSA C22.2 N° 62368-1 ed. 3, IEC/EN/UL 62368-1 ed. 3, IS 13252	Ferramentas do sistema	AXIS Site Designer, AXIS Device Manager, AXIS Device Manager Extend, seletor de produtos, seletor de acessórios, calculadora de lentes Disponível em axis.com
Ambiente	IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-6, IEC 60068-2-14, IEC 60068-2-27, IEC 60068-2-78, IEC/EN 60529 IP66/IP67, IEC/EN 62262 IK10, ISO 4892-2 NEMA 250 Tipo 4X, NEMA TS 2 (2.2.7-2.2.9)	Idiomas	Inglês, alemão, francês, espanhol, italiano, russo, chinês simplificado, japonês, coreano, português, polonês, chinês tradicional, holandês, tcheco, sueco, finlandês, turco, tailandês, vietnamita
Rede	NIST SP500-267, IPv6 USGv6	Garantia	Garantia de 5 anos, consulte axis.com/warranty
Segurança cibernética	ETSI EN 303 645, FIPS 140	Números de peça	Disponível em axis.com/products/axis-p1388-le#part-numbers
Segurança cibernética		Sustentabilidade	
Segurança de borda	Hardware: Plataforma segurança cibernética AXIS Edge Vault Elemento seguro (CC EAL 6 +), ID de dispositivo Axis, repositório de chaves seguro, vídeo assinado, inicialização segura	Controle de substâncias	Sem PVC, sem BFR/CFR de acordo com o padrão JEDEC/ECA JS709 RoHS de acordo com a diretiva RoHS da UE 2011/65/EU e EN 63000:2018 REACH de acordo com a (EC) No 1907/2006. Para SCIP UUIID, consulte echa.europa.eu
Segurança de rede	IEEE 802.1X (EAP-TLS, PEAP-MSCHAPv2), IEEE 802.1AR, HTTPS/HSTS, TLS v1.2/v1.3, Segurança de tempo de rede (NTS), certificado X.509 PKI, filtragem de endereço IP	Materiais	Conteúdo de plástico reciclável baseado em carbono: 36% (base bio) Triagem de minerais de conflito de acordo com as diretrizes da OCDE Para saber mais sobre a sustentabilidade na Axis, acesse axis.com/about-axis/sustainability
Documentação	<i>Guia de Fortalecimento do AXIS OS</i> <i>Política de gerenciamento de vulnerabilidades da Axis</i> <i>Modelo de desenvolvimento de segurança da Axis</i> Lista de materiais (SBOM) de software do AXIS OS Para baixar documentos, vá para axis.com/support/cybersecurity/resources Para saber mais sobre o suporte da Axis à segurança cibernética, acesse axis.com/cybersecurity	Responsabilidade ambiental	axis.com/environmental-responsibility A Axis Communications é signatária do Pacto Global da ONU, leia mais em unglobalcompact.org
Geral		a. <i>Recomenda-se um máximo de 3 streams de vídeo únicos por câmera ou canal para otimizar a experiência do usuário, a largura de banda da rede e a utilização do armazenamento. Um stream de vídeo único pode ser fornecido a vários clientes de vídeo na rede usando o método de transporte multicast ou unicast via funcionalidade de reutilização de stream integrada.</i> b. <i>Este produto inclui software desenvolvido pelo OpenSSL Project para uso no OpenSSL Toolkit. (openssl.org), and cryptographic software written by Eric Young (eay@cryptsoft.com)</i>	
Caixa	Classificações IP66, IP67, NEMA 4X e IK10 Caixa em alumínio e plástico Proteção climática com revestimento antirreflexo preto Cor: branco NCS S 1002-B Para obter instruções de repintura, acesse a página de suporte do produto. Para obter informações sobre o impacto sobre a garantia, acesse axis.com/warranty-implication-when-repainting . Este produto pode ser repintado.	Montando	Base da câmera incluída
Alimentação elétrica	Power over Ethernet (PoE) IEEE 802.3af/802.3at Tipo 2 Classe 4 Típico 9,58 W, máx. 25,5 W 10 – 28 VCC, típico 9,14 W, máx. 25,5 W Iluminação IR ativada: classe 4, máx. 25,50 W Iluminação IR desativada: classe 3, máx. 12,95 W		

Detectar, Observar, Reconhecer, Identificar (DORI)

	Definição de DORI	Distância (grande angular)	Distância (teleobjetiva)
Detectar	25 px/m (8 px/pé)	78,7 m (258,1 ft)	193,5 m (634,8 ft)
Observar	63 px/m (19 px/ft)	31,2 m (102,4 ft)	76,8 m (251,9 ft)
Reconhecer	125 px/m (38 px/ft)	15,7 m (51,6 ft)	38,7 m (127,0 ft)
Identificar	250 px/m (76 px/ft)	7,9 m (25,8 ft)	19,4 m (63,5 ft)

Os valores de DORI são calculados usando densidades de pixels para diferentes casos de uso, conforme recomendado pelo padrão EN-62676-4. Os cálculos usam o centro da imagem como ponto de referência e consideram a distorção da lente. A possibilidade de reconhecer ou identificar uma pessoa ou um objeto depende de fatores como movimento de objetos, compactação de vídeo, condições de iluminação e foco da câmera. Use as margens ao planejar. A densidade de pixels varia na imagem, e os valores calculados podem ser diferentes das distâncias do mundo real.

Esquema de dimensões



Revision	v.01	Revision date	2024-01-05
Paper size	A4	Release date	2024-01-05
Created by	MS	Scale	1:8

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AXIS COMMUNICATIONS
AXIS P1388-LE Box Camera

www.axis.com

Recursos em destaque

AXIS Object Analytics

O AXIS Object Analytics é uma análise de vídeo pré-instalada e multifuncional que detecta e classifica humanos, veículos e tipos de veículos. Graças a algoritmos baseados em IA e a condições comportamentais, ele analisa a cena e o respectivo comportamento espacial dos objetos em – tudo personalizado para suas necessidades específicas. Escalável e baseado na borda, requer um mínimo de esforço para configurar e oferecer suporte a vários cenários que são executados simultaneamente.

Axis Edge Vault

O AXIS Edge Vault é a plataforma segurança cibernética baseada em hardware que protege o dispositivo Axis. Ele forma a base de que todas as operações seguras dependem e oferece recursos para proteger a identidade do dispositivo, proteger sua integridade e proteger informações confidenciais contra acesso não autorizado. Por exemplo, a **inicialização segura** garante que um dispositivo possa inicializar apenas com o **sistema operacional assinado**, o que impede a violação da cadeia de suprimentos física. Com o sistema operacional assinado, o dispositivo também é capaz de validar o novo software do dispositivo antes de aceitar instalá-lo. O **armazenamento de chaves seguro** é o bloco de construção crítico para a proteção de informações de criptografia usadas para comunicação segura (IEEE 802.1x, HTTPS, ID de dispositivo da Axis, chaves de controle de acesso, etc.) contra extração maliciosa em caso de violação de segurança. O armazenamento de chaves seguro e as conexões seguras são fornecidos através de um módulo de computação criptográfica com certificação de critérios comuns e/ou FIPS 140.

Além disso, o vídeo assinado garante que as evidências em vídeo possam ser verificadas como não testadas. Cada câmera usa sua chave de assinatura de vídeo exclusiva, a qual é armazenada de forma protegida no armazenamento seguro para adicionar uma assinatura ao stream de vídeo, permitindo que o vídeo seja rastreado até a câmera Axis que o gerou.

Para saber mais sobre o Axis Edge Vault, acesse [axis.com/solutions/edge-vault](https://www.axis.com/solutions/edge-vault).

Estabilização eletrônica de imagem

A estabilização eletrônica de imagem (EIS) oferece vídeos suaves em situações em que uma câmera está sujeita a vi-

brações. Sensores giroscópicos integrados detectam continuamente os movimentos e vibrações da câmera, e eles ajustam automaticamente o quadro para garantir que você sempre capture os detalhes de que precisa. A estabilização eletrônica de imagem depende de algoritmos diferentes para modelar o movimento da câmera, os quais são usados para corrigir as imagens.

Forensic WDR

As câmeras Axis com tecnologia de amplo alcance dinâmico (WDR, wide dynamic range) fazem a diferença entre observar detalhes forenses importantes com clareza e ver nada além de borrões em condições de iluminação desafiadoras. A diferença entre os pontos mais escuros e mais claros pode causar problemas para a usabilidade e a clareza da imagem. A tecnologia Forensic WDR reduz de forma eficiente ruídos e artefatos visíveis para fornecer vídeo otimizado para a usabilidade forense máxima.

Lightfinder

A tecnologia Axis Lightfinder oferece vídeo em cores de alta resolução com um mínimo de desfoque de movimento, mesmo quase na escuridão. Como ela remove ruídos, a Lightfinder torna visíveis as áreas escuras de uma cena e captura detalhes em condições de pouca luz. As câmeras com Lightfinders diferenciam cores em condições de pouca luz melhor do que o olho humano. Em situações de vigi-lância, a cor pode ser o fator crítico para identificar uma pessoa, um objeto ou um veículo.

OptimizedIR

A tecnologia Axis OptimizedIR fornece uma combinação exclusiva e poderosa de inteligência de câmeras e tecnologia de LED sofisticada, resultando em nossas soluções de infravermelho integradas à câmera mais avançadas para trabalhar na escuridão total. Em nossas câmeras pan-tilt-zoom (PTZ) com OptimizedIR, o feixe de infravermelho se adapta e torna-se mais largo ou estreito, pois a câmera aumenta ou diminui a sua aplicação para garantir que todo o campo de visão seja sempre iluminado de forma uniforme.

Para obter mais informações, consulte [axis.com/glossary](https://www.axis.com/glossary)