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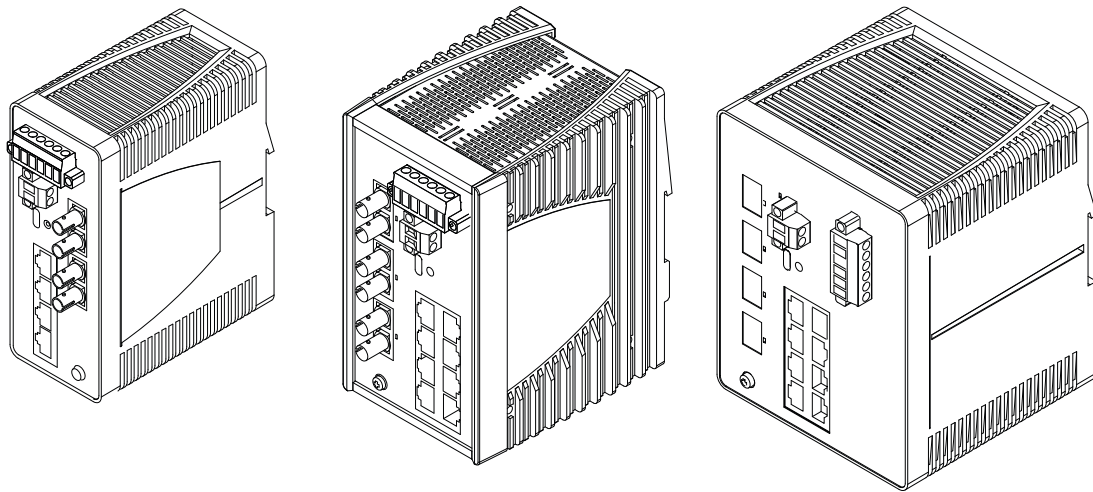
A **BELDEN** BRAND

User Manual

Installation

Industrial Ethernet BOBCAT Rail Switch

BRS20/22/30/32/40/42/50/52



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You can get the latest version of this manual on the Internet at the Hirschmann product site (www.hirschmann.com).

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Safety instructions



WARNING

UNCONTROLLED MACHINE ACTIONS

To avoid uncontrolled machine actions caused by data loss, configure all the data transmission devices individually.

Before you start any machine which is controlled via data transmission, be sure to complete the configuration of all data transmission devices.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

■ General safety instructions

You operate this device with electricity. Improper usage of the device entails the risk of physical injury or significant property damage. The proper and safe operation of this device depends on proper handling during transportation, proper storage and installation, and careful operation and maintenance procedures.

- Before connecting any cable, read this document, and the safety instructions and warnings.
- Operate the device with undamaged components exclusively.
- The device is free of any service components. In case of a damaged or malfunctioning device, turn off the supply voltage and return the device to Hirschmann for inspection.

■ Certified usage

- Use the product only for the application cases described in the Hirschmann product information, including this manual.
- Operate the product only according to the technical specifications. [See "Technical data" on page 51.](#)
- Connect to the product only components suitable for the requirements of the specific application case.

■ Installation site requirements

WARNING

FIRE HAZARD

Install the device in a fire enclosure as per EN 62368-1 or EN 60950-1 if you are connecting it to a power supply >100 W (PS3) or >NEC Class 2.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

- Install this device solely in a switch cabinet or in an operating site with restricted access, to which maintenance staff have exclusive access.
- When you are selecting the installation location, make sure you observe the climatic threshold values specified in the technical data.
- Use the device in an environment with a maximum pollution degree that complies with the specifications in the technical data.
[See “Technical data” on page 51.](#)

■ Qualification requirements for personnel

- Only allow qualified personnel to work on the device.

Qualified personnel have the following characteristics:

- ▶ Qualified personnel are properly trained. Training as well as practical knowledge and experience make up their qualifications. This is the prerequisite for grounding and labeling circuits, devices, and systems in accordance with current standards in safety technology.
- ▶ Qualified personnel are aware of the dangers that exist in their work.
- ▶ Qualified personnel are familiar with appropriate measures against these hazards in order to reduce the risk for themselves and others.
- ▶ Qualified personnel receive training on a regular basis.

■ Device casing

Only technicians authorized by the manufacturer are permitted to open the casing.

■ Shielding ground

The shielding ground of the connectable twisted pair cables is connected to the ground connection as a conductor.

- Beware of possible short circuits when connecting a cable section with conductive shielding braiding.

■ Grounding the device

The device is grounded via the separate ground screw. The grounding screw is located on the front right side of the device for narrow casing sizes. For the medium and wide casing sizes, the grounding screw is located at the bottom left of the front side of the device.

See [“Dimension drawings” on page 58](#).

- Ground the device before connecting any other cables.
- Disconnect the grounding only after disconnecting all other cables.

■ Requirements for connecting electrical wires

Before connecting the electrical wires, **always** verify that the requirements listed are complied with.

The following requirements apply without restrictions:

- ▶ The electrical wires are voltage-free.
- ▶ The cables used are permitted for the temperature range of the application case.



Only use power supply cables that are suitable for a temperature 20 K higher than the maximum ambient air temperature at which the device is used.

■ Requirements for connecting the signal contact

Before connecting the signal contact, **always** verify that the requirements listed are complied with.

The following requirements apply without restrictions:

- ▶ The connected voltage complies with the requirements for a safety extra-low voltage (SELV) or ES1 as per IEC/EN 62368-1.
 - ▶ The connected voltage is limited by a current limitation device or a fuse.
Observe the electrical threshold values for the signal contact.
- See [“Technical data” on page 51](#).
-

■ Requirements for connecting the supply voltage

Before connecting the supply voltage, **always** verify that the requirements listed are complied with.

Prerequisites:

All of the following requirements are complied with:

- ▶ The supply voltage corresponds to the voltage specified on the type plate of the device.
- ▶ The power supply complies with the requirements for a safety extra-low voltage (SELV) or ES1 as per IEC/EN 62368-1.
- ▶ The power supply has an easily accessible disconnecting device (for example a switch or a plug). This disconnecting device is clearly identified. So in the case of an emergency, it is clear which disconnecting device belongs to which power supply cable.
- ▶ The wire diameter of the power supply cable is at least 0.75 mm² (North America: AWG18) on the supply voltage input.
The wire diameter of the power supply cable is at least 1 mm² (North America: AWG16) on the supply voltage input for PoE device variants.
- ▶ The cross-section of the ground conductor is the same size as or bigger than the cross-section of the power supply cables.

Depending on the voltage input used (characteristic value F, T, U, P) and the supply voltage used (DC, AC), the following additional requirements apply:

Device variants featuring supply voltage with characteristic value F, T, U

All of the following requirements are complied with:

Supply with DC voltage:

- ▶ There are fuses suitable for DC voltage in the positive conductors of the supply lines, or the voltage sources are appropriately current-limited. Regarding the properties of this fuse: [See “Technical data” on page 51.](#)
- ▶ The negative conductors of the voltage inputs are on ground potential.

Device variants featuring supply voltage with characteristic value F

All of the following requirements are complied with:

Supply with AC voltage:

- ▶ There are fuses in the supply lines, or the voltage sources are appropriately current-limited. Regarding the properties of this fuse: [See “Technical data” on page 51.](#)
- ▶ The power sources are electrically isolated from the ground potential.

Device variants featuring supply voltage with characteristic value P

All of the following requirements are complied with:

- ▶ There are fuses suitable for DC voltage in the positive conductors of the supply lines, or the voltage sources are appropriately current-limited. Regarding the properties of this fuse: [See “Technical data” on page 51.](#)
- ▶ The power sources are electrically isolated from the ground potential. According to specification IEEE 802.3, the insulation voltage must be 1500 V AC or 2250 V DC.

Note: The devices can be supplied either via one voltage input or redundantly via both voltage inputs.

■ Supply voltage

The supply voltage is connected to the device casing through protective elements exclusively.

■ **LED or laser components**

LED or LASER components according to IEC 60825-1 (2014):
CLASS 1 LASER PRODUCT
CLASS 1 LED PRODUCT

■ **National and international safety regulations**

Verify that the electrical installation meets local or nationally applicable safety regulations.

■ **Relevant for use in explosion hazard areas (Hazardous Locations, Class I, Division 2)**

This equipment is exclusively suitable for use in Class I, Division 2, Groups A, B, C, and D or non-hazardous locations.

This device is an open-type device that is to be installed in an enclosure suitable for the environment and accessible exclusively with the use of a tool.

Exclusively use the device for the application cases specified by the manufacturer. Failure to follow these instructions can impair device protection.

WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

Avertissement - Risque d'explosion - Ne pas débrancher tant que le circuit est sous tension à moins que l'emplacement soit connu pour ne contenir aucune concentration de gaz inflammable.

WARNING - EXPLOSION HAZARD - SUBSTITUTION OF ANY COMPONENT MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.

Avertissement - Risque d'explosion - La substitution de tout composant peut rendre ce matériel incompatible pour une utilisation en classe I, division 2.

The storage medium ACA22-USB-C (EEC) is mechanically secured to prevent the connection from being disconnected.

Le dispositif de sauvegarde ACA22-USB-C (EEC) est fixé mécaniquement pour éviter toute déconnexion de la connexion.

A USB cable for configuring the device may only be used in a non-explosive area.

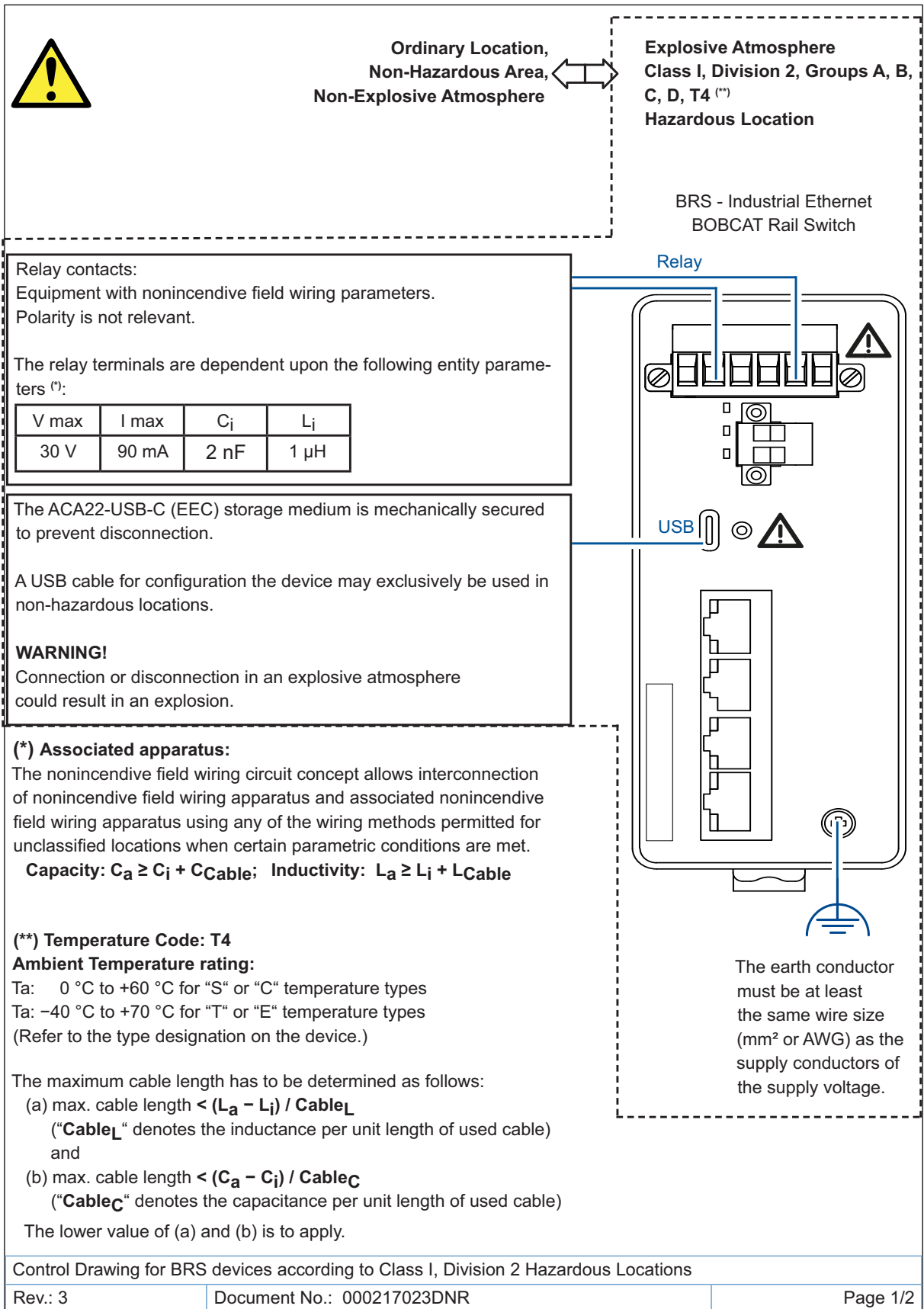
Un câble USB pour la configuration de l'équipement ne doit être utilisé que dans une zone non explosive.

WARNING!

Connection or disconnection in an explosive atmosphere could result in an explosion.

AVERTISSEMENT!

Le branchement ou le débranchement dans une atmosphère explosive peut entraîner une explosion.



For use in Hazardous Locations Class I, Division 2, Groups A, B, C, D:

Exclusively allowed for BRS model No's which are individually labeled
"FOR USE IN HAZARDOUS LOCATIONS".

This equipment is exclusively suitable for use in Class I, Division 2, Groups A, B, C, and D or non-hazardous locations.

Nonincendive field wiring circuits must be wired in accordance with the National Electrical Code (NEC), NFPA 70, article 501.

WARNING – EXPLOSION HAZARD

Substitution of any components may impair suitability for hazardous locations or explosive atmospheres.

WARNING – EXPLOSION HAZARD

Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

THIS DEVICE IS AN OPEN-TYPE DEVICE THAT IS TO BE INSTALLED IN AN ENCLOSURE SUITABLE FOR THE ENVIRONMENT AND ACCESSIBLE EXCLUSIVELY WITH THE USE OF A TOOL.

Control Drawing for BRS devices according to Class I, Division 2 Hazardous Locations

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Document No.: 000217023DNR

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■ **CE marking**

The labeled devices comply with the regulations contained in the following European directive(s):

2011/65/EU and 2015/863/EU (RoHS)

Directive of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

2014/30/EU (EMC)

Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.

In accordance with the above-named EU directive(s), the EU conformity declaration will be available to the relevant authorities at the following address:

Hirschmann Automation and Control GmbH
Stuttgarter Str. 45-51
72654 Neckartenzlingen
Germany
www.hirschmann.com

The device can be used in the industrial sector.

▶ Interference immunity: EN 61000-6-2

▶ Emitted interference: EN 55032

You find more information on technical standards here:

[“Technical data” on page 51](#)

The assembly guidelines provided in these instructions must be strictly adhered to in order to observe the EMC threshold values.

Warning! This is a class A device. This device can cause interference in living areas, and in this case the operator may be required to take appropriate measures.

■ **FCC note:**

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference; (2) this device must accept any interference received, including interference that may cause undesired operation.

Appropriate testing has established that this device fulfills the requirements of a class A digital device in line with part 15 of the FCC regulations.

These requirements are designed to provide sufficient protection against interference when the device is being used in a business environment.

The device creates and uses high frequencies and can also radiate these frequencies. If it is not installed and used in accordance with this operating manual, it can cause radio transmission interference. The use of this device in a residential area can also cause interference, and in this case the user is obliged to cover the costs of removing the interference.

■ **Recycling note**

After usage, this device must be disposed of properly as electronic waste, in accordance with the current disposal regulations of your county, state, and country.




About this manual

The “Installation” user manual contains a device description, safety instructions, a description of the display, and the other information that you need to install the device.

Documentation mentioned in the “User Manual Installation” that is not supplied with your device as a printout can be found as PDF files for downloading on the Internet at: <https://www.doc.hirschmann.com>

Key

The symbols used in this manual have the following meanings:

	Listing
	Work step
	Subheading

1 Description

1.1 General device description

The device is designed for the special requirements of industrial automation. The device meets the relevant industry standards, provides very high operational reliability, even under extreme conditions, and also long-term reliability and flexibility.

The devices allow you to set up switched industrial Ethernet networks that conform to the IEEE 802.3 standard.

You can choose from between a wide range of variants. You have the option to set up your device individually based on different criteria:

- ▶ Number of ports
- ▶ Transmission speed
- ▶ Types of connectors
- ▶ Temperature range
- ▶ Supply voltage range
- ▶ Certifications
- ▶ Software level
- ▶ IP degree of protection: IP30 (plastic casing) or IP40 (metal casing)

Mounting the device

- ▶ Mounting on the DIN rail

You have the option of choosing various media to connect to the end devices and other network components:

- ▶ Twisted pair cable
- ▶ Multimode F/O
- ▶ Singlemode F/O

There are convenient options for managing the device. Manage your devices via:

- ▶ Web browser
- ▶ SSH
- ▶ Telnet
- ▶ Network management software (for example Industrial HiVision)
The Network Management Software Industrial HiVision provides you with options for smooth configuration and monitoring. You find further information on the Internet at the Hirschmann product pages:
<http://www.hirschmann.com/en/QR/INET-Industrial-HiVision>
- ▶ USB-C interface (locally on the device)

The device provides you with a large range of functions, which the manuals for the operating software inform you about. You can download these manuals as PDF files from the Internet on the Hirschmann product pages (<http://www.doc.hirschmann.com>).

1.2 Device name and product code

The device name corresponds to the product code. The product code is made up of characteristics with defined positions. The characteristic values stand for specific product properties.

You have numerous options of combining the device characteristics. You can determine the possible combinations using the Configurator which is available in the Belden E-Catalog (www.e-catalog.beldensolutions.com) on the web page of the device.

Item	Characteristic	Character istic value	Description
1 ... 3	Product	BRS	BOBCAT Rail Switch
4	Data rate	2	100 Mbit/s
		3	100/1000 Mbit/s
		4	1000 Mbit/s
		5	1000/2500 Mbit/s
5	Hardware type	0	Standard
		2	PoE
6	(hyphen)	–	
7 ... 8	Number: 100 Mbit/s ports	00	0 × 10/100 Mbit/s ports
		04	4 × 10/100 Mbit/s ports
		05	5 × 10/100 Mbit/s ports
		06	6 × 10/100 Mbit/s ports
		08	8 × 10/100 Mbit/s ports
		09	9 × 10/100 Mbit/s ports
		10	10 × 10/100 Mbit/s ports
		11	11 × 10/100 Mbit/s ports
9 ... 10	Number: 100/1000/ 2500 Mbit/s ports	00	0 × 100/1000 Mbit/s ports
		04	4 × 100/1000 Mbit/s ports
		08	8 × 100/1000 Mbit/s ports
		12	12 × 100/1000 Mbit/s ports
		12	12 × 8 × 100/1000-Mbit/s-Ports + 4 × 100/1000/2500 Mbit/s

Table 1: Device name and product code

Item	Characteristic	Characteristic value	Description
11 ... 12	Configuration of the first uplink ports	99	Not present
		M2	1 × DSC multimode socket for 100 Mbit/s F/O connections
		M4	1 × DST multimode socket for 100 Mbit/s fiber optic connections
		S2	1 × DSC singlemode socket for 100 Mbit/s F/O connections
		S4	1 × DST singlemode socket for 100 Mbit/s fiber optic connections
		E2	1 × DSC singlemode (plus) socket for 100 Mbit/s fiber optic connections
		L2	1 × DSC singlemode (LH) socket for 100 Mbit/s fiber optic connections
		G2	1 × DSC singlemode (LH) socket for 100 Mbit/s fiber optic connections, 200 km
		Z6	1 × SFP slot for 100 Mbit/s F/O connections
		MM	2 × DSC multimode socket for 100 Mbit/s F/O connections
		NN	2 × DST multimode socket for 100 Mbit/s fiber optic connections
		VV	2 × DSC singlemode socket for 100 Mbit/s F/O connections
		UU	2 × DST singlemode socket for 100 Mbit/s fiber optic connections
		EE	2 × DSC singlemode (plus) socket for 100 Mbit/s fiber optic connections
		LL	2 × DSC singlemode (LH) socket for 100 Mbit/s fiber optic connections
		GG	2 × DSC singlemode (LH) socket for 100 Mbit/s fiber optic connections, 200 km
ZZ	2 × SFP slot for 100 Mbit/s F/O connections		
OO	2 × SFP slot for 100/1000 Mbit/s F/O connections		
2Q	2 × SFP slot for 100/1000/2500 Mbit/s fiber optic connections		

Table 1: Device name and product code

Item	Characteristic	Character	Description	istic value
13 ... 14	Configuration of the second uplink ports	99	Not present	
		M2	1 ×	DSC multimode socket for 100 Mbit/s F/O connections
		M4	1 ×	DST multimode socket for 100 Mbit/s fiber optic connections
		S2	1 ×	DSC singlemode socket for 100 Mbit/s F/O connections
		S4	1 ×	DST singlemode socket for 100 Mbit/s fiber optic connections
		E2	1 ×	DSC singlemode (plus) socket for 100 Mbit/s fiber optic connections
		L2	1 ×	DSC singlemode (LH) socket for 100 Mbit/s fiber optic connections
		G2	1 ×	DSC singlemode (LH) socket for 100 Mbit/s fiber optic connections, 200 km
		Z6	1 ×	SFP slot for 100 Mbit/s F/O connections
		ZZ	2 ×	SFP slot for 100 Mbit/s F/O connections
		OO	2 ×	SFP slot for 100/1000 Mbit/s F/O connections
		2Q	2 ×	SFP slot for 100/1000/2500 Mbit/s fiber optic connections
15	(hyphen)	–		
16	Temperature range	S	Standard	+32 °F ... +140 °F (0 °C ... +60 °C)
		C	Standard with Conformal Coating	+32 °F ... +140 °F (0 °C ... +60 °C)
		T	Extended	-40 °F ... +158 °F (-40 °C ... +70 °C)
		E	Extended with Conformal Coating	-40 °F ... +158 °F (-40 °C ... +70 °C)
17	Supply voltage	T	2 ×	12 V DC ... 24 V DC
		U	2 ×	24 V DC
		F	2 ×	24 V DC ... 48 V DC / 24 V AC
		P	2 ×	48 V DC (PoE) / 54 V DC (PoE+)
18	Housing	C	IP30	Plastic
		D	IP30	Metal
		E	IP40 ^a	Metal
19	Certificates and declarations ^b Part A	Z	CE, FCC, EN 61131-2, EN 62368-1, (NEMA TS2 ^c)	
		Y	Z + cUL 61010	
		X	cUL 61010 + ANSI/UL 121201	
		V	Z + IEC 61850-3	
		U	Z + DNV GL	
		W	Z + ATEX/IECEX	
		T	Z + EN 50121-4	

Table 1: Device name and product code

Item	Characteristic	Characteristic value	Description
20	Certificates and declarations Part B	9	Not present
		Y	cUL 61010
		X	cUL 61010 + ANSI/UL 121201
		V	IEC 61850-3
		U	DNV GL
		W	ATEX/IECEX
		T	EN 50121-4
21	Software packages	9	Reserved
22 ... 23	Customer-specific version	HH	Hirschmann
24	Hardware configuration	S	Standard
25	Software configuration	E	Entry (without configuration)
26	Software level	S	HiOS Layer 2 Standard
		A	HiOS Layer 2 Advanced
27 ... 31	Software version	07.0.	Software version 07.0
		XX.X	Current software version
32 ... 33	Maintenance	00	Bugfix version 00
		XX	Current bugfix version

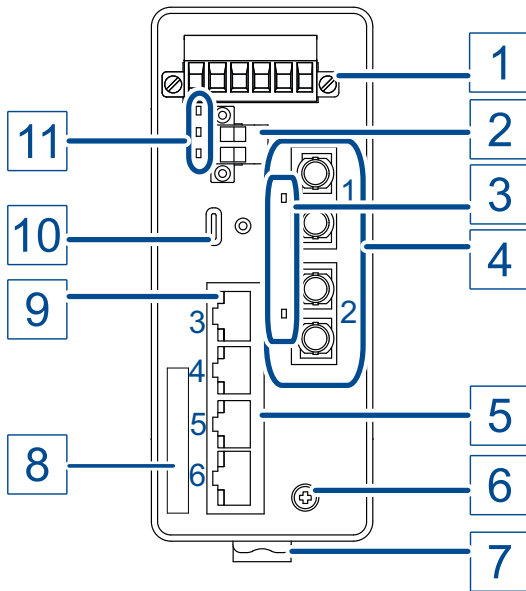
Table 1: Device name and product code

- For device variants with casing with characteristic value E that are DSC sockets, the degree of protection IP30 applies exclusively.
- You will find detailed information on the approvals and self-declarations applying to your device in the data sheet. You will find the data sheet on the Hirschmann product pages www.hirschmann.com
- Applies exclusively to device variants with extended temperature range.

1.3 Device views

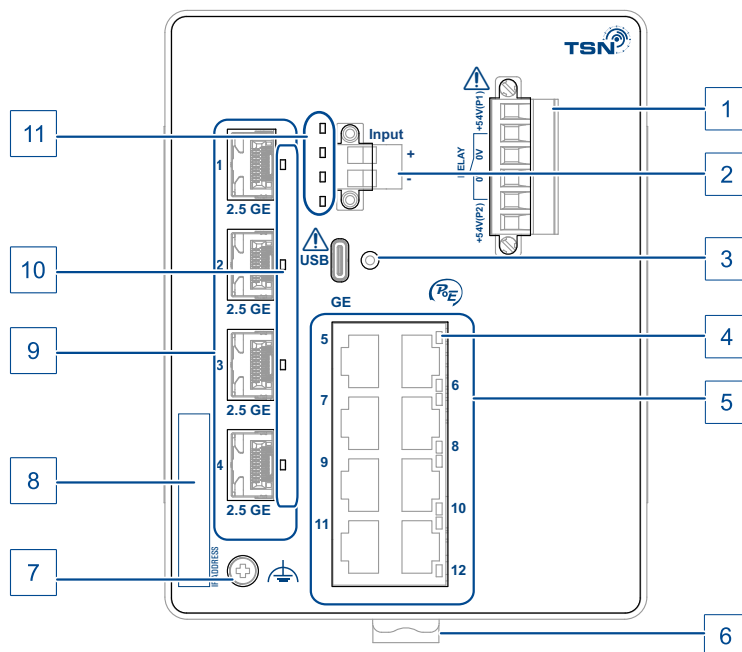
1.3.1 Front view

■ Example of a low-port device variant



1	6-pin terminal block with screw lock for redundant power supply and signal contact
2	2-pin terminal block with screw lock for the digital input
3	LED display elements for port status
4	depending on device variant <ul style="list-style-type: none">▶ SFP slot for 100 Mbit/s F/O connections▶ DSC or DST singlemode socket for 100 Mbit/s fiber optic connections▶ DSC or DST multimode socket for 100 Mbit/s fiber optic connections▶ Not present
5	RJ45 socket for 10/100 Mbit/s Twisted pair connections
6	Grounding screw
7	Rail lock slide for DIN rail mounting
8	Label area for IP address
9	LED display elements for port status
10	USB-C interface
11	LED display elements for device status

■ Example of a low-port device variant with PoE

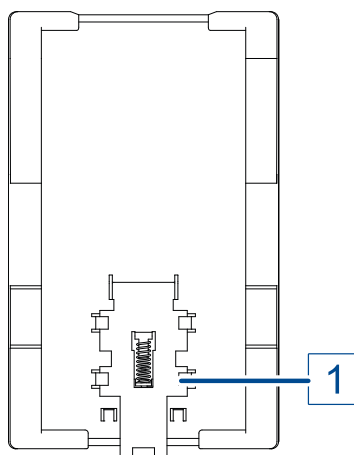
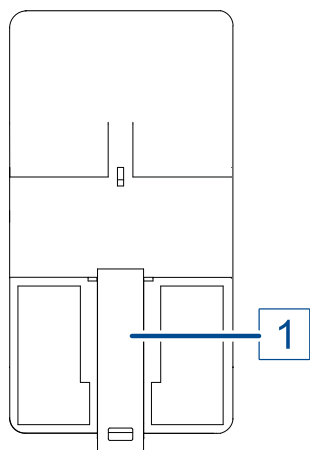


1	6-pin terminal block with screw lock for redundant power supply and signal contact
2	2-pin terminal block with screw lock for the digital input
3	USB-C interface
4	LED display elements for port status
5	BRS20/22/30/32 depending on device variant <ul style="list-style-type: none"> ▶ RJ45 socket for 10/100 Mbit/s Twisted pair connections ▶ RJ45 socket with PoE support BRS40/42/50/52 depending on device variant <ul style="list-style-type: none"> ▶ RJ45 socket for 10/100/1000 Mbit/s Twisted Pair connections ▶ RJ45 socket with PoE support
6	Rail lock slide for DIN rail mounting
7	Grounding screw
8	Label area for IP address
9	BRS20/22 depending on device variant <ul style="list-style-type: none"> ▶ SFP slot for 100 Mbit/s F/O connections ▶ DSC or DST singlemode socket for 100 Mbit/s fiber optic connections ▶ DSC or DST multimode socket for 100 Mbit/s fiber optic connections ▶ Not present BRS30/32/40/42 SFP slot for 100/1000 Mbit/s fiber optic connections BRS50/52 SFP slot for 100/1000/2500 Mbit/s fiber optic connections
10	depending on device variant <ul style="list-style-type: none"> ▶ LED display elements for port status ▶ Not present
11	LED display elements for device status

1.3.2 Rear view

Device variants with casing characteristic value C

Device variants with casing with characteristic value E or D



1 Rail lock slide for DIN rail mounting

1.4 Power supply

1.4.1 Supply voltage with characteristic value T

The following options for power supply are available:

- ▶ 6-pin terminal block

You will find information on connecting the supply voltage here:
[See “Supply voltage with characteristic value T” on page 39.](#)

1.4.2 Supply voltage with characteristic value F

The following options for power supply are available:

- ▶ 6-pin terminal block

You will find information on connecting the supply voltage here:
[See “Supply voltage with characteristic value F” on page 40.](#)

1.4.3 Supply voltage with characteristic value U

The following options for power supply are available:

- ▶ 6-pin terminal block

You will find information on connecting the supply voltage here:
[See “Supply voltage with characteristic value U” on page 41.](#)

1.4.4 Supply voltage with characteristic value P

The following options for power supply are available:

- ▶ 6-pin terminal block

You will find information on connecting the supply voltage here:
[See “Supply voltage with characteristic value P” on page 41.](#)

These device variants support PoE(+).

1.5 Ethernet ports

You can connect end devices and other segments to the device ports using twisted pair cables or optical fibers (F/O).

1.5.1 10/100 Mbit/s twisted pair port

The 10/100 Mbit/s twisted pair port allows you to connect network components according to the IEEE 802.3 10BASE-T/100BASE-TX standard.

This port supports:

- ▶ Autonegotiation
- ▶ Autopolarity
- ▶ Autocrossing
- ▶ 10 Mbit/s half-duplex mode, 10 Mbit/s full duplex mode
- ▶ 100 Mbit/s half-duplex mode, 100 Mbit/s full duplex mode

Delivery state: Autonegotiation activated
 The port casing is electrically connected to the front panel.
 The pin assignment corresponds to MDI-X.

1.5.2 10/100/1000 Mbit/s twisted pair port

This port is an RJ45 socket.

The 10/100/1000 Mbit/s twisted pair port allows you to connect network components according to the IEEE 802.3 10BASE-T/100BASE-TX/1000BASE-T standard.

This port supports:

- ▶ Autonegotiation
- ▶ Autopolarity
- ▶ Autocrossing
- ▶ 10 Mbit/s half-duplex mode, 10 Mbit/s full duplex mode
- ▶ 100 Mbit/s half-duplex mode, 100 Mbit/s full duplex mode
- ▶ 1000 Mbit/s full duplex

Delivery state: Autonegotiation activated
 The port casing is electrically connected to the front panel.
 The pin assignment corresponds to MDI-X.

■ Pin assignment

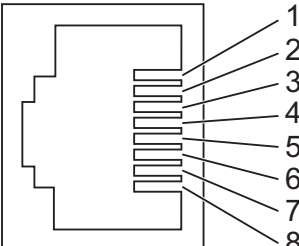
RJ45	Pin	10/100 Mbit/s	1000
	MDI mode		
	1	TX+	BI_DA+
	2	TX-	BI_DA-
	3	RX+	BI_DB+
	4	—	BI_DC+
	5	—	BI_DC-
	6	RX-	BI_DB-
	7	—	BI_DD+
	8	—	BI_DD-
	MDI-X mode		
	1	RX+	BI_DB+
	2	RX-	BI_DB-
	3	TX+	BI_DA+
	4	—	BI_DD+
	5	—	BI_DD-
	6	TX-	BI_DA-
7	—	BI_DC+	
8	—	BI_DC-	

Table 2: Pin assignment 10/100/1000 Mbit/s twisted pair port, RJ45 socket, MDI-X mode

1.5.3 100 Mbit/s F/O port

This port is a DST/DSC socket or an SFP slot.

The 100 Mbit/s F/O port allows you to connect network components according to the IEEE 802.3 100BASE-FX standard.

This port supports:

- ▶ 100 Mbit/s, full duplex

Delivery state:

- ▶ 100 Mbit/s full duplex when using a Fast Ethernet SFP transceiver

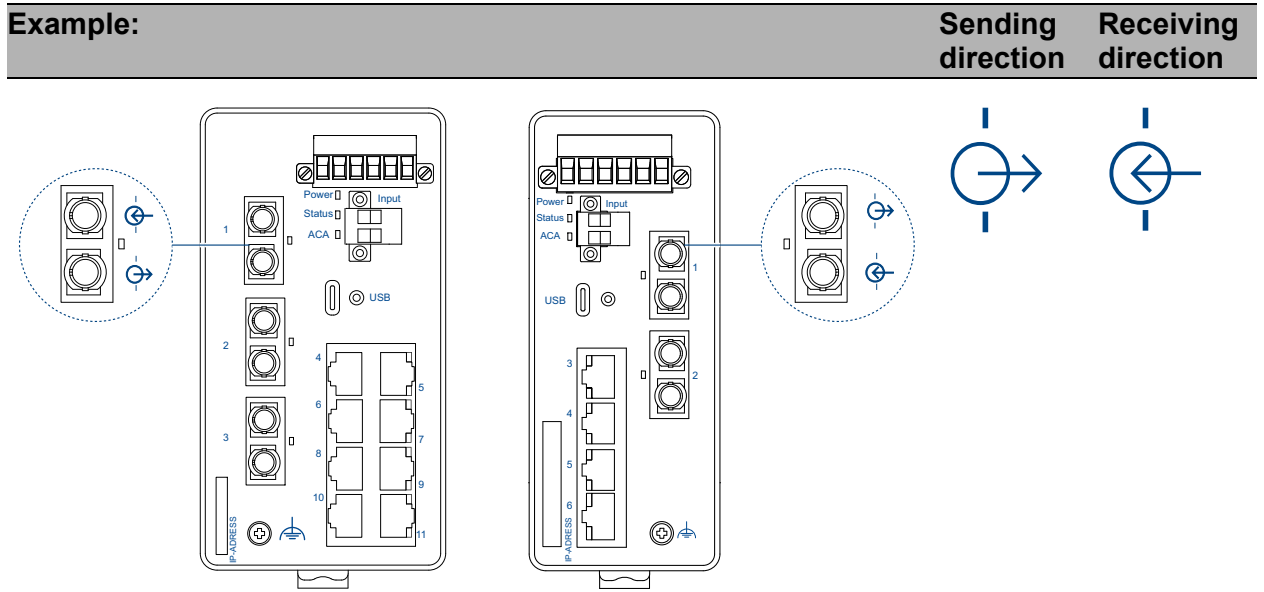


Table 3: Sending and receiving directions for device variants with DSC or DST ports

1.5.4 100/1000 Mbit/s F/O port

This port is an SFP slot.

The 100/1000 Mbit/s F/O port allows you to connect network components according to standard IEEE 802.3 100BASE-FX/1000BASE-SX/1000BASE-LX.

This port supports:

- ▶ 100 Mbit/s, full duplex
- ▶ 1000 Mbit/s full duplex

Delivery state:

- ▶ 100 Mbit/s full duplex when using a Fast Ethernet SFP transceiver
- ▶ 1000 Mbit/s full duplex when using a Gigabit Ethernet SFP transceiver

1.5.5 100/1000/2500 Mbit/s F/O port

This port is an SFP slot.

The 100 Mbit/s F/O port allows you to connect network components according to the standard IEEE 802.3 100BASE-FX.

The port allows you to connect network components according to standard IEEE 802.3 1000BASE-SX/1000BASE-LX.

The port allows you to connect network components according to IEEE P802.3bz 2.5 Gbit/s.

This port supports:

- ▶ 100 Mbit/s full duplex
- ▶ 1000 Mbit/s full duplex
- ▶ 2500 Mbit/s full duplex

Delivery state:

- ▶ 100 Mbit/s full duplex when using a Fast Ethernet SFP transceiver
- ▶ 1000 Mbit/s full duplex when using a Gigabit Ethernet SFP transceiver
- ▶ 2500 Mbit/s full duplex when using a Gigabit Ethernet SFP transceiver

1.5.6 Support of PoE(+)

The device variants BRS22/32/42/52 support Power over Ethernet (PoE) and Power over Ethernet Plus (PoE+).

PoE-capable Ethernet ports are designed as 8 × RJ45 sockets.

See [“Front view” on page 22.](#)

The port allows you to connect network components via a PoE voltage source according to the standard IEEE 802.3af/at.

With the presence of the PoE power supply, a separate power supply for the connected device is unnecessary.

The PoE power is supplied via the wire pairs transmitting the signal (phantom voltage).

The individual ports are not electrically insulated from each other (common PoE voltage).

For the maximum power available to PoE end devices in total, see the technical data: See [“Technical data” on page 51.](#)

Note: Connect only PoE-supplier devices whose data connections are located in the interior of the building and are specified as SELV circuits.

1.6 Display elements

1.6.1 Device state

These LEDs provide information about conditions which affect the operation of the whole device.

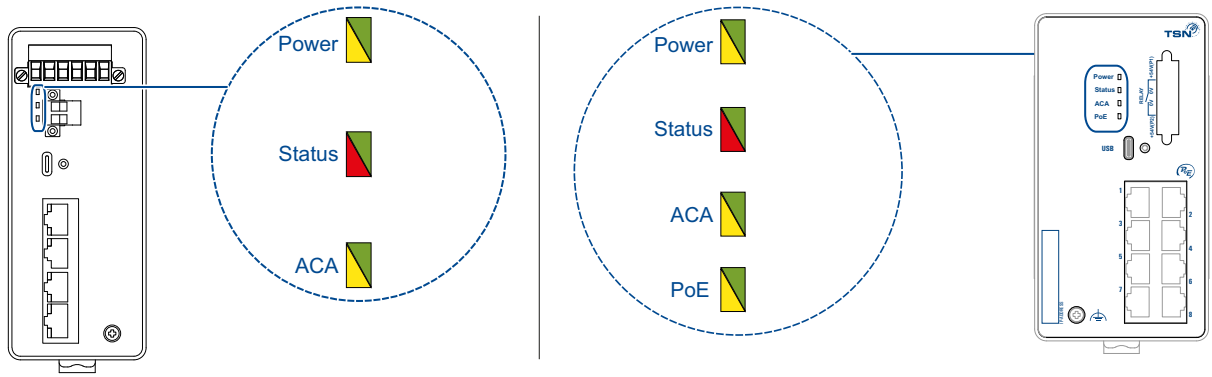


Figure 1: LED display elements for device status

LED	Display	Color	Activity	Meaning
Power	Supply voltage	—	none	Supply voltages 1 and 2 are too low.
		yellow	lights up	Supply voltage 1 or 2 is on
			flashes 4 times a period	Software update is running. Maintain the power supply.
		green	lights up	Supply voltage 1 and 2 is on
Status	Device Status	—	none	Device starts Device is not ready for operation
		green	lights up	Device is ready for operation Characteristics can be configured
		red	lights up	Device is not ready for operation
			flashes 1 time a period	The boot parameters used when the device has been started differ from the boot parameters saved. Start the device again.
			flashes 4 times a period	Device has detected a multiple IP address
red/ green	flashing alternately	Device is in the recovery mode.		
ACA	Storage medium ACA22-USB-C (EEC)	—	none	No ACA connected
		green	lights up	ACA is plugged
			flashes 3 times a period	Device writes to/reads from the storage medium
		yellow	lights up	ACA is not ready for operation
PoE		—	none	Supply voltage is too low
		yellow	lights up	Supply voltage is too low for PoE support.
		green	lights up	PoE voltage is on

Table 4: Meaning of the device display elements

1.6.2 Port status

These LEDs display port-related information.

Note:

- ▶ For device variants with 4 × RJ45 sockets:
The LEDs are directly located at the ports.
[See figure 2 on page 30.](#)
- ▶ For device variants with 8 × RJ45 sockets:
The LEDs are located on the right side of the device.
[See figure 3 on page 31.](#)
[See figure 4 on page 31.](#)
- ▶ For device variants with ports that are DSC/DST sockets and SFP slots:
The LEDs are directly located at the ports.
[See figure 3 on page 31.](#)
[See figure 4 on page 31.](#)

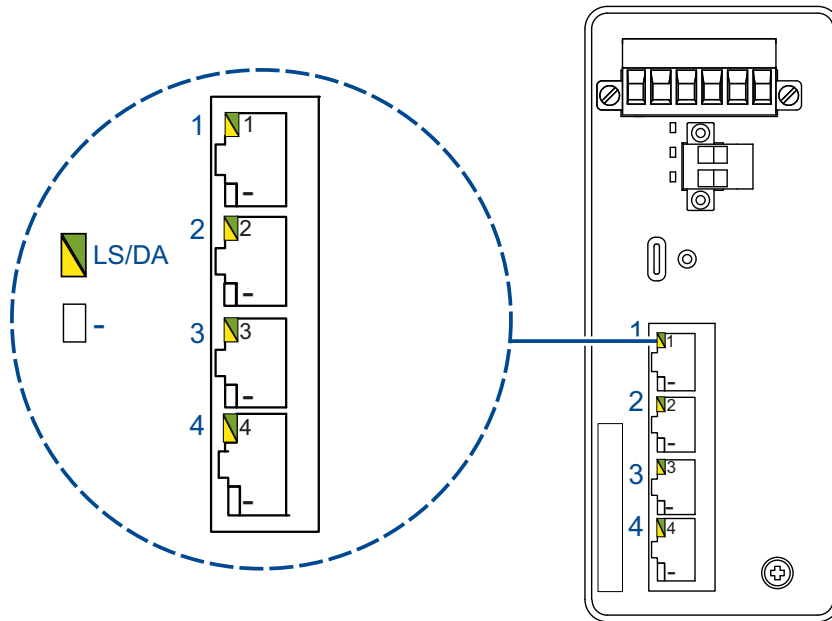


Figure 2: LED display elements for device variants with 4 × RJ45 sockets

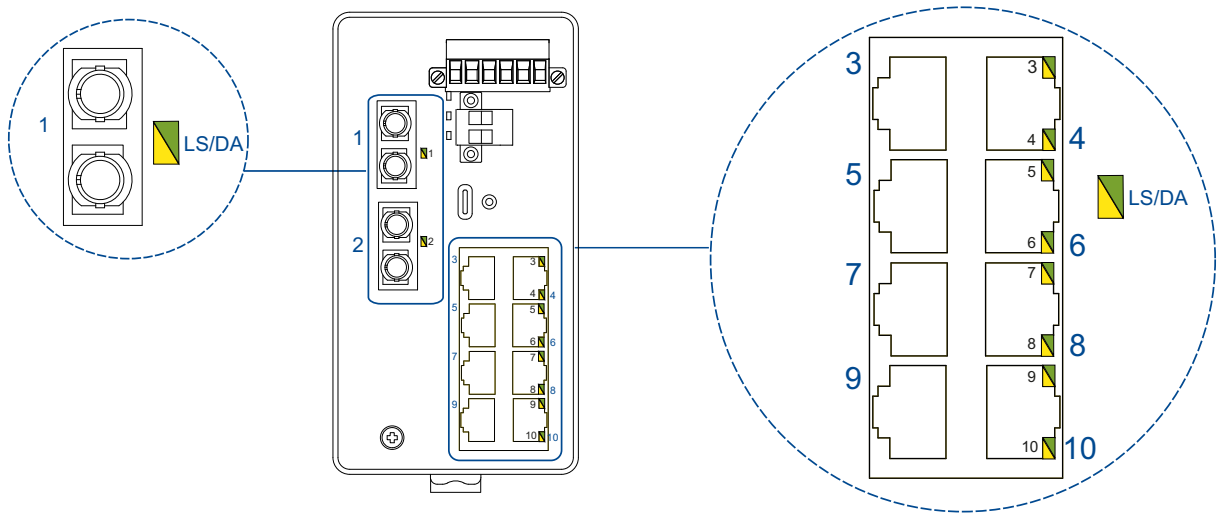


Figure 3: LED display elements for device variants with DSC, DST and 8 × RJ45 sockets

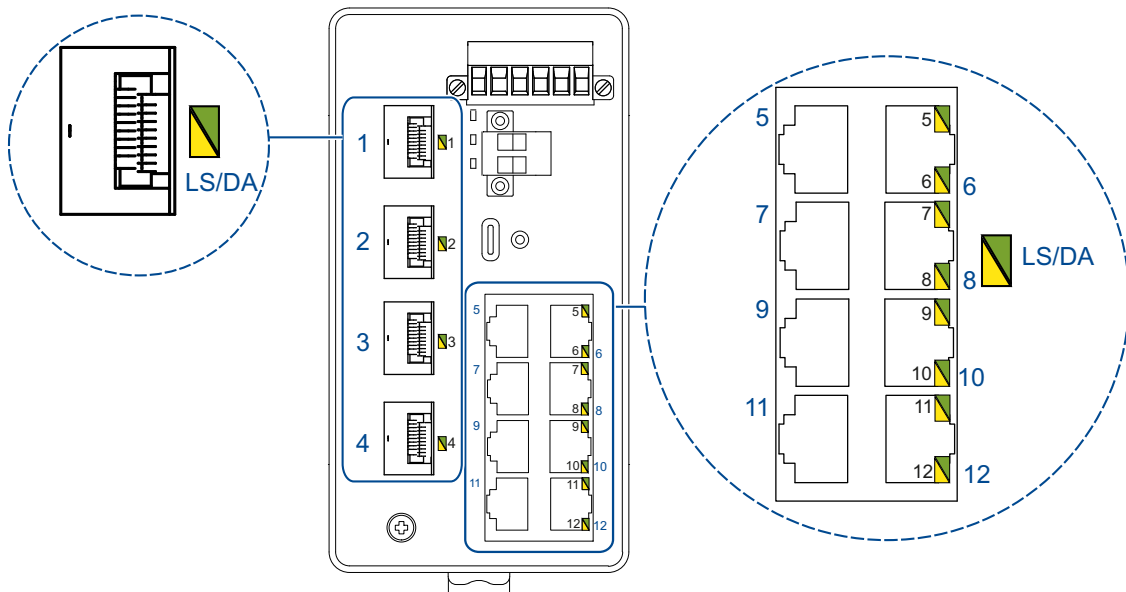


Figure 4: LED display elements for device variants with SFP slots and 8 × RJ45 sockets

Display	Color	Activity	Meaning
Link status	—	none	Device detects an invalid or missing link
Data traffic	green	lights up	Device detects a valid link
		flashes 1 time a period	Port is switched to stand-by
		flashes 3 times a period	Port is switched off
	yellow	flashing	Device is transmitting and/or receiving data

Table 5: Meaning of the port display elements

1.7 Management interfaces

1.7.1 Signal contact

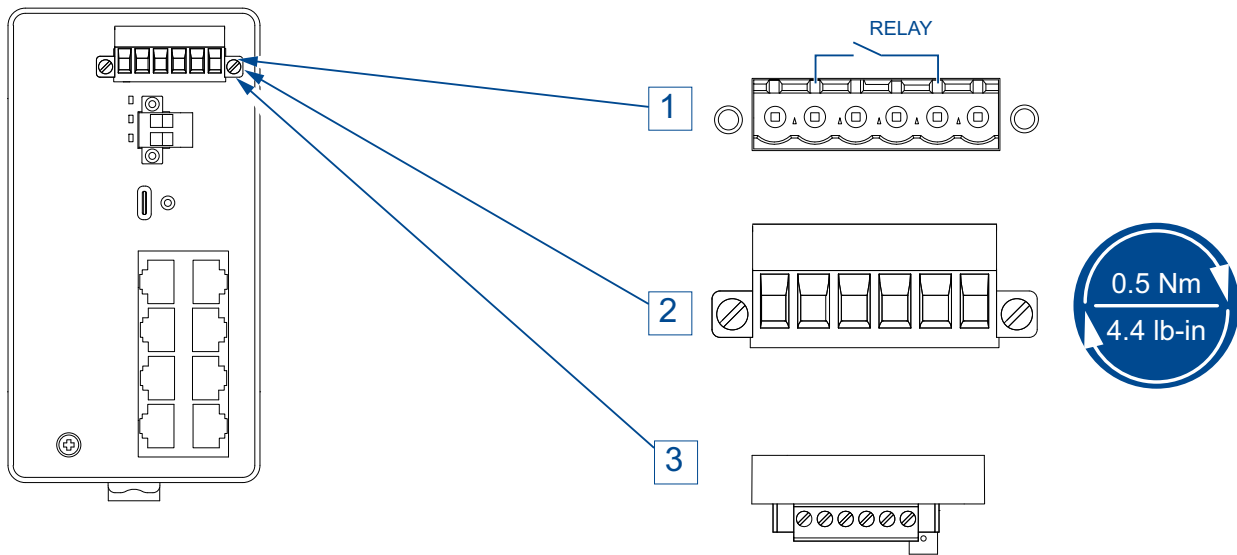


Figure 5: (1) Connection on the device, (2) terminal block mounted on the device (front view), tightening torque, (3) terminal block mounted on the device (view from above).

The signal contact is a potential-free relay contact. The signal contact is open when the device is not connected to a power supply.

The signal contact allows you to control external devices or monitor device functions.

In the configuration, you specify how the device uses the signal contact. You will find detailed information on possible applications and the configuration of the signal contact in the software user documentation. You will find the software user documentation as PDF files on the Internet at <https://www.doc.hirschmann.com>

1.7.2 USB-C interface

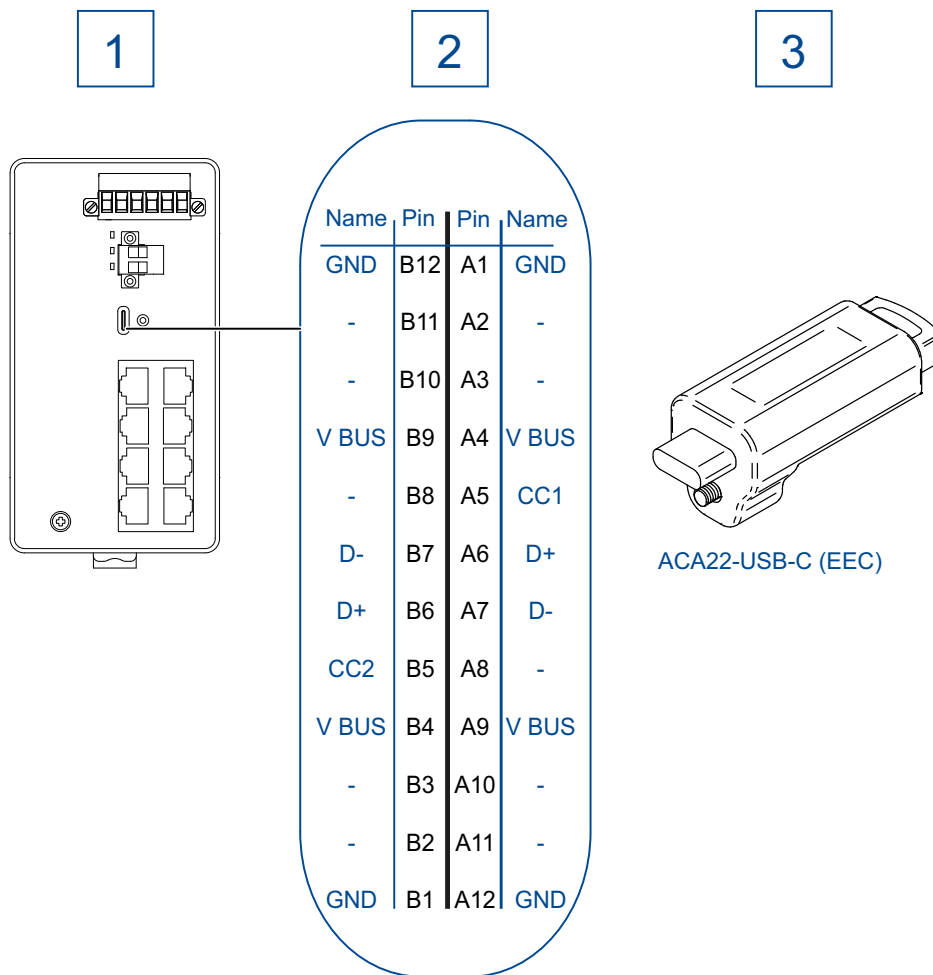


Figure 6: (1) Position of the USB-C interface on the device, (2) pin assignment of the USB-C interface, (3) view of the ACA22-USB-C (EEC).

The USB-C interface allows you to connect the AutoConfiguration Adapter ACA22-USB-C (EEC) storage medium. It is used for saving/loading the configuration data and diagnostic information, and for loading the software.

You have the option to configure your device using the USB-C interface. You will find detailed information in the software user documentation. You will find the software user documentation as PDF files on the Internet at <https://www.doc.hirschmann.com>

The USB-C interface has the following properties:

- ▶ Supports the USB master mode and slave
- ▶ Supports USB 2.0 (data rate max. 480 MBit/s)
- ▶ Connector: type C
- ▶ Supplies current of max. 500 mA

- ▶ Voltage not potential-separated
- ▶ Supported file system: FAT32

Note: A USB cable is used exclusively for the configuration of your device.

Note: The ACA22-USB-C (EEC) storage medium can remain permanently connected to the device.

1.7.3 Digital input

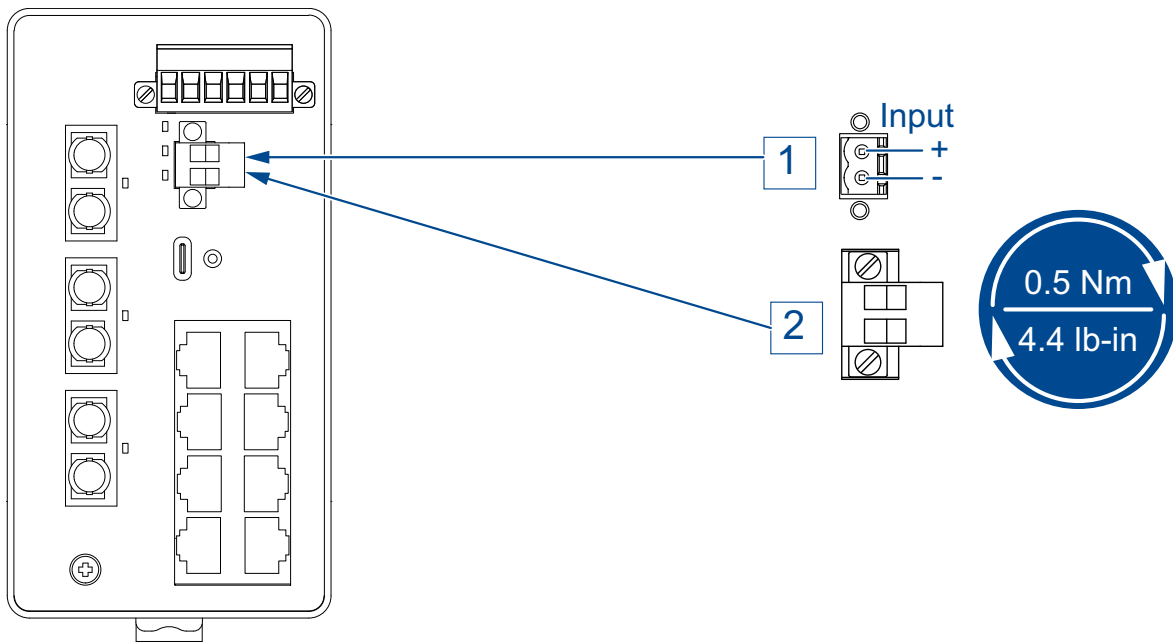


Figure 7: (1) Connection on the device, (2) terminal block mounted on the device (front view), tightening torque.

The digital input allows you to capture and forward signals from digital sensors. In the configuration, you specify how the device uses the digital input.

You will find detailed information on possible applications and the configuration of the digital input in the software user documentation. You will find the software user documentation as PDF files on the Internet at <https://www.doc.hirschmann.com>

Note: For PoE device variants, the digital input is only available for device variants with a wide housing.

See figure “Presence of the digital input for PoE device variants” on page 35.

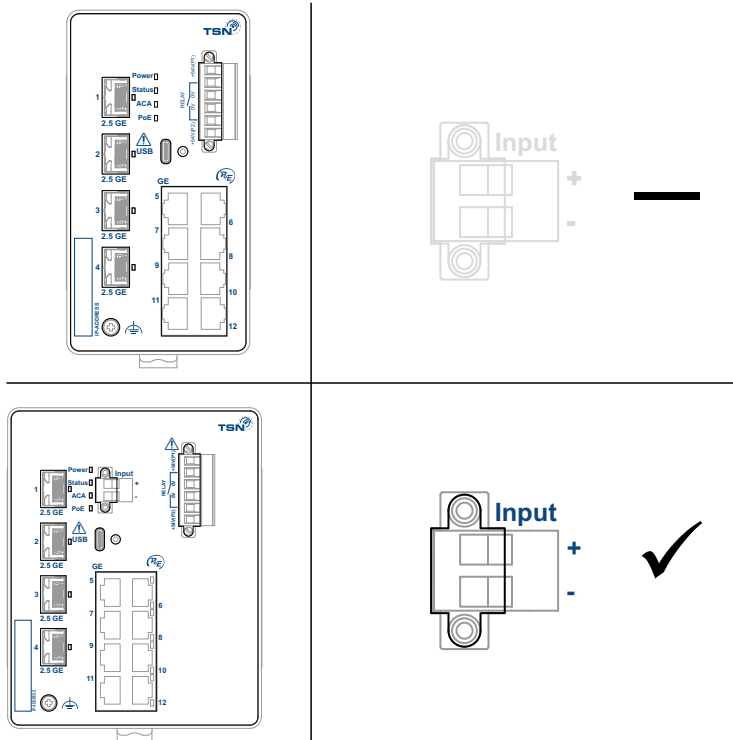


Figure 8: Presence of the digital input for PoE device variants

2 Installation

The devices have been developed for practical application in a harsh industrial environment.

On delivery, the device is ready for operation.

Perform the following steps to install and configure the device:

- ▶ [Checking the package contents](#)
- ▶ [Installing and grounding the device](#)
- ▶ [Connecting the ferrite](#)
- ▶ [Installing an SFP transceiver \(optional\)](#)
- ▶ [Connecting the terminal blocks](#)
- ▶ [Connecting data cables](#)
- ▶ [Filling out the inscription label](#)
- ▶ [Making basic settings](#)

2.1 Checking the package contents

- Check whether the package includes all items named in the section [“Scope of delivery” on page 76](#).
- Check the individual parts for transport damage.

2.2 Installing and grounding the device

2.2.1 Installing the device onto the DIN rail

Prerequisite:

- Verify that the device maintains the minimum clearance to meet the climatic conditions during operation:
Minimum clearance at the ventilation slots: 2 in (5 cm)

Note: Decreasing the minimum clearance reduces the specified maximum operating temperature.

See [“Technical data” on page 51](#).

Mounting	Minimum clearance at the ventilation slots	Temperature derating
Standard mounting (vertical)	2 in (5 cm)	0 K
	0.8 in (2 cm)	3 K
	0 in (0 cm)	15 K
90° rotated mounting (horizontal)	0 in (0 cm)	15 K

Table 6: Derating for different mounting positions

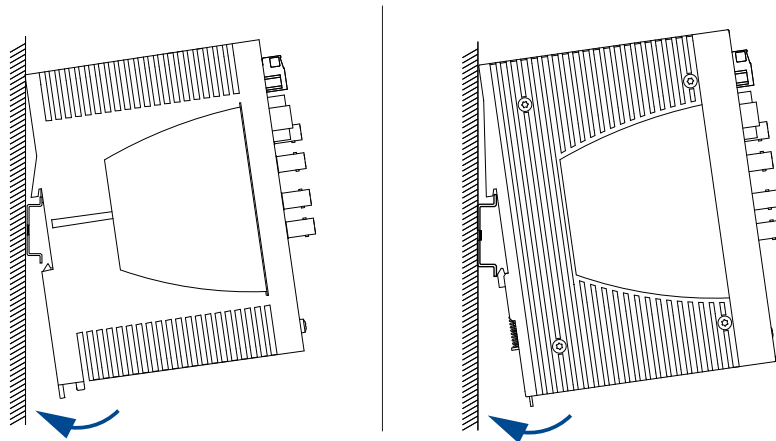


Figure 9: Mounting on the DIN rail (left: plastic casing, right: metal casing)

Proceed as follows:

- Slide the upper snap-in guide of the device into the DIN rail.
- Push the device downwards and onto the DIN rail.
- Snap-in the device.

2.2.2 Grounding the device

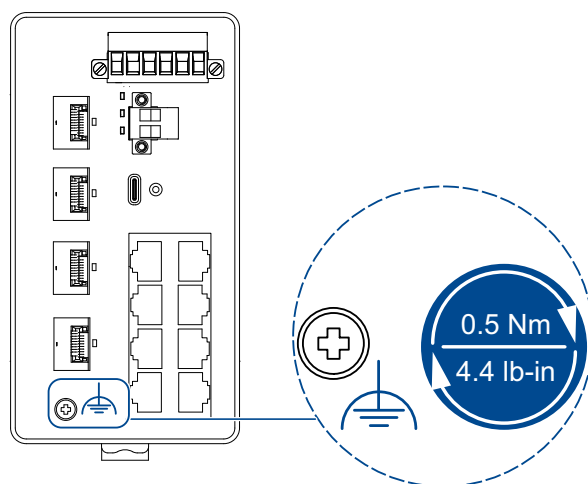


Figure 10: Position of the ground connection on the device; tightening torque.

All device variants have a functional ground connection.

Proceed as follows:

- Ground the device via the ground screw.

2.2.3 Connecting the ferrite

Note: Applies only to devices used in applications requiring ship approval according to DNV GL EMC class B.

Prerequisite:

To adhere to EMC conformity, you connect the ferrite supplied to the voltage input via the power supply cable.

Proceed as follows:

- Insert the power supply cable through the ferrite 2 times.
- Position the ferrite as close as possible to the voltage input (max. distance 19.7 in (50 cm)).

2.3 Installing an SFP transceiver (optional)

Prerequisites:

Exclusively use Hirschmann SFP transceivers.

See [“Accessories” on page 77](#).

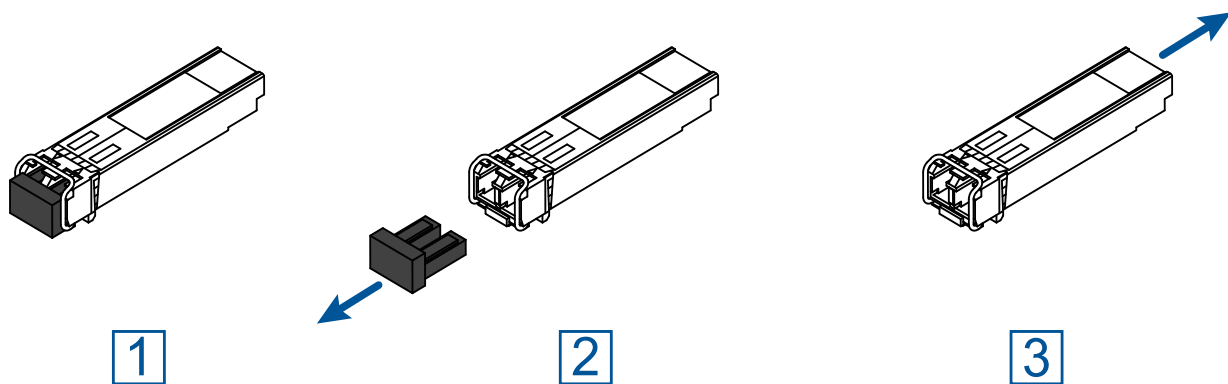


Figure 11: Installing SFP transceivers: Installation sequence

Proceed as follows:

- Take the SFP transceiver out of the transport packaging (1).
- Remove the protection cap from the SFP transceiver (2).
- Push the SFP transceiver with the lock closed into the slot until it latches in (3).

2.4 Connecting the terminal blocks

2.4.1 Power supply

Note: The supply voltage is connected to the device casing through protective elements exclusively.

■ Supply voltage with characteristic value T

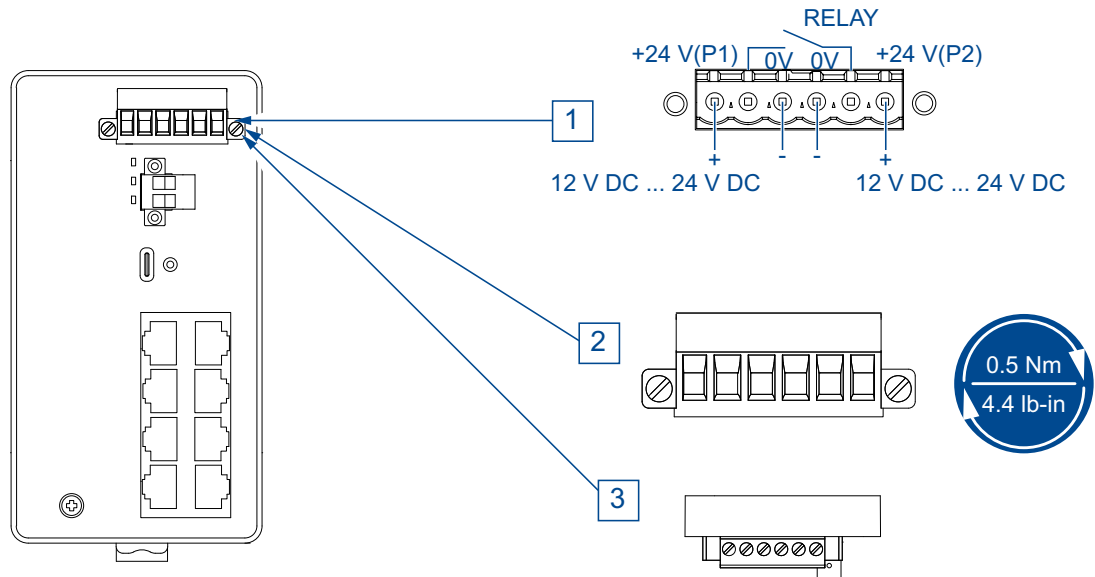


Figure 12: (1) DC voltage connection on the device, (2) terminal block mounted on the device (front view), tightening torque, (3) terminal block mounted on the device (view from above).

Type of the voltages that can be connected	Specification of the supply voltage	Pin assignment
DC voltage	Rated voltage range DC: 12 V DC ... 24 V DC	+24 V Plus terminal of the supply voltage
	Voltage range DC incl. maximum tolerances: 9.6 V DC ... 32 V DC	0 V Minus terminal of the supply voltage

Table 7: Supply voltage with characteristic value T: type and specification of the supply voltage, pin assignment

For the supply voltage to be connected, perform the following steps:

- Remove the terminal connector from the device.
- Connect the wires according to the pin assignment on the device with the clamps.

- Fasten the wires in the terminal block by tightening the terminal screws.
- Mount the terminal block on the device using screws.

■ Supply voltage with characteristic value F

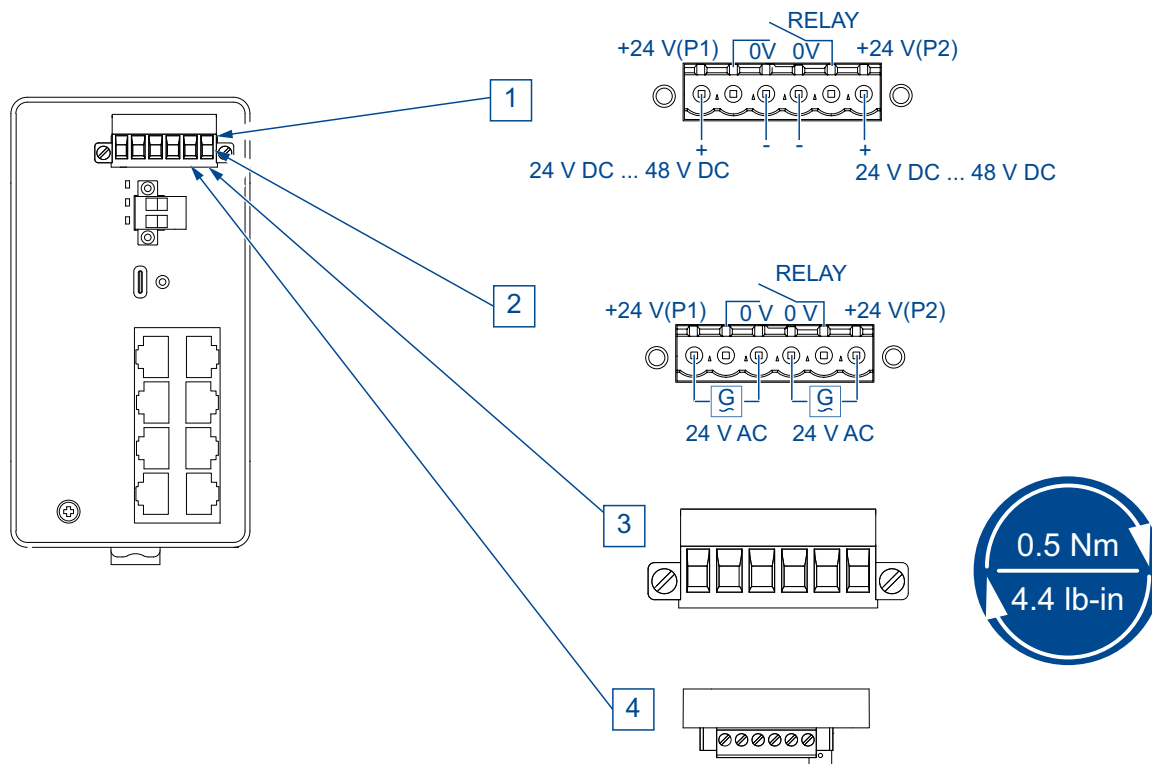


Figure 13: (1) DC voltage connection on the device, (2) AC voltage connection on the device, (3) terminal block mounted on the device (front view), tightening torque, (4) terminal block mounted on the device (view from above).

Type of the voltages that can be connected	Specification of the supply voltage	Pin assignment
DC voltage	Rated voltage range DC: 24 V DC ... 48 V DC Voltage range DC incl. maximum tolerances: 18 V DC ... 60 V DC	+24 V Plus terminal of the supply voltage
		0 V Minus terminal of the supply voltage
AC voltage	Rated voltage AC: 24 V AC Voltage range AC incl. maximum tolerances: 18 V AC ... 30 V AC, 50 Hz ... 60 Hz	

Table 8: Supply voltage with characteristic value F: type and specification of the supply voltage, pin assignment

For the supply voltage to be connected, perform the following steps:

- Remove the terminal connector from the device.
- Connect the wires according to the pin assignment on the device with the clamps.
- Fasten the wires in the terminal block by tightening the terminal screws.
- Mount the terminal block on the device using screws.

■ Supply voltage with characteristic value U

Type of the voltages that can be connected	Specification of the supply voltage	Pin assignment	
DC voltage	Rated voltage DC: 24 V DC	+24 V	Plus terminal of the supply voltage
	Voltage range DC incl. maximum tolerances: 18 V DC ... 30 V DC	0 V	Minus terminal of the supply voltage

Table 9: Supply voltage with characteristic value U: type and specification of the supply voltage, pin assignment

For the supply voltage to be connected, perform the following steps:

- Remove the terminal connector from the device.
- Connect the wires according to the pin assignment on the device with the clamps.
- Fasten the wires in the terminal block by tightening the terminal screws.
- Mount the terminal block on the device using screws.

■ Supply voltage with characteristic value P

Type of the voltages that can be connected	Specification of the supply voltage	Pin assignment	
When using PoE: DC voltage	Rated voltage DC: 48 V DC	+	Plus terminal of the supply voltage
	Voltage range DC incl. maximum tolerances: 46 V DC ... 57 V DC	-	Minus terminal of the supply voltage
When using PoE+:	Rated voltage DC: 54 V DC	+	Plus terminal of the supply voltage
	Voltage range DC incl. maximum tolerances: 52 V DC ... 57 V DC	-	Minus terminal of the supply voltage

Table 10: Supply voltage with characteristic value P: type and specification of the supply voltage, pin assignment

Type of the voltages that can be connected	Specification of the supply voltage	Pin assignment
Without using PoE or PoE+:	Rated voltage range DC: 24 V DC ... 48 V DC	+
DC voltage	Voltage range DC incl. maximum tolerances: 19 V DC ... 60 V DC	-
		Plus terminal of the supply voltage
		Minus terminal of the supply voltage

Table 10: Supply voltage with characteristic value P: type and specification of the supply voltage, pin assignment

For the supply voltage to be connected, perform the following steps:

- Remove the terminal connector from the device.
- Connect the wires according to the pin assignment on the device with the clamps.
- Fasten the wires in the terminal block by tightening the terminal screws.
- Mount the terminal block on the device using screws.

2.4.2 Signal contact (optional)

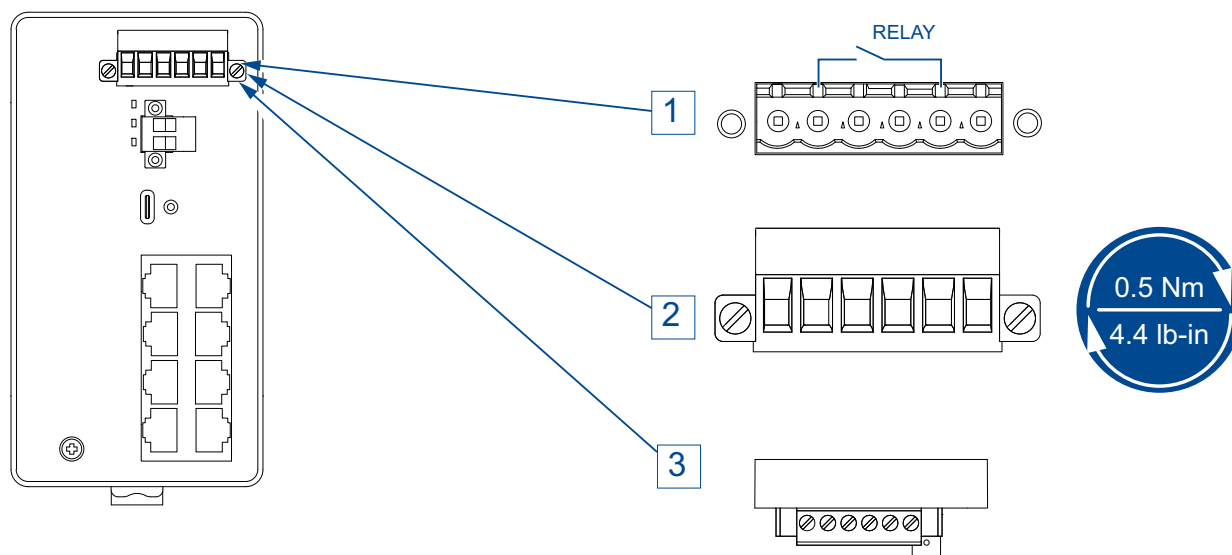


Figure 14: (1) Connection on the device, (2) terminal block mounted on the device (front view), tightening torque, (3) terminal block mounted on the device (view from above).

Proceed as follows:

- Connect the signal contact lines with the terminal block connections.
- Fasten the wires in the terminal block by tightening the terminal screws.
- Mount the terminal block on the device using screws.

2.4.3 Digital input (optional)

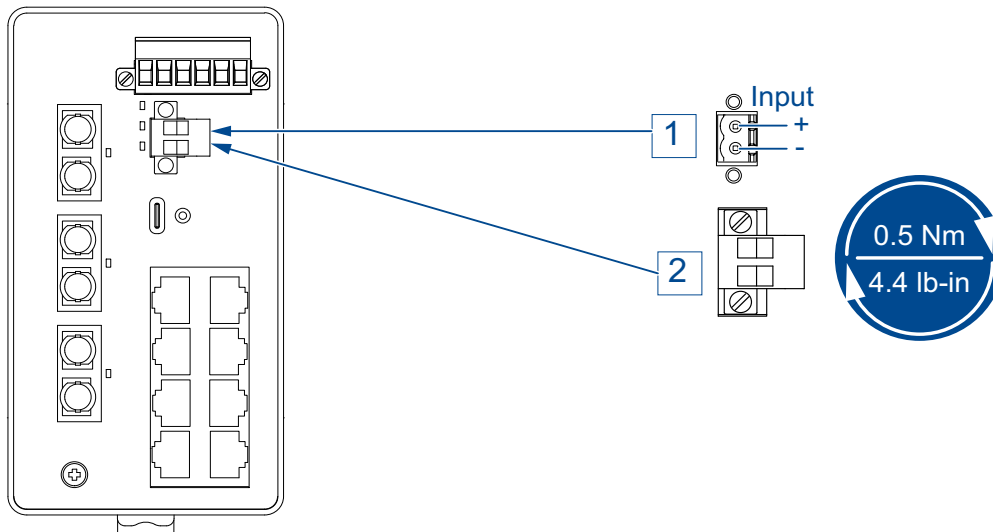


Figure 15: (1) Connection on the device, (2) terminal block mounted on the device (front view), tightening torque.

Pin	Signal, terminal	Function
1	DI (+)	Signal input
2	DI (-)	Reference potential

Table 11: Digital input: pin assignment

Proceed as follows:

- Remove the terminal connector from the device.
- Connect the wires according to the pin assignment on the device with the clamps.
- Fasten the wires in the terminal block by tightening the terminal screws.
- Mount the terminal block on the device using screws.

■ Connection constellations of sensors

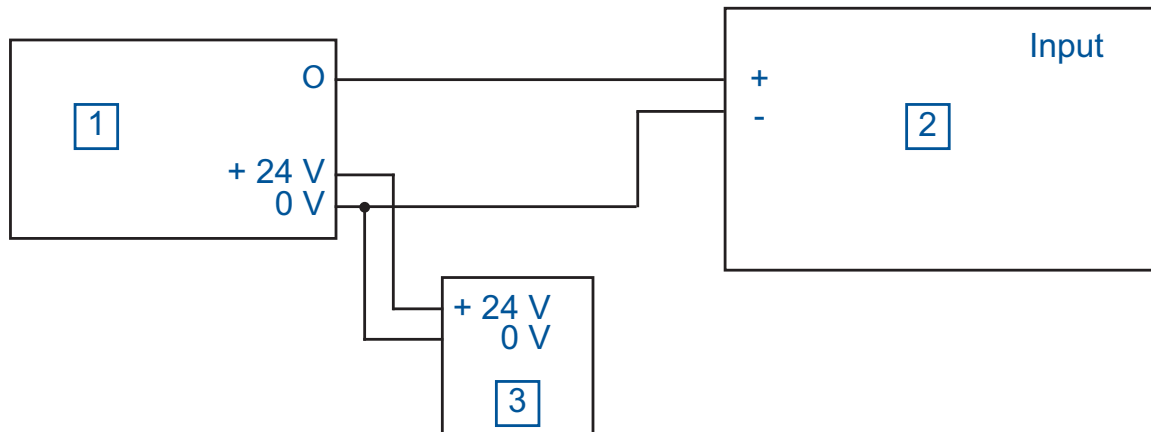


Figure 16: Connection of a sensor with separate power supply

- 1 - Sensor
- 2 - BRS20/22/30/32/40/42/50/52I
- 3 - Separate power supply for sensor

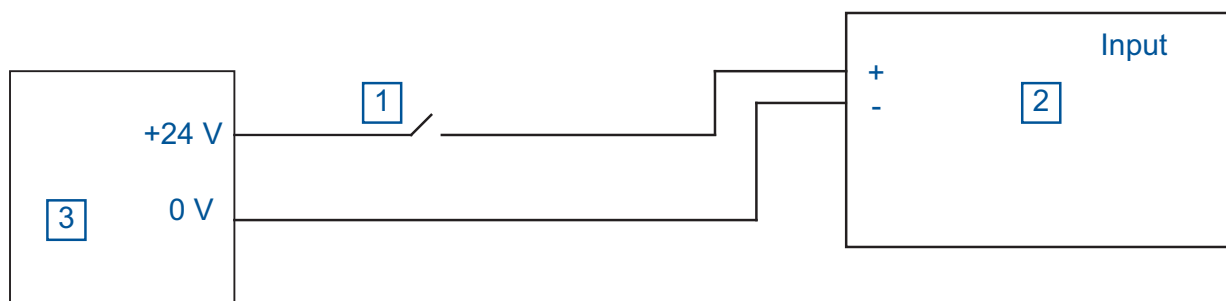


Figure 17: Connection of a sensor with separate power supply

- 1 - Switch (2-wire sensor)
- 2 - BRS20/22/30/32/40/42/50/52I
- 3 - Separate power supply for sensor

2.5 Operating the device

When you connect the supply voltage, you start up the device.

2.6 Connecting data cables

Note the following general recommendations for data cable connections in environments with high electrical interference levels:

- Keep the length of the data cables as short as possible.
- Use optical data cables for the data transmission between the buildings.
- When using copper cables, provide a sufficient separation between the power supply cables and the data cables. Ideally, install the cables in separate cable channels.
- Verify that power supply cables and data cables do not run parallel over longer distances. If reducing the inductive coupling is necessary, verify that the power supply cables and data cables cross at a 90° angle.
- Use shielded data cables for gigabit transmission via copper cables. Only use shielded data cables to meet EMC requirements according to EN 50121-4 and marine applications.
[See “Electromagnetic compatibility \(EMC\)” on page 64.](#)
- Connect the data cables according to your requirements.
[See “Ethernet ports” on page 25.](#)

2.7 Filling out the inscription label

The information field for the IP address helps you identify your device.

2.8 Making basic settings

Note: 2 or more devices configured with the same IP address can cause unpredictable operation of your network.

Install and maintain a process that assigns a unique IP address to every device in the network.

The IP parameters must be entered when the device is installed for the first time. The device provides the following options for configuring IP addresses:

- ▶ Input via the HiView or Industrial HiVision application. You find further information about the applications HiView or Industrial HiVision on the Internet at the Hirschmann product pages:

HiView

<http://www.hirschmann.com/en/QR/INET-HiView>

Industrial HiVision

<http://www.hirschmann.com/en/QR/INET-Industrial-HiVision>

- ▶ Configuration via BOOTP
- ▶ Configuration via DHCP (Option 82)

- ▶ AutoConfiguration AdapterACA22-USB-C (EEC)
- ▶ Configuration via USB-C interface

■ **Default settings**

- ▶ IP address: The device looks for the IP address using DHCP
- ▶ Management password:
 - user, password: public (read only)
 - admin, password: private (read/write)
- ▶ Ethernet ports: link status is not evaluated (signal contact)
- ▶ Optical ports: Full duplex
- ▶ TP ports: Autonegotiation
- ▶ RSTP (Rapid Spanning Tree) activated

3 Monitoring the ambient air temperature

Operate the device below the specified maximum ambient air temperature exclusively.

See [“Climatic conditions during operation” on page 56](#).

The ambient air temperature is the temperature of the air at a distance of 2 in (5 cm) from the device. It depends on the installation conditions of the device, for example the distance from other devices or other objects, and the output of neighboring devices.

The temperature displayed in the CLI and the GUI is the internal temperature of the device. It is higher than the ambient air temperature. The maximum internal temperature of the device named in the technical data is a guideline that indicates to you that the maximum ambient air temperature has possibly been exceeded.

4 Maintenance and service

- ▶ When designing this device, Hirschmann largely avoided using high-wear parts. The parts subject to wear and tear are dimensioned to last longer than the lifetime of the product when it is operated normally. Operate this device according to the specifications.
- ▶ Relays are subject to natural wear. This wear depends on the frequency of the switching operations. Check the resistance of the closed relay contacts and the switching function depending on the frequency of the switching operations.
- ▶ Hirschmann is continually working on improving and developing their software. Check regularly whether there is an updated version of the software that provides you with additional benefits. You find information and software downloads on the Hirschmann product pages on the Internet (<http://www.hirschmann.com>).
- ▶ Depending on the degree of pollution in the operating environment, check at regular intervals that the ventilation slots in the device are not obstructed.

Note: You find information on settling complaints on the Internet at <http://www.beldensolutions.com/en/Service/Repairs/index.phtml>.

5 Disassembly

5.1 Removing an SFP transceiver (optional)

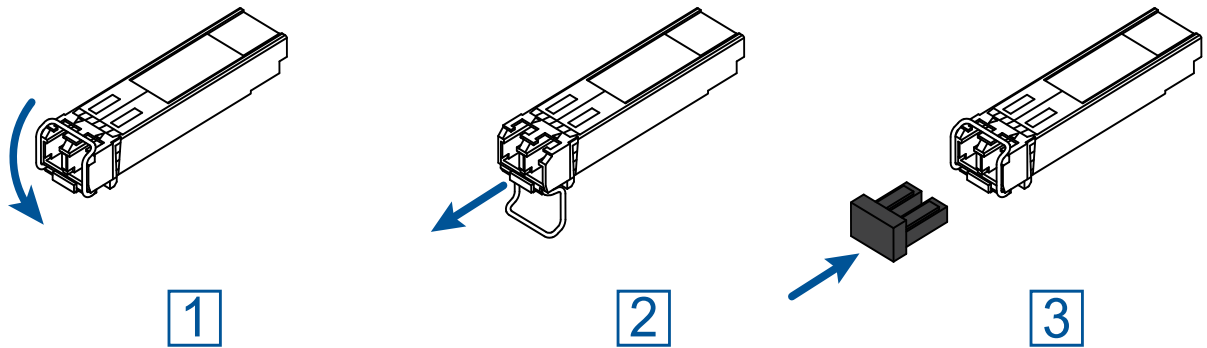


Figure 18: De-installing SFP transceivers: De-installation sequence

Proceed as follows:

- Open the locking mechanism of the SFP transceiver (1).
- Pull the SFP transceiver out of the slot via the open locking mechanism (2).
- Close the SFP transceiver with the protection cap (3).

5.2 Removing the device

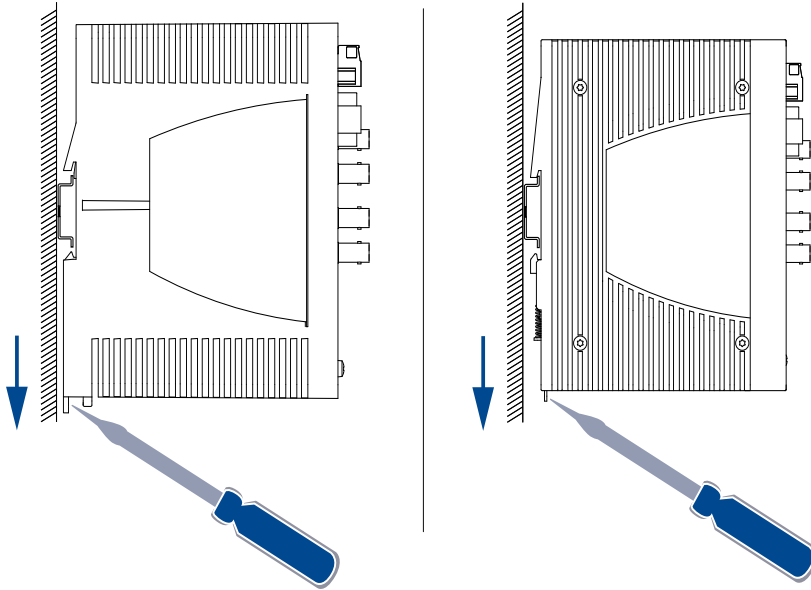


Figure 19: Removal from the DIN rail (left: plastic casing, right: metal casing)

Proceed as follows:

- Disconnect the data cables.
- Disable the supply voltage.
- Disconnect the terminal blocks.
- Disconnect the grounding.
- Insert a screwdriver horizontally below the casing into the locking gate.
- Pull the rail lock slide down using a screwdriver and fold the device up.

6 Technical data

6.1 General data

General data			
	Product name	Weight Plastic casing	Weight Metal casing
	BRS20-0400...	12.22 oz (380 g)	30.69 oz (870 g)
	BRS20-0500...	14.82 oz (420 g)	32.09 oz (910 g)
	BRS20-0600...	14.82 oz (420 g)	32.09 oz (910 g)
	BRS20-0800....S;C...	14.82 oz (420 g)	35.98 oz (1020 g)
	BRS20-0800....T;E...	17.64 oz (500 g)	35.98 oz (1020 g)
	BRS20-0900....S;C...	17.64 oz (500 g)	38.45 oz (1090 g)
	BRS20-0900....T;E...	20.10 oz (570 g)	38.45 oz (1090 g)
	BRS20-1000....S;C...	17.64 oz (500 g)	38.45 oz (1090 g)
	BRS20-1000....T;E...	20.10 oz (570 g)	38.45 oz (1090 g)
	BRS20-1100....S;C...	17.64 oz (500 g)	38.45 oz (1090 g)
	BRS20-1100....T;E...	20.10 oz (570 g)	38.45 oz (1090 g)
	BRS20-1200....S;C...	17.64 oz (500 g)	38.45 oz (1090 g)
	BRS20-1200....T;E...	20.10 oz (570 g)	38.45 oz (1090 g)
	BRS30-0804...	20.10 oz (570 g)	38.45 oz (1090 g)
	BRS40-0008...	17.64 oz (500 g)	35.98 oz (1020 g)
	BRS40-0012...	20.10 oz (570 g)	38.45 oz (1090 g)
	BRS50-0012...	20.10 oz (570 g)	38.45 oz (1090 g)
PoE device variants	BRS22-0800...	26.46 oz (750 g)	49.38 oz (1400 g)
Supply voltage with	BRS32-0804...	28.21 oz (800 g)	51.14 oz (1450 g)
characteristic value U	BRS42-0008...	26.46 oz (750 g)	49.38 oz (1400 g)
	BRS42-0012...	28.21 oz (800 g)	51.14 oz (1450 g)
	BRS52-0012...	28.21 oz (800 g)	51.14 oz (1450 g)
PoE device variants	BRS22-0800....S;C...	17.64 oz (500 g)	38.80 oz (1100 g)
Supply voltage with	BRS22-0800....T;E...	21.16 oz (600 g)	44.09 oz (1250 g)
characteristic value P	BRS32-0804....S;C...	19.4 oz (550 g)	40.56 oz (1150 g)
	BRS32-0804....T;E...	20.90 oz (650 g)	45.85 oz (1300 g)
	BRS42-0008....S;C...	17.64 oz (500 g)	38.80 oz (1100 g)
	BRS42-0008....T;E...	21.16 oz (600 g)	44.09 oz (1250 g)
	BRS42-0012....S;C...	19.4 oz (550 g)	40.56 oz (1150 g)
	BRS42-0012....T;E...	20.90 oz (650 g)	45.85 oz (1300 g)
	BRS52-0012....S;C...	19.4 oz (550 g)	40.56 oz (1150 g)
	BRS52-0012....T;E...	20.90 oz (650 g)	45.85 oz (1300 g)
Dimensions	See "Dimension drawings" on page 58.		
W × H × D			
Mounting	See "Installing the device onto the DIN rail" on page 36.		

Table 12: General data

General data			
	Product name	Weight Plastic casing	Weight Metal casing
Pollution degree	2		
Degree of protection	IP30		
	IP40 ^a		
Laser protection	Class 1 in compliance with IEC 60825-1		

Table 12: General data

- a. For device variants with casing with characteristic value E that are DSC sockets, the degree of protection IP30 applies exclusively.

6.2 Supply voltage

Supply voltage with characteristic value T			
Rated voltage range DC:	12 V DC ... 24 V DC		
Voltage range DC incl. maximum tolerances:	9.6 V DC ... 32 V DC		
Connection type	6-pin terminal block with screw lock		
	Tightening torque	4.4 lb-in (0.5 Nm)	
	min. conductor diameter	AWG18 (0.75 mm ²)	
	max. conductor diameter	AWG12 (2.5 mm ²)	
Power loss buffer	>10 ms at 20.4 V DC		
Overload current protection on the device	Non-replaceable fuse		
Back-up fuse for each voltage input	Nominal rating:	2 A ... 10 A	
	Characteristic:	slow blow	
Peak inrush current	2 A		
Current integral I ² t	<0.05 A ² s		
Connection for functional ground	See "Grounding the device" on page 37.		

Table 13: Supply voltage with characteristic value T

Supply voltage with characteristic value F			
Rated voltage range DC:	24 V DC ... 48 V DC		
Rated voltage AC:	24 V AC		
Voltage range DC incl. maximum tolerances:	18 V DC ... 60 V DC		
Voltage range AC incl. maximum tolerances:	18 V AC ... 30 V AC, 50 Hz ... 60 Hz		
Connection type	6-pin terminal block with screw lock		
	Tightening torque	4.4 lb-in (0.5 Nm)	
	min. conductor diameter	AWG18 (0.75 mm ²)	
	max. conductor diameter	AWG12 (2.5 mm ²)	
Power loss buffer	>10 ms at 20.4 V DC ... 48 V DC and 24 V AC		

Table 14: Supply voltage with characteristic value F

Supply voltage with characteristic value F		
Overload current protection on the device	Non-replaceable fuse	
Back-up fuse for each voltage input	Nominal rating:	2 A ... 10 A
	Characteristic:	slow blow
Peak inrush current	2 A	
Current integral I^2t	<0.05 A ² s at 24 V DC	
	<0.5 A ² s at 48 V DC and 24 V AC	
Crest factor	5 at 24 V AC	
Connection for functional ground	See "Grounding the device" on page 37.	

Table 14: Supply voltage with characteristic value F

Supply voltage with characteristic value U		
Rated voltage DC:	24 V DC	
Voltage range DC incl. maximum tolerances:	18 V DC ... 30 V DC	
Max. PoE power	90 W	<60 °C ambient temperature
	60 W	60 °C ... 70 °C ambient temperature
Connection type	6-pin terminal block with screw lock	
	Tightening torque	4.4 lb-in (0.5 Nm)
	min. conductor diameter	AWG16 (1 mm ²)
	max. conductor diameter	AWG12 (2.5 mm ²)
Power loss buffer	>10 ms at 20.4 V DC	
Overload current protection on the device	Non-replaceable fuse	
Back-up fuse for each voltage input	Nominal rating:	10 A
	Characteristic:	slow blow
Peak inrush current	8 A	
Current integral I^2t	<0.06 A ² s	
Connection for functional ground	See "Grounding the device" on page 37.	

Table 15: Supply voltage with characteristic value U

Supply voltage with characteristic value P		
Rated voltage DC:	When using PoE:	48 V DC
	When using PoE+:	54 V DC
	Without using PoE or PoE+:	24 V DC ... 48 V DC
Max. PoE power	In total:	240 W
Voltage range DC incl. maximum tolerances:	When using PoE:	46 V DC ... 57 V DC
	When using PoE+:	52 V DC ... 57 V DC
	Without using PoE or PoE+:	19 V DC ... 60 V DC

Table 16: Supply voltage with characteristic value P

Supply voltage with characteristic value P	
Connection type	6-pin terminal block with screw lock
	Tightening torque 4.4 lb-in (0.5 Nm)
	min. conductor diameter AWG18 (0.75 mm ²)
	max. conductor diameter AWG12 (2.5 mm ²)
Power loss buffer	>10 ms at 20.4 V DC
Overload current protection on the device	Non-replaceable fuse
Back-up fuse for each voltage input	Nominal rating: 10 A
	Characteristic: slow blow
Peak inrush current	1.4 A
Current integral I ² t	<0.06 A ² s
Insulation requirement	2250 V DC to casing ground/functional ground
Connection for functional ground	See "Grounding the device" on page 37.

Table 16: Supply voltage with characteristic value P

6.3 Power consumption/power output

Device name	Maximum power consumption	Power output
BRS20-0400...	5 W	17 Btu (IT)/h
BRS20-0500...	6 W	20 Btu (IT)/h
BRS20-0600...	7 W	24 Btu (IT)/h
BRS20-0800...	6 W	20 Btu (IT)/h
BRS20-0900...	7 W	24 Btu (IT)/h
BRS20-1000...	8 W	27 Btu (IT)/h
BRS20-1100...	9 W	31 Btu (IT)/h
BRS20-1200...	9 W	31 Btu (IT)/h
BRS30-0804...	9 W	31 Btu (IT)/h
BRS40-0008...	8 W	27 Btu (IT)/h
BRS40-0012...	11 W	38 Btu (IT)/h
BRS50-0012...	12 W	41 Btu (IT)/h
BRS22-08009999U...	14 W	48 Btu (IT)/h
BRS22-08009999P...	7 W	24 Btu (IT)/h
BRS32-08040000U...	17 W	58 Btu (IT)/h
BRS32-08040000P...	10 W	34 Btu (IT)/h
BRS42-00089999U...	16 W	55 Btu (IT)/h
BRS42-00089999P...	9 W	31 Btu (IT)/h
BRS42-00120000U...	19 W	65 Btu (IT)/h
BRS42-00120000P...	12 W	41 Btu (IT)/h
BRS52-00120000U...	20 W	68 Btu (IT)/h
BRS52-00120000P...	13 W	44 Btu (IT)/h

Table 17: Power consumption/power output

6.4 Signal contact

Signal contact	
Device variants featuring supply voltage with characteristic value F and T	
Connection type	6-pin terminal block with screw lock
	Tightening torque 4.4 lb-in (0.5 Nm)
	min. conductor diameter 0.08 mm ² (AWG 28)
	max. conductor diameter AWG12 (2.5 mm ²)
Nominal value	$I_{\max} = 1 \text{ A}$ at $U_{\max} = 30 \text{ V AC}$ (resistive load)
	$I_{\max} = 1 \text{ A}$ at $U_{\max} = 60 \text{ V DC}$ (resistive load)
	according to the UL Standards:
	$I_{\max} = 0.5 \text{ A}$ at $U_{\max} = 30 \text{ V AC}$ (resistive load)
	$I_{\max} = 1 \text{ A}$ at $U_{\max} = 30 \text{ V DC}$ (resistive load)
	as per ANSI/UL 121201: See control drawing in chapter “Relevant for use in explosion hazard areas (Hazardous Locations, Class I, Division 2)” on page 10

Table 18: Signal contact: device variants featuring supply voltage with characteristic value F and T

6.5 Digital input

Digital input	
Connection type	2-pin terminal block with screw lock
	Tightening torque 4.4 lb-in (0.5 Nm)
	min. conductor diameter 0.08 mm ² (AWG 28)
	max. conductor diameter AWG12 (2.5 mm ²)
Maximum permitted input voltage range	between -32 V DC and +32 V DC
Nominal input voltage	+24 V DC
Input voltage, low level, status “0”	-0.3 V DC ... +5 V DC
Input voltage, high level, status “1”	+11 V DC ... +30 V DC
Maximum input current at nominal input voltage	15 mA
Permitted closed-circuit current for 2-wire sensors	1.5 mA
Input characteristic according to IEC 61131-2 (current-consuming)	Typ 3

Table 19: Digital input

6.6 Climatic conditions during operation

Climatic conditions during operation	
Minimum clearance around the device	See "Installing the device onto the DIN rail" on page 36.
Ambient air temperature ^a	<p>Standard</p> <ul style="list-style-type: none"> ▶ up to 6562 ft ASL (2000 m ASL) +32 °F ... +140 °F (0 °C ... +60 °C) ▶ 6562 ft ASL ... 13123 ft ASL (2000 m ASL ... 4000 m ASL) +32 °F ... +131 °F (0 °C ... +55 °C) <p>Extended</p> <ul style="list-style-type: none"> ▶ up to 6562 ft ASL (2000 m ASL) -40 °F ... +158 °F (-40 °C ... +70 °C) ▶ 6562 ft ASL ... 13123 ft ASL (2000 m ASL ... 4000 m ASL) -40 °F ... +149 °F (-40 °C ... +65 °C)
Maximum inner temperature of device (guideline)	tbd
Humidity	1 % ... 95 % (non-condensing)
Air pressure	<p>Without derating</p> <ul style="list-style-type: none"> ▶ min. 795 hPa (+6562 ft; +2000 m) ▶ max. 1060 hPa (-1312 ft; -400 m) <p>With derating</p> <ul style="list-style-type: none"> ▶ min. 600 hPa (+13123 ft; +4000 m) ▶ max. 1060 hPa (-1312 ft; -400 m)

Table 20: Climatic conditions during operation

a. Temperature of the ambient air at a distance of 2 in (5 cm) from the device

6.7 Climatic conditions during storage

Climatic conditions during storage	
Ambient temperature	<p>-40 °F ... +185 °F (-40 °C ... +85 °C) up to 3 months</p> <hr/> <p>-40 °F ... +158 °F (-40 °C ... +70 °C) up to 1 year</p> <hr/> <p>-40 °F ... +122 °F (-40 °C ... +50 °C) up to 2 years</p> <hr/> <p>+32 °F ... +86 °F (0 °C ... +30 °C) up to 10 years</p>
Humidity	1 % ... 95 % (non-condensing)
Air pressure	<ul style="list-style-type: none"> ▶ min. 600 hPa (+13123 ft; +4000 m) ▶ max. 1060 hPa (-1312 ft; -400 m)

Table 21: Climatic conditions during storage

6.8 Casing widths for PoE device variants

PoE device variants		
With supply voltage with characteristic value:	With temperature range characteristic value S, C 0 °C ... +60 °C	With temperature range characteristic value T, E -40 °C ... +70 °C
U	Casing with characteristic value C (wide plastic casing)	Casing with characteristic value C (wide plastic casing)
	Casing with characteristic value E (wide metal casing IP40)	Casing with characteristic value D (wide metal casing IP30)
P	Casing with characteristic value C (medium plastic casing)	Casing with characteristic value C (wide plastic casing)
	Casing with characteristic value E (medium metal casing IP40)	Casing with characteristic value D (wide metal casing IP30)

Table 22: Casing widths for PoE device variants

6.9 Dimension drawings

6.9.1 Device variants with casing with characteristic value C (plastic casing)

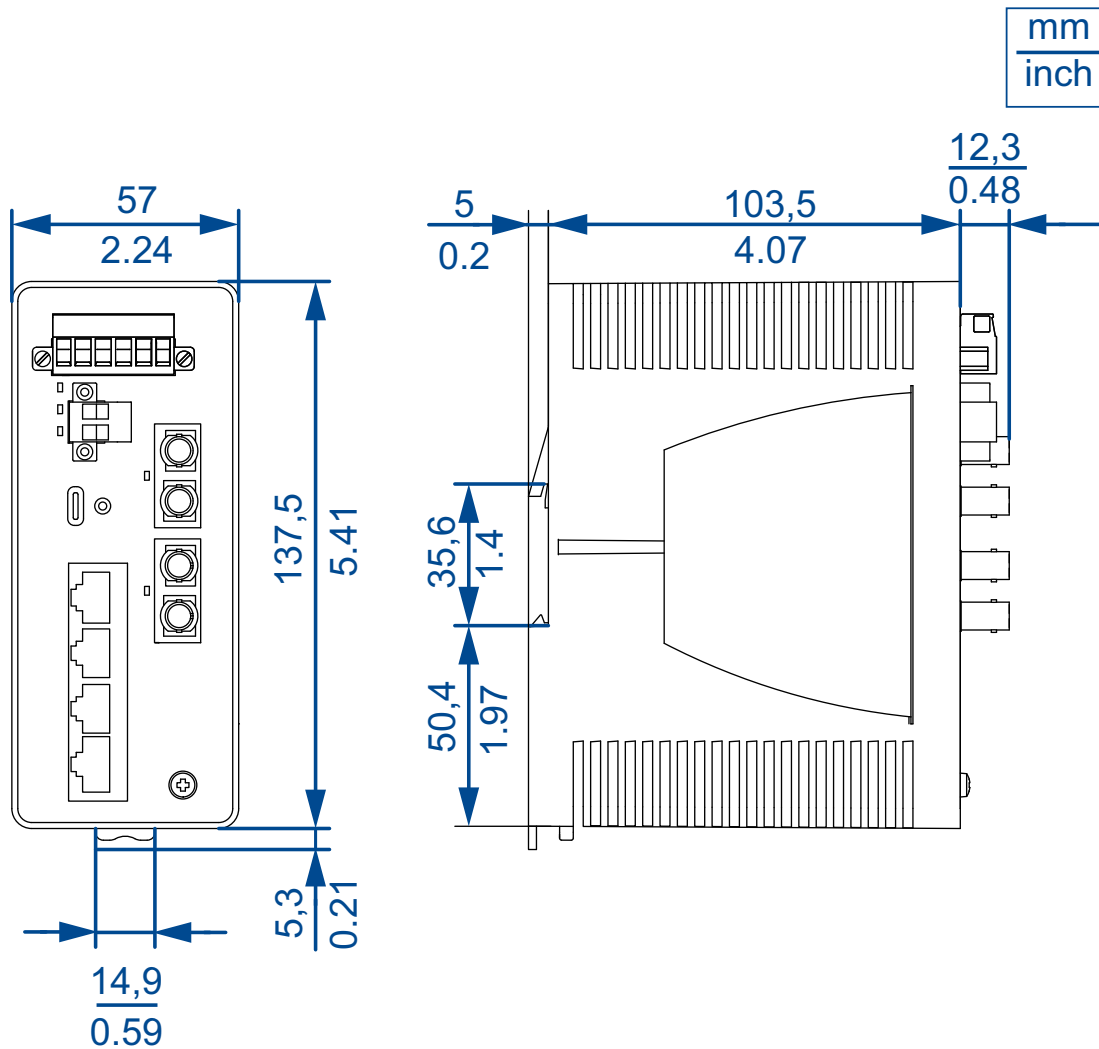


Figure 20: Narrow plastic casing

mm
inch

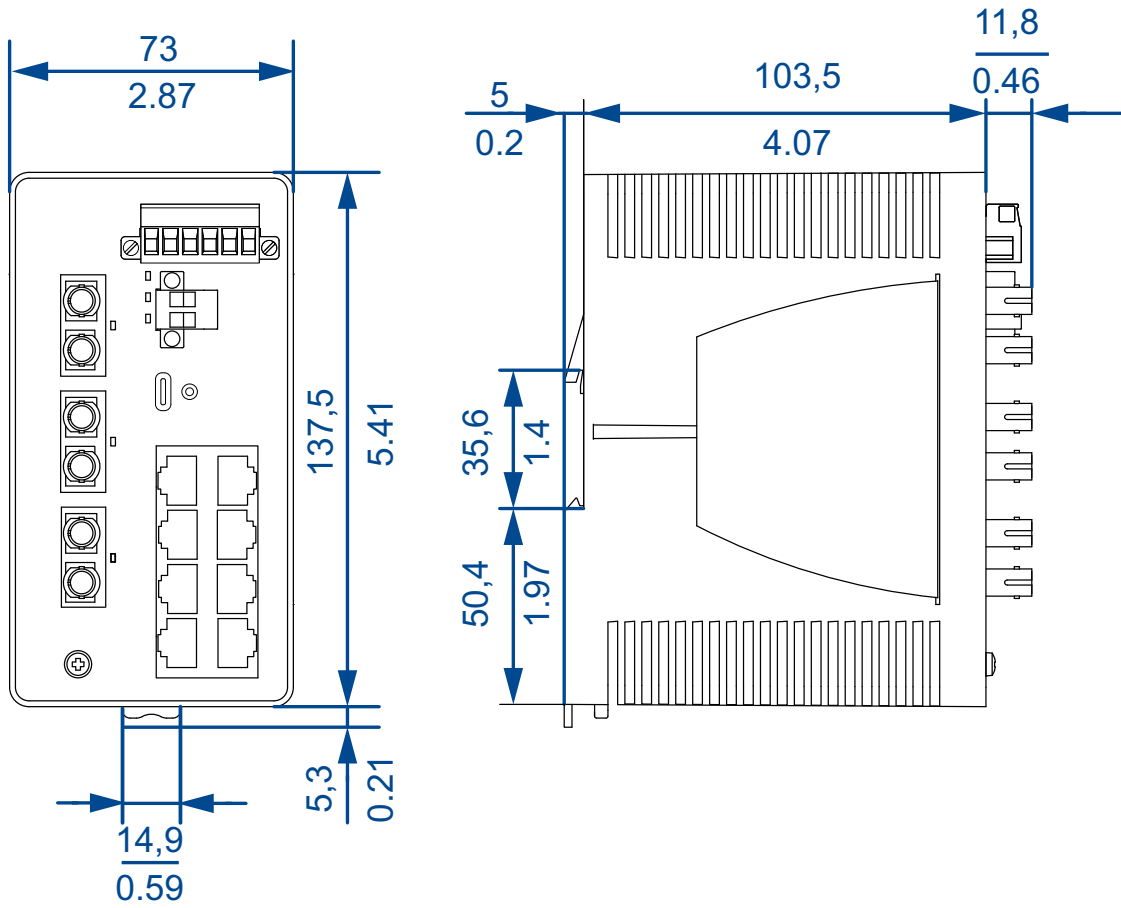


Figure 21: Medium plastic casing

mm
inch

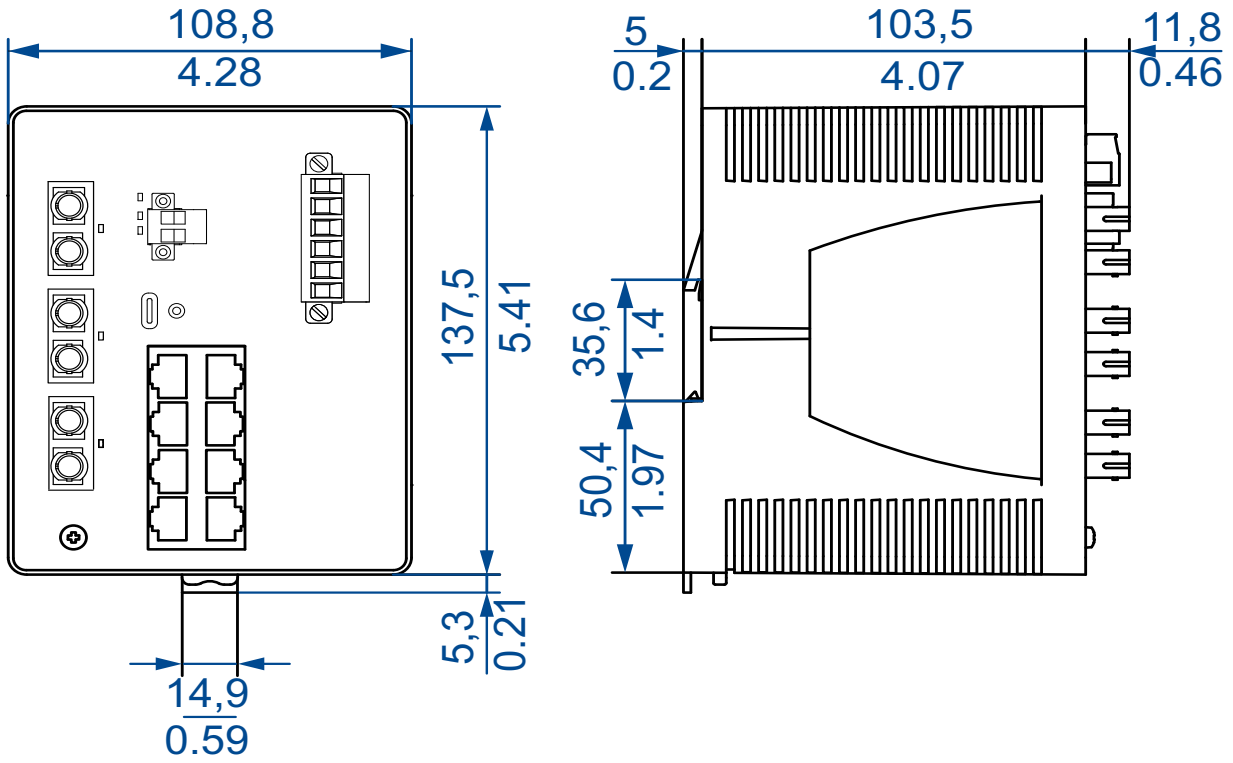


Figure 22: Wide plastic casing

6.9.2 Device variants with casing with characteristic value E/D (metal casing)

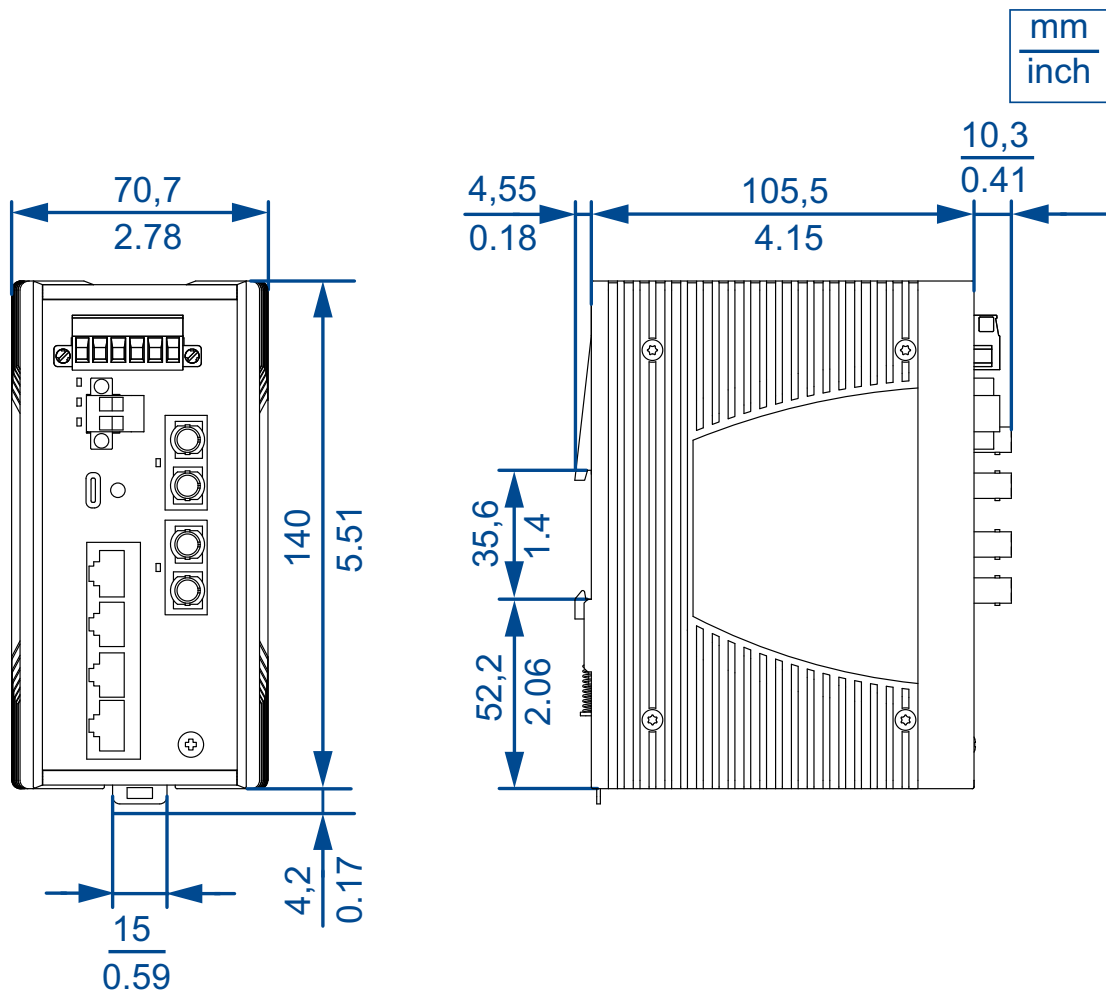


Figure 23: Narrow metal casing

mm
inch

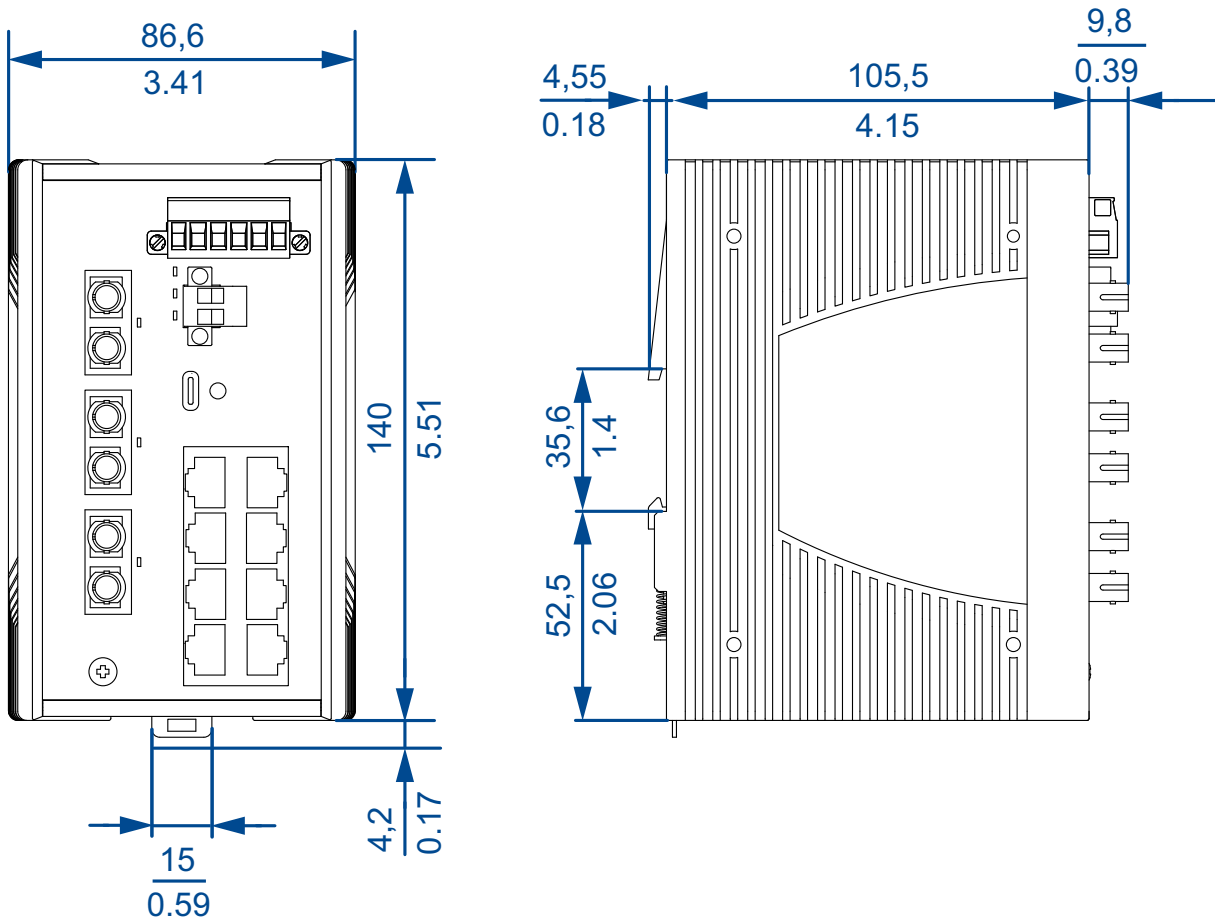


Figure 24: Medium plastic casing

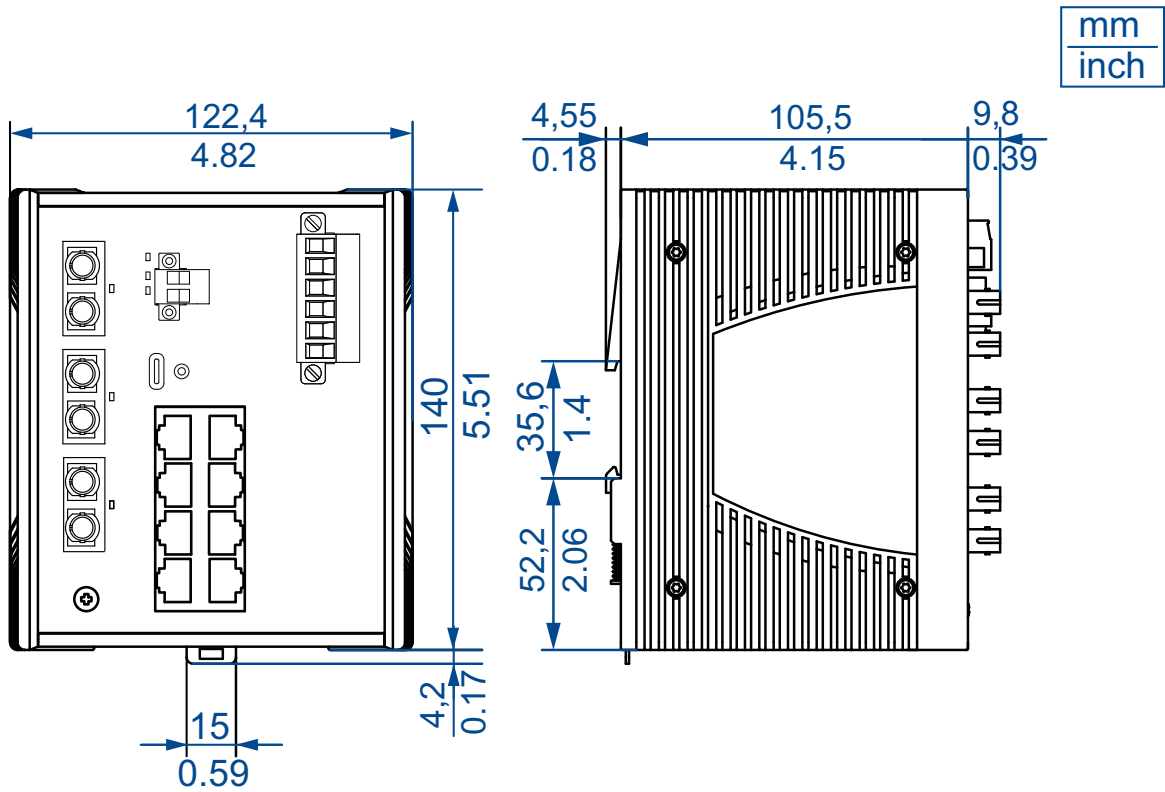


Figure 25: Wide plastic casing

6.10 Stability

Stability		Standard applications ^a	Navy applications	Railway applications (trackside) as per EN 50121-4
IEC 60068-2-6, test Fc	Vibration	5 Hz ... 8.4 Hz with 0.14 in (3.5 mm) amplitude	2 Hz ... 13.2 Hz with 0.04 in (1 mm) amplitude	—
		8.4 Hz ... 200 Hz with 1 g	13.2 Hz ... 100 Hz with 0.7 g	—
IEC 60068-2-27, test Ea	Shock	15 g at 11 ms	—	—

Table 23: Immunity

a. EN 61131-2, CE, FCC – applies to all devices

6.11 Electromagnetic compatibility (EMC)

Note: Use shielded data cables for gigabit transmission via copper cables. Use shielded data cables for all transmission rates to meet the requirements according to EN 50121-4 and marine applications.

EMC interference emission	Standard applications ^a	Navy applications	Railway applications (trackside) as per EN 50121-4
EN 55032	Class A	—	—
DNV GL Guidelines	—	EMC B	—
FCC 47 CFR Part 15	Class A	—	—
EN 61000-6-4	Fulfilled	—	Fulfilled

Table 24: EMC interference emission

a. EN 61131-2, CE, FCC – applies to all devices

EMC interference immunity		Standard applications^a	Navy applications	Railway applications (trackside) as per EN 50121-4
Electrostatic discharge				
EN 61000-4-2	Contact discharge	±4 kV	±6 kV	±6 kV
EN 61000-4-2	Air discharge	±8 kV	±8 kV	±8 kV
Electromagnetic field				
EN 61000-4-3	80 MHz ... 800 MHz	—	—	10 V/m
	80 MHz ... 1000 MHz	10 V/m	—	—
	800 MHz ... 1000 MHz	—	—	20 V/m
	80 MHz ... 2000 MHz	—	10 V/m	—
	1.4 GHz ... 2.0 GHz	3 V/m	—	10 V/m
	2.0 GHz ... 2.7 GHz	1 V/m	—	5 V/m
	5.1 GHz ... 6.0 GHz	—	—	3 V/m
Fast transients (burst) – power supply connection				
EN 61000-4-4		±2 kV	±2 kV	±2 kV
Fast transients (burst) – data line				
EN 61000-4-4		±1 kV	±1 kV	±2 kV
Voltage surges – power supply connection				
EN 61000-4-5	line/ground	±2 kV	±1 kV	±2 kV
EN 61000-4-5	line/line	±1 kV	±0.5 kV	±1 kV
Voltage surges - data line				
EN 61000-4-5	line/ground	±1 kV	—	±2 kV
Conducted disturbances				
EN 61000-4-6	150 kHz ... 80 MHz	10 V	10 V	10 V

Table 25: EMC interference immunity

a. EN 61131-2, CE, FCC – applies to all devices

6.12 Network range

Note: The line lengths specified for the transceivers apply for the respective fiber data (fiber attenuation and Bandwidth Length Product (BLP)/ Dispersion).

6.12.1 10/100/1000 Mbit/s twisted pair port

10/100/1000 Mbit/s twisted pair port

Length of a twisted pair segment max. 328 ft (100 m) (for Cat5e cable)

Table 26: Network range: 10/100/1000 Mbit/s twisted pair port

6.12.2 Fast Ethernet SFP transceiver

Product code M-FAST-SFP-...	Mode ^a	Wave length	Fiber	System attenuation	Example for F/O cable length ^b	Fiber attenuation	BLP/Dispersion
-MM/LC...	MM	1310 nm	50/125 μm	0 dB ... 8 dB	0 mi ... 3.11 mi (0 km ... 5 km)	1.0 dB/km	800 MHz×km
-MM/LC...	MM	1310 nm	62.5/125 μm	0 dB ... 11 dB	0 mi ... 2.49 mi (0 km ... 4 km)	1.0 dB/km	500 MHz×km
-SM/LC...	SM	1310 nm	9/125 μm	0 dB ... 13 dB	0 mi ... 15.53 mi (0 km ... 25 km)	0.4 dB/km	3.5 ps/(nm×km)
-SM+/LC...	SM	1310 nm	9/125 μm	10 dB ... 29 dB	15.53 mi ... 40.39 mi (25 km ... 65 km)	0.4 dB/km	3.5 ps/(nm×km)

Table 27: Fiber port 100BASE-FX (SFP fiber optic Fast Ethernet Transceiver)

Product code M-FAST-SFP-...	Mode ^a	Wave length	Fiber	System attenuation	Example for F/O cable length ^b	Fiber attenuation	BLP/Dispersion
-LH/LC...	SM	1550 nm	9/125 μm	10 dB ... 29 dB	29.20 mi ... 64.62 mi (47 km ... 104 km)	0.25 dB/km	19 ps/(nm×km)
-LH/LC...	SM	1550 nm	9/125 μm	10 dB ... 29 dB	14.29 mi ... 86.99 mi (55 km ... 140 km)	0.18 dB/km ^c	18 ps/(nm×km)

Table 27: Fiber port 100BASE-FX (SFP fiber optic Fast Ethernet Transceiver)

- a. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul
- b. Including 3 dB system reserve when compliance with the fiber data is observed.
- c. With ultra-low-loss optical fiber.

Product code	Mode ^a	Wave length	Fiber	System attenuation	Example for F/O cable length ^b	Fiber attenuation	BLP/Dispersion
-M2, -MM	MM	1300 nm	50/125 μm	0 dB ... 8 dB	0 mi ... 3.11 mi (0 km ... 5 km)	1.0 dB/km	800 MHz×km
-M2, -MM	MM	1300 nm	62.5/125 μm	0 dB ... 11 dB	0 mi ... 2.49 mi (0 km ... 4 km)	1.0 dB/km	500 MHz×km
-M4, -NN	SM	1300 nm	62.5/125 μm	0 dB ... 11 dB	0 mi ... 2.49 mi (0 km ... 4 km)	1.0 dB/km	500 MHz×km
-S2, -VV	SM	1300 nm	9/125 μm	0 dB ... 16 dB	0 mi ... 18.64 mi (0 km ... 30 km)	0.4 dB/km	3.5 ps/(nm×km)
-S4, -UU	SM	1300 nm	9/125 μm	0 dB ... 16 dB	0 mi ... 18.64 mi (0 km ... 30 km)	0.4 dB/km	3.5 ps/(nm×km)
-E2, EE	SM+	1300 nm	9/125 μm	7 dB ... 29 dB	12.43 mi ... 40.39 mi (25 km ... 65 km)	0.4 dB/km	3.5 ps/(nm×km)

Table 28: F/O port 100BASE-FX (DSC/DST fiber optic Fast Ethernet Transceiver)

Product code	Mode ^a	Wave length	Fiber	System attenuation	Example for F/O cable length ^b	Fiber attenuation	BLP/Dispersion
-L2, -LL	LH	1550 nm	9/125 μm	3 dB ... 29 dB	8.70 mi ... 64.62 mi (14 km ... 104 km)	0.25 dB/km	19 ps/(nm×km)
-G2, -GG	LH+	1550 nm	9/125 μm	14 dB ... 47 dB	41.63 mi ... 109.36 mi (67 km ... 176 km)	0.25 dB/km	19 ps/(nm×km)

Table 28: F/O port 100BASE-FX (DSC/DST fiber optic Fast Ethernet Transceiver)

- a. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul
b. Including 3 dB system reserve when compliance with the fiber data is observed.

6.12.3 Gigabit Ethernet SFP transceiver

Product code M-SFP-...	Mode ^a	Wave length	Fiber	System attenuation	Example for F/O cable length ^b	Fiber attenuation	BLP ^c /Dispersion
-SX/LC...	MM	850 nm	50/125 μm	0 dB ... 7.5 dB	0 mi ... 0.34 mi (0 km ... 0.55 km)	3.0 dB/km	400 MHz×km
-SX/LC...	MM	850 nm	62.5/125 μm	0 dB ... 7.5 dB	0 mi ... 0.17 mi (0 km ... 0.275 km)	3.2 dB/km	200 MHz×km
-MX/LC...	MM	1310 nm	50/125 μm	0 dB ... 12 dB	0 km ... 1.5 km	1.0 dB/km	800 MHz×km
-MX/LC...	MM	1310 nm	62.5/125 μm	0 dB ... 12 dB	0 mi ... 31.06 mi (0 km ... 50 km)	1.0 dB/km	500 MHz×km
-LX/LC...	MM	1310 nm ^d	50/125 μm	0 dB ... 10.5 dB	0 mi ... 0.34 mi (0 km ... 0.55 km)	1.0 dB/km	800 MHz×km
-LX/LC...	MM	1310 nm ^e	62.5/125 μm	0 dB ... 10.5 dB	0 mi ... 0.34 mi (0 km ... 0.55 km)	1.0 dB/km	500 MHz×km
-LX/LC...	SM	1310 nm	9/125 μm	0 dB ... 10.5 dB	0 mi ... 12.43 mi (0 km ... 20 km) ^f	0.4 dB/km	3.5 ps/(nm×km)

Table 29: F/O port 1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver)

Product code M-SFP-...	Mode ^a	Wave length	Fiber	System attenuation	Example for F/O cable length ^b	Fiber attenuation	BLP ^c /Dispersion
-LX+/LC...	SM	1310 nm	9/125 µm	5 dB ... 20 dB	8.70 mi ... 26.10 mi (14 km ... 42 km)	0.4 dB/km	3.5 ps/(nm×km)
-LH/LC...	LH	1550 nm	9/125 µm	5 dB ... 22 dB	14.29 mi ... 49.71 mi (23 km ... 80 km)	0.25 dB/km	19 ps/(nm×km)
-LH+/LC	LH	1550 nm	9/125 µm	15 dB ... 30 dB	44.12 mi ... 67.11 mi (71 km ... 108 km)	0.25 dB/km	19 ps/(nm×km)
-LH+/LC	LH	1550 nm	9/125 µm	15 dB ... 30 dB	44.12 mi ... 79.54 mi (71 km ... 128 km)	0.21 dB/km (typically)	19 ps/(nm×km)
-LH+/LC...	LH	1550 nm	9/125 µm	13 dB ... 32 dB	38.52 mi ... 72.07 mi (62 km ... 116 km)	0.25 dB/km	19 ps/(nm×km)
-LH+/LC...	LH	1550 nm	9/125 µm	13 dB ... 32 dB	38.52 mi ... 85.75 mi (62 km ... 138 km)	0.21 dB/ km (typically)	19 ps/(nm×km)

Table 29: F/O port 1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver)

- a. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul
- b. Including 3 dB system reserve when compliance with the fiber data is observed.
- c. Using the bandwidth-length product is inappropriate for expansion calculations.
- d. With F/O adapter compliant with IEEE 802.3-2002 Clause 38 (single-mode fiber offset-launch mode conditioning patch cord).
- e. With F/O adapter compliant with IEEE 802.3-2002 Clause 38 (single-mode fiber offset-launch mode conditioning patch cord).
- f. Including 2.5 dB system reserve when compliance with the fiber data is observed.

6.12.4 2.5 Gigabit Ethernet SFP transceiver

Product code M-SFP-2.5-...	Mode ^a	Wave length	Fiber	System attenuation	Example for F/O cable length	Fiber attenuation	BLP/dispersion
MM/LC EEC	MM	850 nm	50/125 μm	0 dB ... 4 dB	0.34 mi (0.55 km)	3.5 dB/km	2000 MHz×km (OM3)
MM/LC EEC	MM	850 nm	50/125 μm	0 dB ... 4 dB	0.25 mi (0.4 km)	3.5 dB/km	500 MHz×km (OM2)
MM/LC EEC	MM	850 nm	62.5/125 μm	0 dB ... 4 dB	0.11 mi (0.17 km)	3.5 dB/km	200 MHz×km (OM1)
SM-/LC EEC	SM	1310 nm	9/125 μm	0 dB ... 8.5 dB	3.11 mi (5 km)	0.4 dB/km	3.5 ps/(nm×km)
SM/LC EEC	SM	1310 nm	9/125 μm	0 dB ... 13 dB	12.43 mi (20 km)	0.4 dB/km	3.5 ps/(nm×km)
SM+/LC EEC	SM	1310 nm	9/125 μm	12 dB ... 25 dB	27.96 mi (45 km)	0.4 dB/km	3.5 ps/(nm×km)
LH/LC	SM	1551 nm	9/125 μm	14 dB ... 28 dB	80 km ^b	0.25 dB/km	19 ps/(nm×km)
LH+/LC	SM	1550.12 nm	9/125 μm	16 dB ... 31 dB	62.13 mi (100 km)	0.25 dB/km	19 ps/(nm×km)
LH+/LC	SM	1550.12 nm	9/125 μm	16 dB ... 31 dB	99.41 mi (160 km)	0.25 dB/km	19 ps/(nm×km)
LH+/LC EEC	LH	1550.12 nm	9/125 μm	13 dB ... 32 dB	38.52 mi ... 72.07 mi (62 km ... 116 km)	0.25 dB/km	19 ps/(nm×km)
LH+/LC EEC	LH	1550 nm	9/125 μm	13 dB ... 32 dB	38.52 mi ... 85.75 mi (62 km ... 138 km)	0.21 dB/km	19 ps/(nm×km) (typically)

Table 30: F/O port 2.5 Gbit/s (SFP fiber optic Gigabit Ethernet transceiver)

- a. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul
 b. Typically the DWDM (Dense Wave Division Multiplexing) links have filters because the remaining attenuation budget is consumed by the filters. For point-to-point connections without filters and with max. 1.5 dB of connector losses you can cover up to 59 mi (95 km).

6.12.5 Bidirectional Fast Ethernet SFP transceiver

Product code SFP-FAST-B...	Mode ^a	Wave length TX	Wave length RX	Fiber	System attenuation	Example for F/O cable length ^b	Fiber attenuation	Dispersion
SFP-FAST-BA MM/LC EEC	MM	1310 nm	1550 nm	50/125 µm 62.5/125 µm	0 dB ... 16 dB	0 mi ... 1.24 mi (0 km ... 2 km)	1.0 dB/km	800 MHz×km 500 MHz×km
SFP-FAST-BB MM/LC EEC	MM	1550 nm	1310 nm	50/125 µm 62.5/125 µm	0 dB ... 16 dB	0 mi ... 1.24 mi (0 km ... 2 km)	1.0 dB/km	800 MHz×km 500 MHz×km
SFP-FAST-BA SM/LC EEC	SM	1310 nm	1550 nm	9/125 µm	0 dB ... 18 dB	0 km ... 12.43 mi (0 km ... 20 km)	0.4 dB/km	3.5 ps/(nm×km)
SFP-FAST-BB SM/LC EEC	SM	1550 nm	1310 nm	9/125 µm	0 dB ... 18 dB	0 km ... 12.43 mi (0 km ... 20 km)	0.25 dB/km	19 ps/(nm×km)
SFP-FAST-BA SM+/LC EEC	SM	1310 nm	1550 nm	9/125 µm	0 dB ... 29 dB	0 mi ... 37.29 mi (0 km ... 60 km)	0.4 dB/km	3.5 ps/(nm×km)
SFP-FAST-BB SM+/LC EEC	SM	1550 nm	1310 nm	9/125 µm	0 dB ... 29 dB	0 mi ... 37.29 mi (0 km ... 60 km)	0.25 dB/km	19 ps/(nm×km)

Table 31: F/O port (bidirectional Fast Ethernet SFP transceiver)

- a. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul
b. Including 3 dB system reserve when compliance with the fiber data is observed.

6.12.6 Bidirectional Gigabit Ethernet SFP transceiver

Product code SFP-GIG-B...	Mode ^a	Wave length TX	Wave length RX	Fiber	System attenuation	Example for F/O cable length ^b	Fiber attenuation	Dispersion
SFP-GIG-BA LX/ LC EEC	SM	1310 nm	1550 nm	9/125 µm	0 dB ... 15 dB	0 km ... 12.43 mi (0 km ... 20 km)	0.4 dB/km	3.5 ps/(nm×km)
SFP-GIG-BB LX/ LC EEC	SM	1550 nm	1310 nm	9/125 µm	0 dB ... 15 dB	0 km ... 12.43 mi (0 km ... 20 km)	0.25 dB/km	19 ps/(nm×km)
SFP-GIG-BA LX+/ LC EEC	SM	1310 nm	1550 nm	9/125 µm	3 dB ... 20 dB	7.45 mi ... 24.86 mi (12 km ... 40 km)	0.4 dB/km	3.5 ps/(nm×km)

Table 32: F/O port (bidirectional Gigabit Ethernet SFP transceiver)

Product code SFP-GIG-B...	Mode ^a	Wave length TX	Wave length RX	Fiber	System attenuation	Example for F/O cable length ^b	Fiber attenuation	Dispersion
SFP-GIG-BB LX+/ LC EEC	SM	1550 nm	1310 nm	9/125 µm	3 dB ... 20 dB	7.45 mi ... 24.86 mi (12 km ... 40 km)	0.25 dB/km	19 ps/(nm×km)
SFP-GIG-BA LH/ LC EEC	SM	1490 nm	1550 nm	9/125 µm	4 dB ... 24 dB	11.80 mi ... 49.71 mi (19 km ... 80 km)	0.25 dB/km	19 ps/(nm×km)
SFP-GIG-BB LH/ LC EEC	SM	1550 nm	1490 nm	9/125 µm	4 dB ... 24 dB	11.80 mi ... 49.71 mi (19 km ... 80 km)	0.25 dB/km	19 ps/(nm×km)

Table 32: F/O port (bidirectional Gigabit Ethernet SFP transceiver)

- a. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul
b. Including 3 dB system reserve when compliance with the fiber data is observed.

6.13 Derating due to SFP transceiver

6.13.1 Fast Ethernet SFP transceiver

Product code	Derating for a device with operating temperature +140 °F (+60 °C) per SFP transceiver used	Derating for a device with operating temperature +158 °F (+70 °C) per SFP transceiver used	Order number
M-FAST SFP-MM/LC	0 K	a	943 865-001
M-FAST SFP-MM/LC EEC	0 K	0 K	943 945-001
M-FAST SFP-SM/LC	0 K	a	943 866-001
M-FAST SFP-SM/LC EEC	0 K	0 K	943 946-001

Table 33: Derating due to Fast Ethernet SFP transceiver

Product code	Derating for a device with operating temperature +140 °F (+60 °C) per SFP transceiver used	Derating for a device with operating temperature +158 °F (+70 °C) per SFP transceiver used	Order number
M-FAST SFP-SM+/LC	0 K	0 K	943 867-001
M-FAST SFP-SM+/LC EEC	0 K	0 K	943 947-001
M-FAST SFP-LH/LC	0 K	a	943 868-001
M-FAST SFP-LH/LC EEC	0 K	0 K	943 948-001
M-FAST SFP-TX/RJ45	0 K	a	942 098-001
M-FAST SFP-TX/RJ45 EEC	0 K	0 K	942 098-002
SFP-FAST-MM/LC	0 K	a	942 194-001
SFP-FAST-MM/LC EEC	0 K	0 K	942 194-002
SFP-FAST-SM/LC	0 K	a	942 195-001
SFP-FAST-SM/LC EEC	0 K	0 K	942 195-002

Table 33: Derating due to Fast Ethernet SFP transceiver

a - By using a SFP transceiver without “EEC” extension, the temperature of the device is reduced by 15 K.

6.13.2 Gigabit Ethernet SFP transceiver

Product code	Derating for a device with max. operating temperature +140 °F (+60 °C) per SFP transceiver used	Derating for a device with max. operating temperature +158 °F (+70 °C) per SFP transceiver used	Order number
M-SFP-SX/LC	0 K	a	943 014-001
M-SFP-SX/LC EEC	0 K	0 K	943 896-001
M-SFP-LX/LC	0 K	a	943 015-001
M-SFP-LX/LC EEC	0 K	0 K	943 897-001
M-SFP-LH/LC	2 K	a	943 042-001
M-SFP-LH/LC EEC	0 K	2 K	943 898-001
M-SFP-LH+/LC	2 K	a	943 049-001

Table 34: Derating due to Gigabit Ethernet SFP transceiver

Product code	Derating for a device with max. operating temperature +140 °F (+60 °C) per SFP transceiver used	Derating for a device with max. operating temperature +158 °F (+70 °C) per SFP transceiver used	Order number
M-SFP-TX/RJ45	3 K	a	943 977-001
M-SFP-TX/RJ45 EEC	0 K	3 K	942 161-001
SFP-GIG-LX/LC	0 K	a	942 196-001
SFP-GIG-LX/LC EEC	0 K	0 K	942 196-002
M-SFP-LX+/LC	0 K	a	942 023-001
M-SFP-LX+/LC EEC	0 K	0 K	942 024-001
M-SFP-LH+/LC EEC	tbd	tbd	942 119-001
M-SFP-MX/LC EEC	0 K	2 K	942 108-001

Table 34: Derating due to Gigabit Ethernet SFP transceiver

a - By using a SFP transceiver without “EEC” extension, the temperature of the device is reduced by 15 K.

6.13.3 2.5 Gigabit Ethernet SFP transceiver

Product code	Derating for a device with operating temperature +140 °F (+60 °C) per SFP transceiver used	Derating for a device with operating temperature +158 °F (+70 °C) per SFP transceiver used	Order number
M-SFP-2.5-MM/LC EEC	0 K	0 K	942 162-001
M-SFP-2.5-SM-/LC EEC	0 K	0 K	942 163-001
M-SFP-2.5-SM/LC EEC	tbd	tbd	942 164-001
M-SFP-2.5-SM+/LC EEC	0 K	0 K	942 165-001
M-SFP-2.5-LH/LC	tbd	a	942 220-001
M-SFP-2.5-LH+/LC	tbd	a	942 221-001

Table 35: Derating due to 2.5 Gigabit Ethernet SFP transceiver

a - By using a SFP transceiver without “EEC” extension, the temperature of the device is reduced by 15 K.

6.13.4 Bidirectional Fast Ethernet SFP transceiver

Product code	Derating for a device with operating temperature +140 °F (+60 °C) per SFP transceiver used	Derating for a device with operating temperature +158 °F (+70 °C) per SFP transceiver used	Order number
SFP-FAST-BA MM/LC EEC	tbd	tbd	942 204-001
SFP-FAST-BB MM/LC EEC	tbd	tbd	942 204-002
SFP-FAST-BA SM/LC EEC	tbd	tbd	942 205-001
SFP-FAST-BB SM/LC EEC	tbd	tbd	942 205-002
SFP-FAST-BA SM+/LC EEC	tbd	tbd	942 206-001
SFP-FAST-BB SM+/LC EEC	tbd	tbd	942 206-002

Table 36: Derating due to bidirectional Fast Ethernet SFP transceiver

6.13.5 Bidirectional Gigabit Ethernet SFP transceiver

Product code	Derating for a device with max. operating temperature +140 °F (+60 °C) per SFP transceiver used	Derating for a device with max. operating temperature +158 °F (+70 °C) per SFP transceiver used	Order number
SFP-GIG-BA LX/LC EEC	tbd	tbd	942 207-001
SFP-GIG-BB LX/LC EEC	tbd	tbd	942 207-002
SFP-GIG-BA LX+/LC EEC	tbd	tbd	942 208-001
SFP-GIG-BB LX+/LC EEC	tbd	tbd	942 208-002
SFP-GIG-BA LH/LC EEC	tbd	tbd	942 209-001
SFP-GIG-BB LH/LC EEC	tbd	tbd	942 209-002

Table 37: Derating due to bidirectional Gigabit Ethernet SFP transceiver

7 Scope of delivery

Scope of delivery
1 × Device
1 × General safety instructions
1 × Terminal block for supply voltage and signal contact
1 × Terminal block for the digital input depending on device variant

Table 38: Scope of delivery

8 Accessories

8.1 General accessories

General accessories	
AutoConfiguration Adapter ACA22-USB-C (EEC)	942-239-001
6-pin terminal block with screw lock (10 pieces)	972 272-303
6-pin terminal block with screw lock (50 pieces)	943 845-013
2-pin terminal block with screw lock (10 pieces)	972 272-201
2-pin terminal block with screw lock (50 pieces)	943 845-009
Industrial HiVision Network Management Software	943 156-xxx
OPC Server software HiOPC	943 055-001

Table 39: General accessories

8.2 Order numbers for standard variants

Name	Order number
BRS20-4TX	942 170-001
BRS20-8TX	942 170-002
BRS20-4TX/2FX	942 170-003
BRS20-8TX/2FX	942 170-004
BRS20-4TX/2FX-SM	942 170-005
BRS20-8TX/2FX-SM	942 170-006
BRS30-8TX/4SFP	942 170-007
BRS40-8TX	942 170-008
BRS40-8TX/4SFP	942 170-009
BRS50-8TX/4SFP	942 170-010
BRS20-4TX-EEC	942 170-011
BRS20-8TX-EEC	942 170-012
BRS20-4TX/2FX-EEC	942 170-013
BRS20-8TX/2FX-EEC	942 170-014
BRS20-4TX/2FX-SM-EEC	942 170-015
BRS20-8TX/2FX-SM-EEC	942 170-016
BRS30-8TX/4SFP-EEC	942 170-017
BRS40-8TX-EEC	942 170-018
BRS40-8TX/4SFP-EEC	942 170-019
BRS50-8TX/4SFP-EEC	942 170-020

Table 40: Order numbers for standard variants in plastic casing

8.3 Fast Ethernet SFP transceiver

Fast Ethernet SFP transceiver	Order number
M-FAST SFP-TX/RJ45	942 098-001
M-FAST SFP-TX/RJ45 EEC	942 098-002
The following operating conditions apply to twisted pair transceivers:	
<ul style="list-style-type: none"> ▶ Longer RSTP switching times and link loss detection times compared to twisted pair ports provided by the device directly. ▶ It is currently not possible to set autocrossing manually. 	
M-FAST SFP-MM/LC	943 865-001
M-FAST SFP-MM/LC EEC	943 945-001
M-FAST SFP-SM/LC	943 866-001
M-FAST SFP-SM/LC EEC	943 946-001
M-FAST SFP-SM+/LC	943 867-001
M-FAST SFP-SM+/LC EEC	943 947-001
M-FAST SFP-LH/LC	943 868-001
M-FAST SFP-LH/LC EEC	943 948-001
SFP-FAST-MM/LC ^a	942 194-001
SFP-FAST-MM/LC EEC ^a	942 194-002
SFP-FAST-SM/LC ^a	942 195-001
SFP-FAST-SM/LC EEC ^a	942 195-002

Table 41: Accessory: Fast Ethernet SFP transceiver

- a. You will find further information on certifications on the Internet on the Hirschmann product pages (www.hirschmann.com).

8.4 Gigabit Ethernet SFP transceiver

Gigabit Ethernet SFP transceiver	Order number
M-SFP-TX/RJ45	943 977-001
M-SFP-TX/RJ45 EEC	942 161-001
The following operating conditions apply to twisted pair transceivers:	
<ul style="list-style-type: none"> ▶ Longer RSTP switching times and link loss detection times compared to twisted pair ports provided by the device directly. ▶ Cannot be used with Fast Ethernet ports. ▶ Exclusively supports the autonegotiation mode including autocrossing. 	
M-SFP-SX/LC	943 014-001
M-SFP-SX/LC EEC	943 896-001
M-SFP-MX/LC EEC	942 108-001
M-SFP-LX/LC	943 015-001
M-SFP-LX/LC EEC	943 897-001
M-SFP-LX+/LC	942 023-001
M-SFP-LX+/LC EEC	942 024-001
M-SFP-LH/LC	943 042-001
M-SFP-LH/LC EEC	943 898-001
M-SFP-LH+/LC	943 049-001

Table 42: Accessory: Gigabit Ethernet SFP transceiver

Gigabit Ethernet SFP transceiver	Order number
M-SFP-LH+/LC EEC	942 119-001
SFP-GIG-LX/LC ^a	942 196-001
SFP-GIG-LX/LC EEC ^a	942 196-002

Table 42: Accessory: Gigabit Ethernet SFP transceiver

- a. You will find further information on certifications on the Internet on the Hirschmann product pages (www.hirschmann.com).

8.5 2.5 Gigabit Ethernet SFP transceiver

2.5 Gigabit Ethernet SFP transceiver	Order number
M-SFP-2.5-MM/LC EEC	942 162-001
M-SFP-2.5-SM-/LC EEC	942 163-001
M-SFP-2.5-SM/LC EEC	942 164-001
M-SFP-2.5-SM+/LC EEC	942 165-001
M-SFP-2.5-LH/LC	942 220-001

Table 43: Accessory: 2.5 Gigabit Ethernet SFP transceiver

8.6 Bidirectional Fast Ethernet SFP transceiver

Bidirectional Fast Ethernet SFP transceiver	Order number
SFP-FAST-BA MM/LC EEC ^a	942 204-001
SFP-FAST-BB MM/LC EEC ^a	942 204-002
SFP-FAST-BA SM/LC EEC ^a	942 205-001
SFP-FAST-BB SM/LC EEC ^a	942 205-002
SFP-FAST-BA SM+/LC EEC ^a	942 206-001
SFP-FAST-BB SM+/LC EEC ^a	942 206-002

Table 44: Accessory: Bidirectional Fast Ethernet SFP transceiver

- a. You will find further information on certifications on the Internet on the Hirschmann product pages (www.hirschmann.com).

8.7 Bidirectional Gigabit Ethernet SFP transceiver

Bidirectional Gigabit Ethernet SFP transceiver	Order number
SFP-GIG-BA LX/LC EEC	942 207-001
SFP-GIG-BB LX/LC EEC	942 207-002
SFP-GIG-BA LX+/LC EEC	942 208-001
SFP-GIG-BB LX+/LC EEC	942 208-002
SFP-GIG-BA LH/LC EEC	942 209-001
SFP-GIG-BB LH/LC EEC	942 209-002

Table 45: Accessory: Bidirectional Gigabit Ethernet SFP transceiver

9 Underlying technical standards

Name	
ANSI/UL 121201	Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations
DNVGL-CG-0339	Environmental test specification for electrical, electronic and programmable equipment and systems.
FCC 47 CFR Part 15	Code of Federal Regulations
NEMA TS 2	Traffic Controller Assemblies with NTCIP Requirements (environmental requirements)
RCM	Australian Regulatory Compliance Mark (RCM) Australian Radiocommunications Standard 2008, Radiocommunications Act 1992
UL/IEC 61010-2-201	Safety for Control Equipment
EN 50121-4	Railway applications – EMC – Emission and immunity of the signaling and telecommunications apparatus (Rail Trackside)
EN 55032	Electromagnetic compatibility of multimedia equipment – Emission Requirements
EN 62368-1	Equipment for audio/video, information and communication technology - Part 1: safety requirements
EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
EN 61131-2	Programmable controllers – Part 2: Equipment requirements and tests
IEEE 802.3	Ethernet

Table 46: List of the technical standards

The device has an approval based on a specific standard exclusively if the approval indicator appears on the device casing.

If your device has a shipping approval according to DNV GL, you find the approval mark printed on the device label. You will find out whether your device has other shipping approvals on the Hirschmann website at www.hirschmann.com in the product information.

The device generally fulfills the technical standards named in their current versions.

A Further support

Technical questions

For technical questions, please contact any Hirschmann dealer in your area or Hirschmann directly.

You find the addresses of our partners on the Internet at <http://www.hirschmann.com>.

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