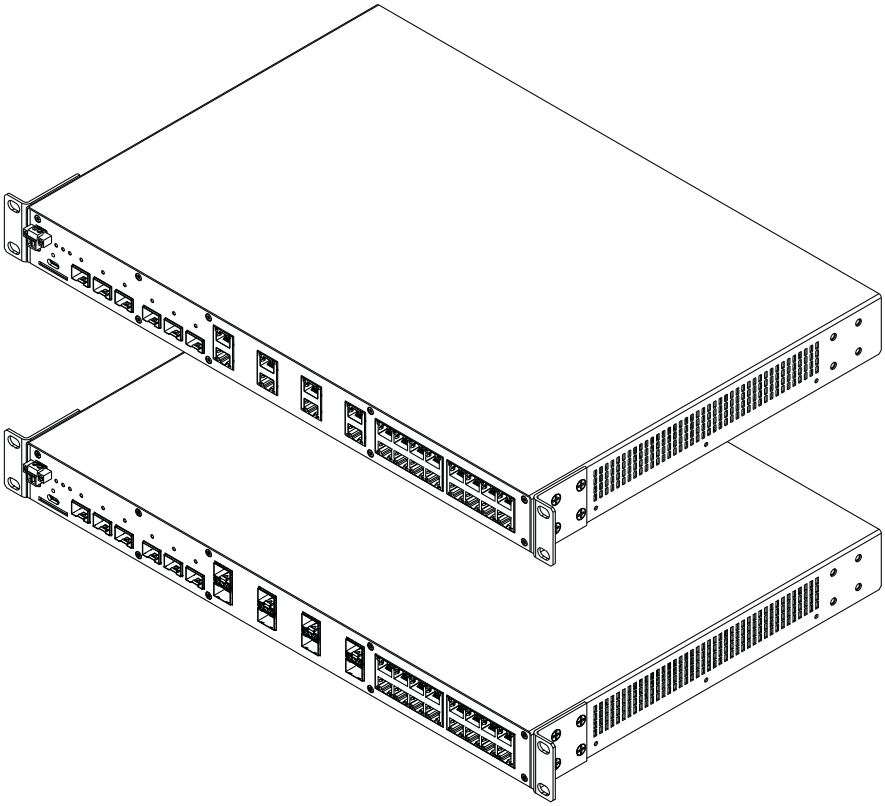
HIRSCHMANN
A BELDEN BRAND

User Manual
Installation
Industrial Ethernet Workgroup Switch
GRS105/106/115/116/125/126



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You can get the latest version of this manual on the Internet at:
https://www.doc.hirschmann.com

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Stuttgarter Str. 45-51
72654 Neckartenzlingen
Germany

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 “Installation” user manual that is not supplied with your device as a printout can be found at:
https://www.doc.hirschmann.com

The Network Management Software Industrial HiVision provides you with options for smooth configuration and monitoring. You find further information at:
https://www.belden.com/products/industrial-networking-cybersecurity/software-solutions/network-management-software/industrial-hivision-network-management-software

Important information

Read these instructions carefully, and familiarize yourself with the device before trying to install, operate, or maintain it. The following notes may appear throughout this documentation or on the device. These notes warn of potential hazards or call attention to information that clarifies or simplifies a procedure.

Warning symbols

This is a general warning symbol. This symbol alerts you to potential personal injury hazards. Observe all safety notes that follow this symbol to avoid possible injury or death.

If this symbol is displayed in addition to a safety instruction of the type “Danger” or “Warning”, it means that there is a danger of electric shock and failure to observe the instructions will inevitably result in injury.

This symbol indicates the danger of hot surfaces on the device. In connection with safety instructions, non-observance of the instructions will inevitably result in injuries.

This symbol instructs you to disconnect all power sources before opening the device.

⚠ DANGER

DANGER draws attention to an immediately dangerous situation, which will inevitably result in a serious or fatal accident if not observed.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION	
	CAUTION indicates a possible danger which, if not avoided, may result in minor injuries.

NOTICE
NOTICE provides information about procedures that do not involve the risk of injury.

Symboles d'avertissement

Il s'agit d'un symbole d'avertissement général. Ce symbole vous avertit des risques potentiels de blessures. Respectez les consignes accompagnant ce symbole afin d'éviter toute blessure ou accident mortel.

La présence de ce symbole sur une étiquette "Danger" ou "Avertissement" signale un risque d'électrocution qui provoquera des blessures physiques en cas de non-respect des consignes de sécurité.

Ce symbole indique le risque de surfaces chaudes sur l'équipement. En relation avec les consignes de sécurité, le non-respect des instructions entraînera inévitablement des blessures.

Ce symbole vous indique de débrancher toutes les sources d'alimentation avant d'ouvrir l'équipement.

⚠ DANGER	
	DANGER indique une situation immédiatement dangereuse qui, si elle n'est pas évitée, entraînera la mort ou des blessures graves.

⚠ AVERTISSEMENT	
	AVERTISSEMENT indique une situation potentiellement dangereuse et susceptible d'entraîner la mort ou des blessures graves.

⚠ ATTENTION	
	ATTENTION indique une situation potentiellement dangereuse et susceptible d'entraîner des blessures d'ampleur mineure à modérée.

AVIS
AVIS indique des pratiques n’entraînant pas de risques corporels.

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1. Safety instructions

⚠ WARNING

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

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.

⚠ AVERTISSEMENT

ACTIONS INCONTRÔLÉES DE LA MACHINE
Le non-respect de ces instructions peut entraîner la mort, des blessures graves ou des dommages matériels.

Pour éviter les actions incontrôlées de la machine causées par la perte de données, configurez tous les équipements de transmission de données individuellement.

Avant de démarrer une machine commandée par transmission de données, veillez à terminer la configuration de tous les équipements de transmission de données.

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.

- Verify that the electrical installation meets local or nationally applicable safety regulations.
- 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.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

1.1. 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.

1.2. Intended use

- Use the product only for the application cases described in the Hirschmann Automation and Control GmbH product information, including this manual.
- Operate the product only according to the technical specifications, see *General data* on page 97.
- Connect to the product only components suitable for the requirements of the specific application case.

1.3. Installation site requirements

- Operate the device only at the specified ambient temperature (temperature of the ambient air at a distance of 5 cm (2 in) from the device) and at the specified relative humidity.
- 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 in *General data* on page 97.
- If the device is not installed in a horizontal position, it must be installed in a control cabinet or other enclosure with fire protection properties. The enclosure can be made of metal or plastic with fire protection properties of at least V-1 according to IEC 60695-11-10. Bottom openings must **NOT** exceed 2 mm (0.078 in) in diameter.

Relevant for installations in 19" switch cabinets according to UL 60950-1/UL 62368-1

- Higher ambient air temperature during operation: If installed in a closed switch cabinet or a multi-unit switch cabinet, the ambient air temperature inside the switch cabinet during operation can be higher than the ambient air temperature in the room. Install devices in environments that are compatible with the maximum ambient air temperature of the device.
- Reduced air flow: When you install the device in a switch cabinet, make sure that a sufficient air flow is guaranteed in order to safely operate your devices.
- Mechanical stress: Check for potential dangers resulting from unevenly distributed weight when you install the device in a switch cabinet.
- Electric circuit overloading: Observe the effects of electric circuit overloads on the overload current protection and the power supply cables when you connect devices to the power supply. Refer to the device parameters specified on the type plate of the device.
- Safe grounding: Make sure that devices installed in switch cabinets are grounded safely. When you install a device in a switch cabinet, also watch out for power supply connections other than the direct connections to the circuit branch (for example socket boards).

1.4. Device casing

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

- Never insert sharp objects (small screwdrivers, wires, or similar items) into connectors or device openings.
- Keep the ventilation slits free to ensure good air circulation.
- Make sure there is at least 5 cm (2 in) of space in front of the ventilation slits of the casing.
- Mount the device horizontally or vertically in a switch cabinet (see *Mounting in a switch cabinet* on page 75) or on a flat surface (see *Mounting on a flat surface* on page 71).

  Optionally, the device can be rotated by 90° to optimize ventilation when mounted vertically on a flat surface, such as a wall (see *Mounting on a vertical flat surface* on page 73).
- Exclusively use Hirschmann mounting brackets to fix the device in place.
- Exclusively use the provided screws when you reposition the attached mounting brackets or install additional mounting brackets.

  You obtain additional brackets as accessories, see *Accessories* on page 119.

1.5. Strain relief

Note: If the strain relief is insufficient, there is a potential risk of torsion, contact problems and creeping interruptions.

- Relieve the connection points of cables and lines from mechanical stress.
- Design strain reliefs in such a way that they help prevent any mechanical damage to cables, wires or conductors caused by external influences or their own weight.
- To help prevent damage to device connections, connectors and cables, follow the instructions for proper installation in accordance with DIN VDE 0100-520:2013-06, sections 522.6, 522.7 and 522.13.

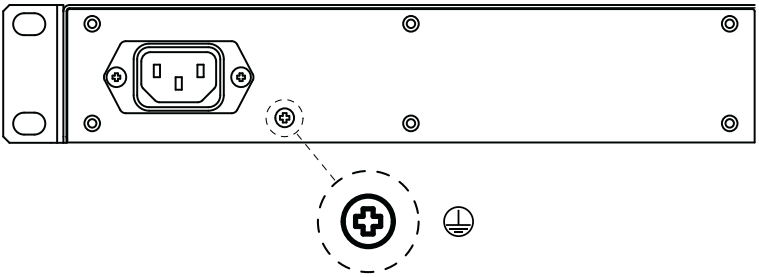
1.6. Electrical connections

1.6.1. Grounding the device

Before supplying your device with power, **ALWAYS** verify that the device is grounded.

The device is grounded via the separate grounding screw. The grounding screw is located on the left rear side of the device next to the power supply connection.

Figure 1. Grounding screw location: Example of a device variant with supply voltage characteristic value G



Power supply variants with characteristic value G and M are additionally grounded via the power supply connection. For more information on the characteristic values, see *Device name and product code* on page 28.

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

1.6.2. Shielding ground

The shielding ground of connectable twisted pair cables is connected to the front panel as an electrical conductor.

- Beware of possible ground loops when connecting a cable section with a conductive braided shielding.

1.6.3. General requirements for connecting electrical wires

Before connecting the electrical wires, **ALWAYS** verify that the requirements listed are complied with. The following requirements apply without restriction:

- The electrical wires are voltage-free.
- Only switch on the device when the casing is closed.
- The cables used are permitted for the temperature range of the application case.

  ⚠ Relevant for North America: Exclusively use +60/75 °C (+140/167 °F or +75 °C (+167 °F) copper wire (Cu wire).

1.6.4. General requirements for connecting the supply voltage

Before connecting the supply voltage, **ALWAYS** verify that the requirements listed are complied with. The following requirements apply without restrictions:

- The supply voltage corresponds to the voltage specified on the type plate of the device.
- The power supply cable is suitable for the required voltage, current, and physical load.
- The cross-section of the ground conductor is the same size as or larger than the cross-section of the power supply cables.
- The power supply conforms to overvoltage category I or II.
- The power supply conforms to NEC Class 2.
- The power supply has an easily accessible disconnecting device (for example a switch or a plug). This disconnecting device is clearly labelled and identifiable, so that in case of an emergency it is clear which power supply the disconnecting device belongs to.
- The power supply is potential-free.

DC voltage power supply:

- The device is rated for DC voltage.
- The conductor cross-section of the power supply cable is at least 1 mm² (16 AWG) on the supply voltage input of the device.
- A back-up fuse suitable for DC voltage is installed in **EVERY** plus conductor of the power supply.
- **EVERY** minus conductor is on ground potential. Otherwise, an additional back-up fuse is installed in **EVERY** minus conductor. Regarding the properties of this back-up fuse, see *General data* on page 97.

AC voltage power supply:

- The device is rated for AC voltage.
- The conductor cross-section of the power supply cable is at least 0.75 mm² (18 AWG) on the supply voltage input of the device.
- A back-up fuse suitable for AC voltage is installed in **EVERY** outer conductor of the power supply.
- **Every** neutral conductor is on ground potential at the voltage input of the device. Otherwise, an additional back-up fuse is installed in **EVERY** neutral conductor. Regarding the properties of this back-up fuse, see *General data* on page 97.

1.6.5. Requirements for connecting the signal contact

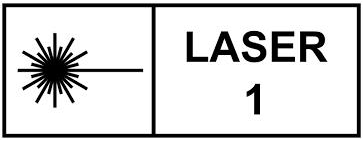
Before connecting the signal contact, **ALWAYS** verify that the requirements listed are complied with. The following requirements apply without restriction:

- The switched voltage complies with the requirements for a safety extra-low voltage (SELV) according to IEC 60950-1 or ES1 according to IEC/EN 62368-1.
- The connected voltage source is limited by a current limitation device or a fuse.
- The electrical threshold values for the signal contact are observed.

  For more information, see *Signal contact* on page 100.

1.7. LED or laser components

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



Warning: Class 1 laser product according to IEC 60825-1:2014 and EN 0825-1:2014 + A11:2021.
Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in “Laser Notice No. 56”, dated May 8, 2019.

Avertissement : Produit laser de classe 1 selon les normes CEI 60825-1:2014 et EN 0825-1:2014 + A11:2021.
Conforme aux normes 21 CFR 1040.10 et 1040.11, à l'exception de la conformité à la norme CEI 60825-1 Éd. 3., comme décrit dans le document « Laser Notice No. 56 » du 8 mai 2019.

1.8. Recycling note

The symbol of a crossed-out wheeled bin shown on the device indicates that the device **MUST NOT** be disposed of with household waste at the end of its service life.

After its service life, the used device must be disposed of properly as electronic waste in accordance with the locally applicable disposal regulations.

End users are responsible for deleting personal data from the used device prior to disposal.

End users are obliged to separate used batteries and accumulators that are not enclosed by the used device from the used device in a non-destructive manner before disposing of the used device. The used batteries and accumulators must be handed in for separate collection. This does not apply if the used device is handed in for reuse.

2. Approvals

2.1. 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.
- **2014/35/EU**
  Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits.

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

You can download the PDF file of the EU conformity declaration at: *https://www.doc.hirschmann.com/certificates.html*

The device can be used in industrial environments.

- Interference immunity: EN 61000-6-2
- Emitted interference: EN 55032
- Safety: IEC/EN 62368-1

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.

Avertissement ! Ce produit est un équipement de la classe A. À ce titre, il peut provoquer des perturbations radioélectriques dans les habitations. Dans ce cas, l'exploitant peut être tenu de procéder aux mesures appropriées.

2.2. FCC note

Supplier's Declaration of Conformity

47 CFR § 2.1077 Compliance Information

Workgroup Switch

GRS105/106/115/116/125/126

U.S. Contact Information

Belden Inc. – St. Louis
1 N Brentwood Blvd. 15th Floor
St. Louis, Missouri 63105,
United States
Phone: 314.854.8000

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, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual,

may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

3. Description

The Hirschmann network components help you ensure continuous communication across all levels of the company.

The GRS105/106/115/116/125/126 family provides you with a range of device variants.

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 with software variant L2... allow you to set up switched industrial Ethernet networks that conform to the IEEE 802.3 standard.

The following installation options are available:

- Horizontal mounting in a 19" switch cabinet, see *Mounting in a switch cabinet* on page 75.
- Horizontal mounting on a flat surface, see *Mounting on a flat surface* on page 71.
- Vertical mounting on a flat surface, see *Mounting on a vertical flat surface* on page 73.

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

- Twisted pair cable
- Multimode F/O (Fiber Optic)
- Singlemode F/O (Fiber Optic)
- DAC cable

The ring redundancy concept allows the network to be reconfigured quickly after a failure.

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

- Web browser
- SSH
- Network management software (for example Industrial HiVision)

  The Network Management Software Industrial HiVision provides you with options for smooth configuration and monitoring. For more information, see *https://www.belden.com/products/industrial-networking-cybersecurity/software-solutions/network-management-software/industrial-hivision-network-management-software*.

- USB-C interface (locally on the device)

The device provides you with a large range of functions, which the Manual Collection (User and Reference Manuals) for the operating software informs you about. For more information, see *https://www.doc.hirschmann.com*.

3.1. 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.

Table 1. Product code GRS105/106/115/116/125/126

Item	Characteristic	Characteristic value	Description
1 ... 3	Product	GRS	GREYHOUND Switch
4	Series	1	GREYHOUND Series
5	Technology	0	Standard
		1	MACsec
		2	Standard plus PoE(+/++)
6	Data rate	5	GRS105-... 6 × 1/2.5 GE (Port group I) + 8 × 1 GE (Port group II) + 16 × 1 GE (Port group III)
			GRS115-... 4 × 1 GE MACsec capable (Port group I) + 2 × 1/2.5 GE (Port group I) + 8 × 1 GE (Port group II) + 16 × 1 GE (Port group III)
			GRS125-... 6 × 1/2.5 GE (Port group I) + 8 × 1 GE (Port group II) + 16 × 1 GE (Port group III)
		6	GRS106-... 6 × 1/2.5/10 GE (Port group I) + 8 × 1/2.5 GE (Port group II) + 16 × 1 GE (Port group III)
			GRS116-... 4 × 1/10 GE MACsec capable (Port group I) + 2 × 1/2.5/10 GE (Port group I) + 8 × 1/2.5 GE (Port group II) + 16 × 1 GE (Port group III)
			GRS126-... 6 × 1/2.5/10 GE (Port group I) + 8 × 1/2.5 GE (Port group II) + 16 × 1 GE (Port group III)
7	-	-	(hyphen)
8 ... 9	Port group I	6F	6 × SFP slot
10 ... 11	Port group II	8F	8 × SFP slot
		8T	8 × Twisted Pair port
12 ... 14	Port group III	16T	16 × Twisted Pair port

Table 1. Product code GRS105/106/115/116/125/126 (continued)

Item	Characteristic	Characteristic value	Description	
15	Operating temperature range	S	Standard	-10 °C ... +60 °C (+14 °F ... +140 °F)
		C	Standard with Conformal Coating	-10 °C ... +60 °C (+14 °F ... +140 °F)
16	Power supply unit 1	G	Rated voltage range 110 V AC ... 240 V AC	
		M	Rated voltage range 110 V DC ... 250 V DC	
		L	Rated voltage range 24 V DC ... 48 V DC	
17	Power supply unit 2	G	Rated voltage range 110 V AC ... 240 V AC	
		M	Rated voltage range 110 V DC ... 250 V DC	
		L	Rated voltage range 24 V DC ... 48 V DC	
		9	No second power supply unit	
18 ... 19	Certificates and declarations	Z9	CE, FCC, EN 61131, IEC/EN 62368-1	
		Y9	Characteristic value Z9 + UL 62368-1	
		T9	Characteristic value Z9 + EN 50121-4	
		TY	Characteristic value T9 + UL 62368-1	
20 ... 21	Customer-specific version	HH	Hirschmann Standard	
22	Hardware configuration	S	Standard	
23	Software configuration	E	Entry (Hirschmann Standard)	
24 ... 25	Software level	2S	HiOS Layer 2 Standard	
		2A	HiOS Layer 2 Advanced	
		3A	HiOS Layer 3 Advanced	
26 ... 27	Software package	99	Reserved	
		UR	Unicast Routing	
		MR	Unicast + Multicast Routing	
28 ... 32	Software version	XX.X	Current software version	
		08.9.	Software version 08.9.	
		09.0.	Software version 09.0.	

Table 1. Product code GRS105/106/115/116/125/126 (continued)

Item	Characteristic	Characteristic value	Description
		09.1.	Software version 09.1.
33 ... 34	Maintenance version	00	Maintenance version 00
		XX	Current maintenance version

3.2. Device views

3.2.1. Front view

- *Front view GRS105-6F8F...* on page 31
- *Front view GRS105-6F8T...* on page 32
- *Front view GRS106-6F8F...* on page 33
- *Front view GRS106-6F8T...* on page 34
- *Front view GRS115-6F8F...* on page 35
- *Front view GRS115-6F8T...* on page 36
- *Front view GRS116-6F8F...* on page 37
- *Front view GRS116-6F8T...* on page 38
- *Front view GRS125-6F8F...* on page 39
- *Front view GRS125-6F8T...* on page 40
- *Front view GRS126-6F8F...* on page 41
- *Front view GRS126-6F8T...* on page 42

Front view GRS105-6F8F...

Figure 2.

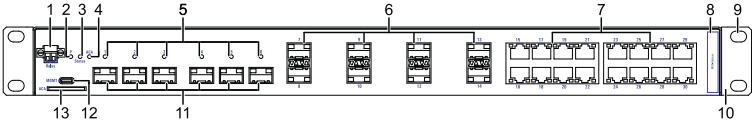


Table 2. Description of device elements

1	Signal contact	2-pin terminal block
2	Status LED Power (P)	
3	Status LED Device status (Status)	
4	Status LED AutoConfiguration Adapter (ACA)	
5	LED display elements (SFP slots Port group I)	
6	Port group II	8 × SFP slot for 1000 Mbit/s F/O connections
7	Port group III	16 × RJ45 socket for 10/100/1000 Mbit/s Twisted Pair connections
8	MAC address field	
9	Oblong hole	
10	Mounting bracket	
11	Port group I	6 × SFP slot for 1/2.5 Gbit/s F/O connections
12	Management interface (MGMT), USB Type-C socket	
13	SD card slot (ACA31)	

Front view GRS105-6F8T...

Figure 3.

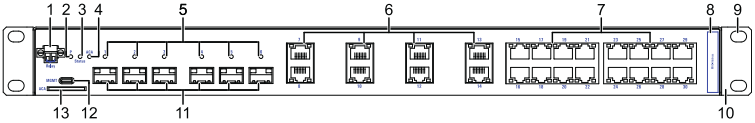


Table 3. Description of device elements

1	Signal contact	2-pin terminal block
2	Status LED Power (P)	
3	Status LED Device status (Status)	
4	Status LED AutoConfiguration Adapter (ACA)	
5	LED display elements (SFP slots Port group I)	
6	Port group II	8 × RJ45 socket for 100/1000 Mbit/s Twisted pair connections
7	Port group III	16 × RJ45 socket for 10/100/1000 Mbit/s Twisted Pair connections
8	MAC address field	
9	Oblong hole	
10	Mounting bracket	
11	Port group I	6 × SFP slot for 1/2.5 Gbit/s F/O connections
12	Management interface (MGMT), USB Type-C socket	
13	SD card slot (ACA31)	

Front view GRS106-6F8F...

Figure 4.

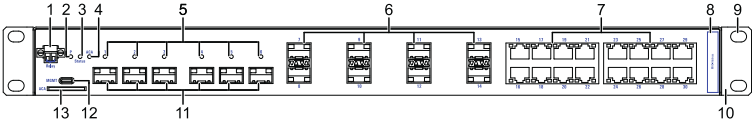


Table 4. Description of device elements

1	Signal contact	2-pin terminal block
2	Status LED Power (P)	
3	Status LED Device status (Status)	
4	Status LED AutoConfiguration Adapter (ACA)	
5	LED display elements (SFP slots Port group I)	
6	Port group II	8 × SFP slot for 1/2.5 Gbit/s F/O connections
7	Port group III	16 × RJ45 socket for 10/100/1000 Mbit/s Twisted Pair connections
8	MAC address field	
9	Oblong hole	
10	Mounting bracket	
11	Port group I	6 × SFP slot for 1/2.5/10 Gbit/s F/O connections
12	Management interface (MGMT), USB Type-C socket	
13	SD card slot (ACA31)	

Front view GRS106-6F8T...

Figure 5.

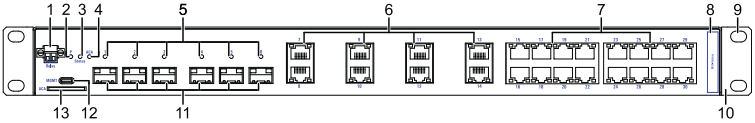


Table 5. Description of device elements

1	Signal contact	2-pin terminal block
2	Status LED Power (P)	
3	Status LED Device status (Status)	
4	Status LED AutoConfiguration Adapter (ACA)	
5	LED display elements (SFP slots Port group I)	
6	Port group II	8 × RJ45 socket for 100/1000/2500 Mbit/s Twisted pair connections
7	Port group III	16 × RJ45 socket for 10/100/1000 Mbit/s Twisted Pair connections
8	MAC address field	
9	Oblong hole	
10	Mounting bracket	
11	Port group I	6 × SFP slot for 1/2.5/10 Gbit/s F/O connections
12	Management interface (MGMT), USB Type-C socket	
13	SD card slot (ACA31)	

Front view GRS115-6F8F...

Figure 6.

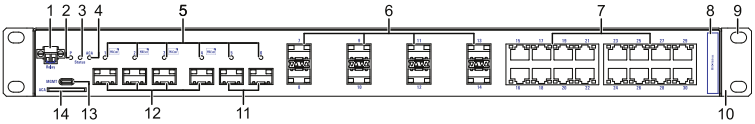


Table 6. Description of device elements

1	Signal contact	2-pin terminal block
2	Status LED Power (P)	
3	Status LED Device status (Status)	
4	Status LED AutoConfiguration Adapter (ACA)	
5	LED display elements (SFP slots Port group I)	
6	Port group II	8 × SFP slot for 1000 Mbit/s F/O connections
7	Port group III	16 × RJ45 socket for 10/100/1000 Mbit/s Twisted Pair connections
8	MAC address field	
9	Oblong hole	
10	Mounting bracket	
11	Port group I: Port 5-6	2 × SFP slot for 1/2.5 Gbit/s F/O connections
12	Port group I: Port 1-4	4 × SFP slot for 1 Gbit/s F/O connections (MACsec capable)
13	Management interface (MGMT), USB Type-C socket	
14	SD card slot (ACA31)	

Front view GRS115-6F8T...

Figure 7.

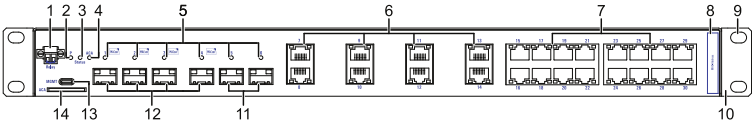


Table 7. Description of device elements

1	Signal contact	2-pin terminal block
2	Status LED Power (P)	
3	Status LED Device status (Status)	
4	Status LED AutoConfiguration Adapter (ACA)	
5	LED display elements (SFP slots Port group I)	
6	Port group II	8 × RJ45 socket for 100/1000 Mbit/s Twisted pair connections
7	Port group III	16 × RJ45 socket for 10/100/1000 Mbit/s Twisted Pair connections
8	MAC address field	
9	Oblong hole	
10	Mounting bracket	
11	Port group I: Port 5-6	2 × SFP slot for 1/2.5 Gbit/s F/O connections
12	Port group I: Port 1-4	4 × SFP slot for 1 Gbit/s F/O connections (MACsec capable)
13	Management interface (MGMT), USB Type-C socket	
14	SD card slot (ACA31)	

Front view GRS116-6F8F...

Figure 8.

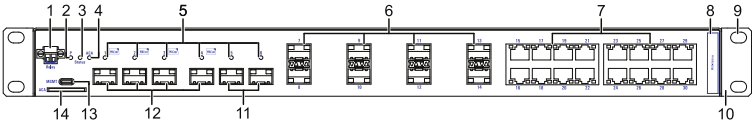


Table 8. Description of device elements

1	Signal contact	2-pin terminal block
2	Status LED Power (P)	
3	Status LED Device status (Status)	
4	Status LED AutoConfiguration Adapter (ACA)	
5	LED display elements (SFP slots Port group I)	
6	Port group II	8 × SFP slot for 1/2.5 Gbit/s F/O connections
7	Port group III	16 × RJ45 socket for 10/100/1000 Mbit/s Twisted Pair connections
8	MAC address field	
9	Oblong hole	
10	Mounting bracket	
11	Port group I: Port 5-6	2 × SFP slot for 1/2.5/10 Gbit/s F/O connections
12	Port group I: Port 1-4	4 × SFP slot for 1/10 Gbit/s F/O connections (MACsec capable)
13	Management interface (MGMT), USB Type-C socket	
14	SD card slot (ACA31)	

Front view GRS116-6F8T...

Figure 9.

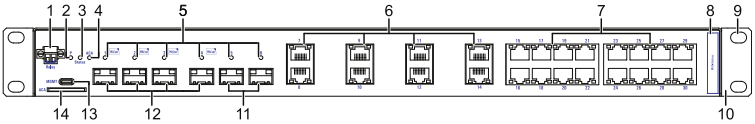


Table 9. Description of device elements

1	Signal contact	2-pin terminal block
2	Status LED Power (P)	
3	Status LED Device status (Status)	
4	Status LED AutoConfiguration Adapter (ACA)	
5	LED display elements (SFP slots Port group I)	
6	Port group II	8 × RJ45 socket for 100/1000/2500 Mbit/s Twisted pair connections
7	Port group III	16 × RJ45 socket for 10/100/1000 Mbit/s Twisted Pair connections
8	MAC address field	
9	Oblong hole	
10	Mounting bracket	
11	Port group I: Port 5-6	2 × SFP slot for 1/2.5/10 Gbit/s F/O connections
12	Port group I: Port 1-4	4 × SFP slot for 1/10 Gbit/s F/O connections (MACsec capable)
13	Management interface (MGMT), USB Type-C socket	
14	SD card slot (ACA31)	

Front view GRS125-6F8F...

Figure 10.

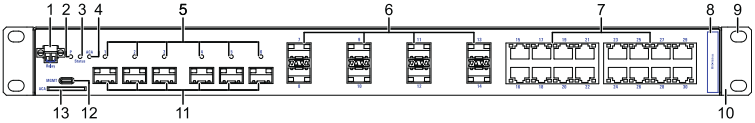


Table 10. Description of device elements

1	Signal contact	2-pin terminal block
2	Status LED Power (P)	
3	Status LED Device status (Status)	
4	Status LED AutoConfiguration Adapter (ACA)	
5	LED display elements (SFP slots Port group I)	
6	Port group II	8 × SFP slot for 1000 Mbit/s F/O connections
7	Port group III	16 × RJ45 socket for 10/100/1000 Mbit/s Twisted Pair connections (PoE++ capable)
8	MAC address field	
9	Oblong hole	
10	Mounting bracket	
11	Port group I	6 × SFP slot for 1/2.5 Gbit/s F/O connections
12	Management interface (MGMT), USB Type-C socket	
13	SD card slot (ACA31)	

Front view GRS125-6F8T...

Figure 11.

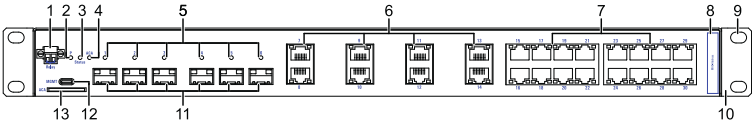


Table 11. Description of device elements

1	Signal contact	2-pin terminal block
2	Status LED Power (P)	
3	Status LED Device status (Status)	
4	Status LED AutoConfiguration Adapter (ACA)	
5	LED display elements (SFP slots Port group I)	
6	Port group II	8 × RJ45 socket for 100/1000 Mbit/s Twisted pair connections (PoE++ capable)
7	Port group III	16 × RJ45 socket for 10/100/1000 Mbit/s Twisted Pair connections (PoE++ capable)
8	MAC address field	
9	Oblong hole	
10	Mounting bracket	
11	Port group I	6 × SFP slot for 1/2.5 Gbit/s F/O connections
12	Management interface (MGMT), USB Type-C socket	
13	SD card slot (ACA31)	

Front view GRS126-6F8F...

Figure 12.

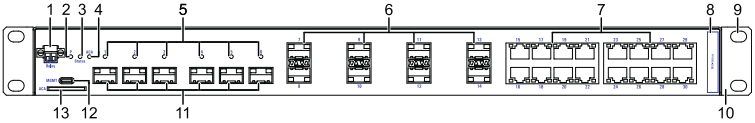


Table 12. Description of device elements

1	Signal contact	2-pin terminal block
2	Status LED Power (P)	
3	Status LED Device status (Status)	
4	Status LED AutoConfiguration Adapter (ACA)	
5	LED display elements (SFP slots Port group I)	
6	Port group II	8 × SFP slot for 1/2.5 Gbit/s F/O connections
7	Port group III	16 × RJ45 socket for 10/100/1000 Mbit/s Twisted Pair connections (PoE++ capable)
8	MAC address field	
9	Oblong hole	
10	Mounting bracket	
11	Port group I	6 × SFP slot for 1/2.5/10 Gbit/s F/O connections
12	Management interface (MGMT), USB Type-C socket	
13	SD card slot (ACA31)	

Front view GRS126-6F8T...

Figure 13.

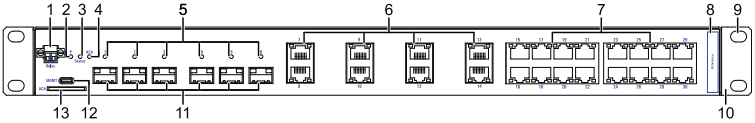
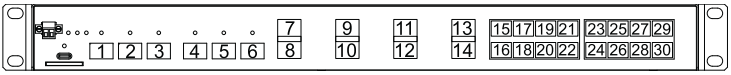


Table 13. Description of device elements

1	Signal contact	2-pin terminal block
2	Status LED Power (P)	
3	Status LED Device status (Status)	
4	Status LED AutoConfiguration Adapter (ACA)	
5	LED display elements (SFP slots Port group I)	
6	Port group II	8 × RJ45 socket for 100/1000/2500 Mbit/s Twisted pair connections (PoE++ capable)
7	Port group III	16 × RJ45 socket for 10/100/1000 Mbit/s Twisted Pair connections (PoE++ capable)
8	MAC address field	
9	Oblong hole	
10	Mounting bracket	
11	Port group I	6 × SFP slot for 1/2.5/10 Gbit/s F/O connections
12	Management interface (MGMT), USB Type-C socket	
13	SD card slot (ACA31)	

3.2.1.1. Port assignment

Figure 14. Port assignment: Front view; numbering sequence identical for all device variants



Port	Description
1 ... 6	Port group I
7 ... 14	Port group II
15 ... 30	Port group III

3.2.2. Rear view

For more information on the characteristic values, see *Device name and product code* on page 28.

Figure 15. Rear view: Power supply characteristic value G9 (non-redundant, 1 connector)

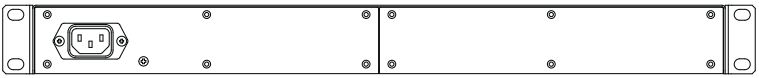


Figure 16. Rear view: Power supply characteristic value GG (redundant, 2 connectors)

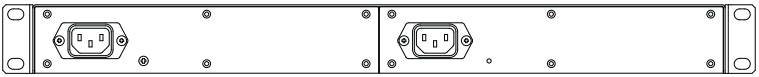


Figure 17. Rear view: Power supply characteristic value M9 (non-redundant, 1 connector)

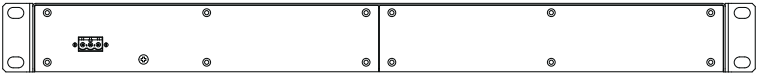


Figure 18. Rear view: Power supply characteristic value MM (redundant, 2 connectors)

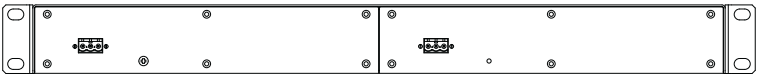


Figure 19. Rear view: Power supply characteristic value L9 (non-redundant, 1 connector)

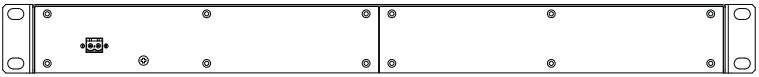
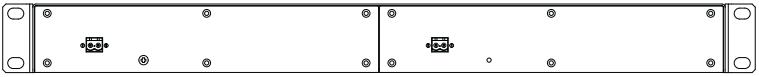


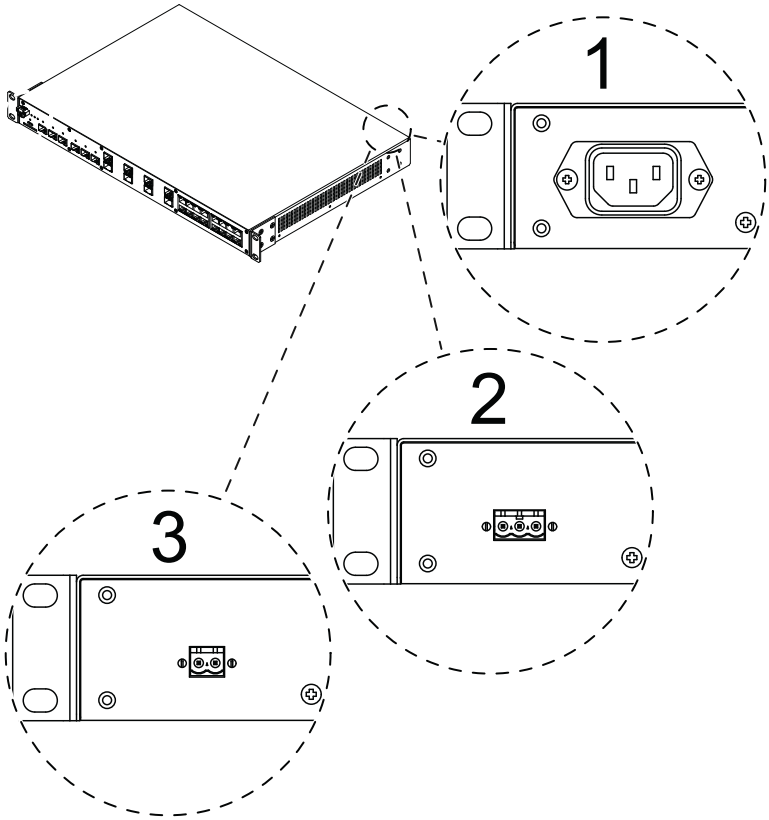
Figure 20. Rear view: Power supply characteristic value LL (redundant, 2 connectors)



3.3. Power supply

The following options for power supply are available:

Figure 21. Supply voltage: Supply voltage options, location on the device



Supply voltage variants - characteristic values[1]		
1	Value G:	Built-in C14 plug according to IEC 60320-1
2	Value M:	3-pin terminal block
3	Value L:	2-pin terminal block

The supply voltage can be connected redundantly. Both inputs are electrically isolated from each other. When 2 power supply units are used, the load is distributed. Without redundant supply, the power supply unit supplies the device on its own.

The supply voltage is electrically isolated from the casing. The power supply units are protected against polarity reversal.

1. For more information, see *Device name and product code* on page 28.

With a non-redundant supply of the supply voltage, the device reports the loss of a supply voltage. You can prevent this message by applying the supply voltage via both inputs, or by changing the configuration in the device management.

3.3.1. Supply voltage range 110 V AC ... 240 V AC

Corresponds to the supply voltage characteristic value **G**. For more information, see *Device name and product code* on page 28.

You have the option of supplying the supply voltage redundantly, with load distribution.

The supply voltage is electrically isolated from the casing.

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

Figure 22. Connection for non-heating appliance cable with built-in C14 plug (according to IEC 60320-1)

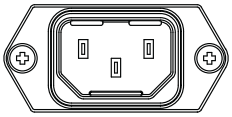


Table 14. Type and specification of the supply voltage

Type of the voltages that can be connected	Specification of the supply voltage
AC voltage	Rated voltage range 110 V AC ... 240 V AC, 50 Hz ... 60 Hz

3.3.2. Supply voltage range 110 V DC ... 250 V DC

Corresponds to the supply voltage characteristic value **M**. For more information, see *Device name and product code* on page 28.

You have the option of supplying the supply voltage redundantly, with load distribution.

Both supply voltage inputs are electrically isolated.

Figure 23. 3-pin terminal block with screw lock

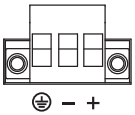


Table 15. Type and specification of the supply voltage, pin assignment on the device

Type of the voltages that can be connected	Specification of the supply voltage	Pin assignment	
DC voltage	Rated voltage range 110 V DC ... 250 V DC Voltage range including maximum tolerances 88 V DC ... 288 V DC	+ - ⏚	Plus terminal of the supply voltage Minus terminal of the supply voltage Protective conductor

3.3.3. Supply voltage range 24 V DC ... 48 V DC

Note: Exclusively supply your device with SELV/ES1 voltage.

Corresponds to the supply voltage characteristic value **L**. For more information, see *Device name and product code* on page 28.

You have the option of supplying the supply voltage redundantly, with load distribution.

Both supply voltage inputs are electrically isolated.

Figure 24. 2-pin terminal block with screw lock

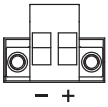


Table 16. Type and specification of the supply voltage, pin assignment on the device

Type of the voltages that can be connected	Specification of the supply voltage	Pin assignment	
DC voltage	Rated voltage range 24 V DC ... 48 V DC Voltage range including maximum tolerances 19.2 V DC ... 60 V DC	+ -	Plus terminal of the supply voltage Minus terminal of the supply voltage

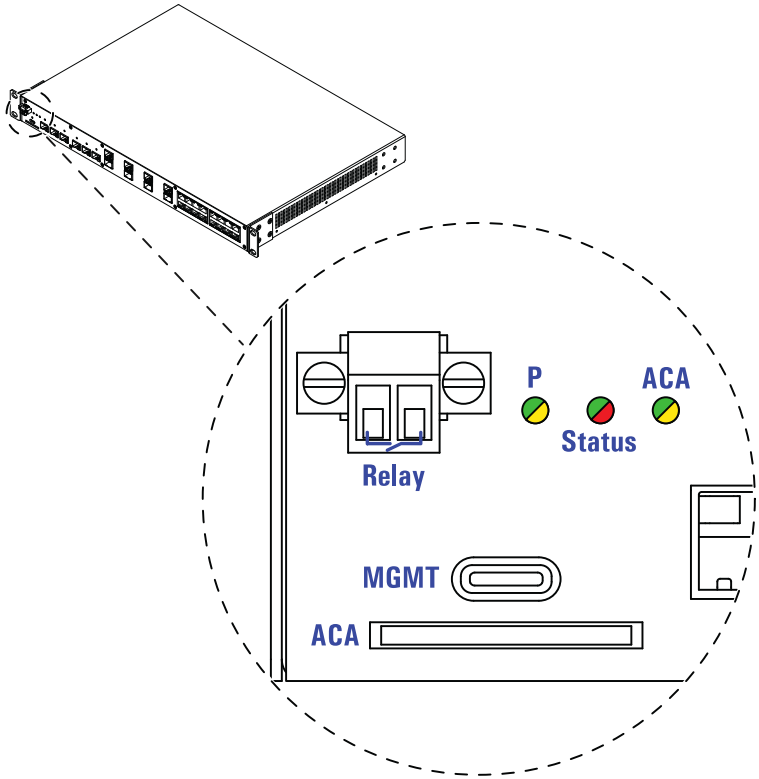
3.4. Management Interfaces

3.4.1. SD card interface

Prerequisite:

Only use Hirschmann SD cards.

Figure 25. SD card interface: Location on the device (front side of the device)



The SD card interface allows you to connect the AutoConfiguration Adapter ACA31 storage medium. This is used for saving/loading the configuration data and diagnostic information, and for loading the software.

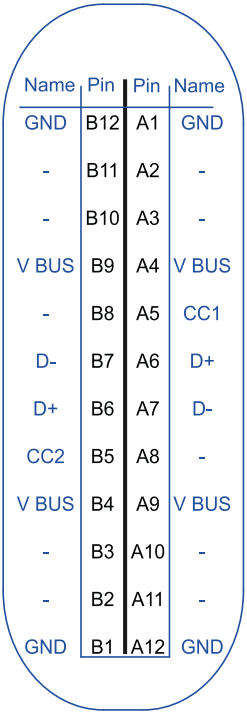
On the front of the device there is an LED display that informs you about the status of the interface. For more information, see *Device status* on page 57.

3.4.2. Management interface MGMT (external management)

Note: The MGMT interface exclusively supports CLI access via terminal emulation.

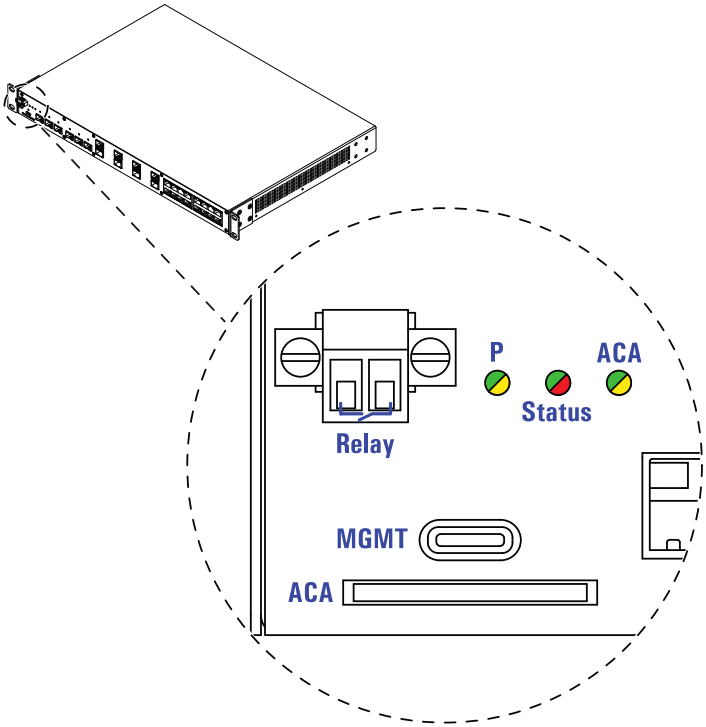
Note: When connecting an external USB-C to USB-C cable to the Management interface MGMT, the rotational symmetry feature of the connectors is not supported. For this reason, connections may not be operational. To fix this issue, remove the plugged-in USB-C connector from the device and plug it back in rotated by 180 °.

Figure 26. Management interface MGMT: Pin assignment of the USB-C interface.



This interface is a USB Type-C socket with shielding. This interface is electrically isolated from the power supply input.

Figure 27. Management interface MGMT: Location on the device (front side of the device)



The interface allows you to connect your device temporarily via terminal emulation or network to an external device using an adapter cable. The adapter cable is available as an accessory, see *Accessories* on page 119.

The interface allows you to configure, manage and check your device.

The interface has the following properties:

- Supports USB Device mode
- Supports USB 2.0 (data rate max. 480 Mbit/s)

VT100 terminal settings	
Speed	115200 Baud
Data	8 bit
Stopbit	1 bit

VT100 terminal settings	
Handshake	off
Parity	none

3.4.2.1. Configuration, management and checking via adapter cable

You have the option to configure, manage and check your device via the interface using an adapter cable. For more information, see the Manual Collection (User and Reference Manuals) at *https://www.doc.hirschmann.com*.

The adapter cable is available as an accessory, see *Accessories* on page 119.

Note: The interface is electrically isolated from the power supply input. Exclusively connect adapter cables temporarily. Adapter cables may exclusively be used to configure, manage and check your device.

3.5. Ethernet ports

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

Note: The port/slot speed available to you on each port group and the number of ports depends on the data rate characteristic value of your device variant and the individual types of the chosen port group(s). For more information, see item 6 in *Device name and product code* on page 28.

3.5.1. Twisted pair port 10/100/1000 Mbit/s

This port is an RJ45 socket.

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

This port supports:

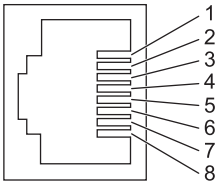
- Autonegotiation
- Autopolarity
- Autocrossing (if autonegotiation is activated)
- 10 Mbit/s half duplex mode, 10 Mbit/s full duplex mode
- 100 Mbit/s half duplex mode, 100 Mbit/s full duplex mode
- 1000 Mbit/s full duplex mode

Delivery state: Autonegotiation activated

The port casing is electrically connected to the front panel.

The pin assignment corresponds to MDI-X mode.

Table 17. Pin assignments of the 10/100/1000 Mbit/s twisted pair port in 1000 Mbit/s mode, RJ45 socket, MDI-X mode



Pin	Function
1	BI_DB+
2	BI_DB−
3	BI_DA+
4	BI_DD+
5	BI_DD−
6	BI_DA−
7	BI_DC+
8	BI_DC−

3.5.2. Twisted pair port 100/1000/2500 Mbit/s

This port is an RJ45 socket.

The 100/1000/2500 Mbit/s twisted pair port allows you to connect network components according to the IEEE 802.3 100BASE-TX/1000BASE-T and IEEE 802.3bz 2.5GBASE-T standards.

This port supports:

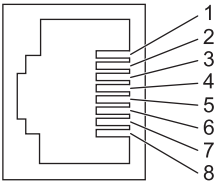
- Autonegotiation
- Autopolarity
- Autocrossing (if autonegotiation is activated)
- 100/1000/2500 Mbit/s full duplex

Delivery state: Autonegotiation activated

The port casing is electrically connected to the front panel.

The pin assignment corresponds to MDI-X.

Table 18. Pin assignments of 100/1000/2500 Mbit/s twisted pair port, RJ45 socket, MDI-X mode



Pin	Function
1	BI_DB+
2	BI_DB-
3	BI_DA+
4	BI_DD+
5	BI_DD-
6	BI_DA-
7	BI_DC+
8	BI_DC-

3.5.3. Support of PoE++

The device variants with technology type characteristic value 2 support Power over Ethernet (PoE++). For more information, see item 5 in *Device name and product code* on page 28. With PoE++ power supply, no additional external power supply is necessary.

You can identify PoE++ ports by the following symbol.

Table 19. Maximum power available to PoE++ end devices in total: 600 W, divided between the ports:

Device	Port range	Power
GRS12x-6F8F	15 ... 30	60 W
GRS12x-6F8T	7 ... 30	60 W

Connect only PoE-powered devices whose data connections are located in the interior of the building and are specified as SELV circuits according to IEC 60950-1 or ES1 circuits according to IEC/EN 62368-1.

The PoE support complies with the following technical standards:

Technical standard	Description			
IEEE 802.3af	PoE	Powered Device (PD)	max. Class 0 ... 3	12.95 W
		Power Sourcing Equipment (PSE)	max. Class 0 ... 3	15.4 W
IEEE 802.3at	PoE+	Powered Device (PD)	max. Class 4	25.5 W
		Power Sourcing Equipment (PSE)	max. Class 4	30 W
IEEE 802.3bt	PoE++	Powered Device (PD)	max. Class 5	40 W
		Power Sourcing Equipment (PSE)	max. Class 5	45 W
		Powered Device (PD)	max. Class 6	51 W
		Power Sourcing Equipment (PSE)	max. Class 6	60 W

3.5.3.1. 10/100/1000 Mbit/s PoE+/++ port

The 10/100/1000 Mbit/s PoE port allows you to connect network components as a Powered Device (PD) according to the standards IEEE 802.3 10BASE-T/100BASE-TX/1000BASE-T, IEEE 802.3af/at, and IEEE 802.3bt.

Table 20. Pin assignment RJ45 socket, MDI-X mode

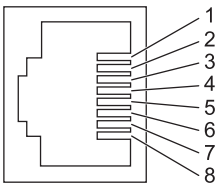
RJ45	Pin	Function	PoE+	PoE++
	1	BI_DB+	Negative V^{PSE}	Negative V^{PSE}
	2	BI_DB−	Negative V^{PSE}	Negative V^{PSE}
	3	BI_DA+	Positive V^{PSE}	Positive V^{PSE}
	4	BI_DD+	–	Positive V^{PSE}
	5	BI_DD−	–	Positive V^{PSE}

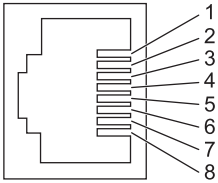
Table 20. Pin assignment RJ45 socket, MDI-X mode (continued)

RJ45	Pin	Function	PoE+	PoE++
	6	BI_DA−	Positive V^{PSE}	Positive V^{PSE}
	7	BI_DC+	–	Negative V^{PSE}
	8	BI_DC−	–	Negative V^{PSE}

3.5.3.2. 100/1000/2500 Mbit/s PoE+/++ port

The 100/1000/2500 Mbit/s PoE port allows you to connect network components as a Powered Device (PD) according to the standards IEEE 802.3 100BASE-TX/1000BASE-T, IEEE 802.3bz 2.5GBASE-T, IEEE 802.3at, and IEEE 802.3bt.

Table 21. Pin assignment RJ45 socket, MDI-X mode

RJ45	Pin	Function	PoE+	PoE++
	1	BI_DB+	Negative V^{PSE}	Negative V^{PSE}
	2	BI_DB−	Negative V^{PSE}	Negative V^{PSE}
	3	BI_DA+	Positive V^{PSE}	Positive V^{PSE}
	4	BI_DD+	–	Positive V^{PSE}
	5	BI_DD−	–	Positive V^{PSE}
	6	BI_DA−	Positive V^{PSE}	Positive V^{PSE}
	7	BI_DC+	–	Negative V^{PSE}
	8	BI_DC−	–	Negative V^{PSE}

3.5.4. F/O port 1/2.5 Gbit/s

This port is an SFP slot.

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

The port allows you to connect network components according to 2500BASE-X.

This port supports:
Full duplex mode

Delivery state:
1 Gbit/s full duplex when using a Gigabit Ethernet SFP transceiver, or
2.5 Gbit/s full duplex when using a 2.5 Gigabit Ethernet SFP transceiver.

Note: The 1/2.5 Gbit/s F/O ports of the current device versions are not capable of Fast Ethernet.

3.5.5. F/O port 1/2.5/10 Gbit/s

This port is an SFP slot.

The port allows you to connect network components according to the standards IEEE 802.3 1000BASE-SX/1000BASE-LX or IEEE 802.3 (Clause 49) 10GBASE-R.

This port supports:
Full duplex mode

Delivery state:
1 Gbit/s full duplex when using a Gigabit Ethernet SFP transceiver, or
2.5 Gbit/s full duplex when using a 2.5 Gigabit Ethernet SFP, or 10 Gbit/s full duplex when using a 10 Gigabit Ethernet SFP+ transceiver.

Note: The F/O ports of the current device versions are not capable of Fast Ethernet.

3.6. Display elements

After the supply voltage is set up, the software starts and initializes the device. Afterwards, the device performs a self-test. During this process, various LEDs light up.

3.6.1. Device status

This LED provides information about conditions which affect the operation of the whole device.

Figure 28. Device status: Location of the display elements on the device (front side of the device)

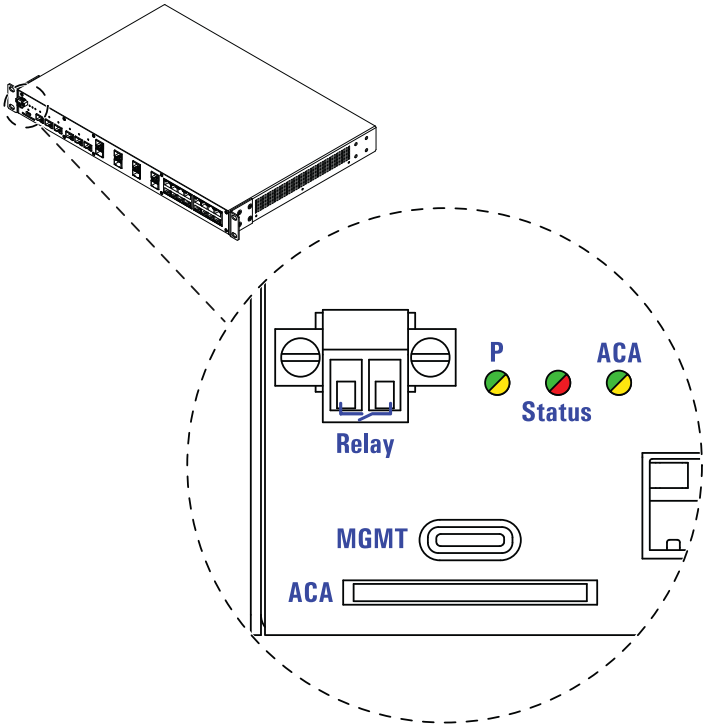


Table 22. Power LED: Color, activity and meaning

Color	Activity	Meaning
none	none	Supply voltage is too low or not available

Table 22. Power LED: Color, activity and meaning (continued)

Color	Activity	Meaning
yellow	lights up	Device variants with redundant power #supply Supply voltage 1 **or** 2 is on
yellow	flashes 4 × a period	Software update is running. Maintain the power supply
green	lights up	Device variants with redundant power #supply: Supply voltage 1 **and** 2 is on
green	lights up	Device variants with single power supply Supply voltage is on

Table 23. Status LED: Color, activity and meaning

Color	Activity	Meaning
none	none	Device is starting and/or is not ready for operation
red	lights up	Device is ready for operation Device has detected at least one error in the monitoring results
red	flashes 1 × a period	The boot parameters used when the device has been started differ from the boot parameters saved. Start the device again.
red	flashes 4 × a period	Device has detected duplicate IP address
red/ green	flashes alternately	Device is in recovery mode
green	lights up	Device is ready for operation Characteristics can be configured

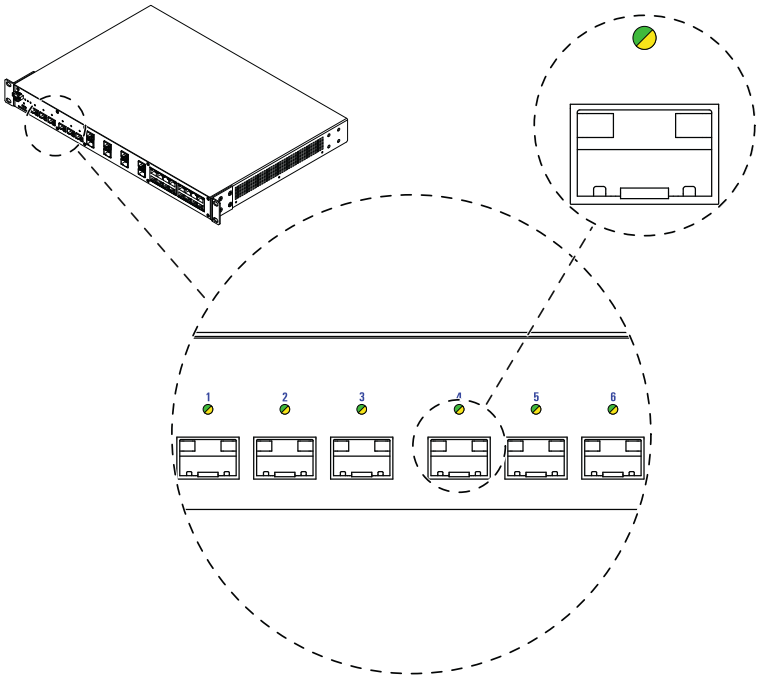
Table 24. ACA LED: Color, activity and meaning

Color	Activity	Meaning
none	none	ACA storage medium not connected
yellow	lights up	ACA is not ready for operation
green	lights up	ACA storage medium connected
green	flashes 3 × a period	Device writes to/reads from the storage medium

3.6.2. Port status

Port Group I

Figure 29. Port status: Location of the display elements of Port group I on the device (front side of the device)



Port Group II

Figure 30. Port status: Location of the display elements of Port group II on the device (front side of the device)

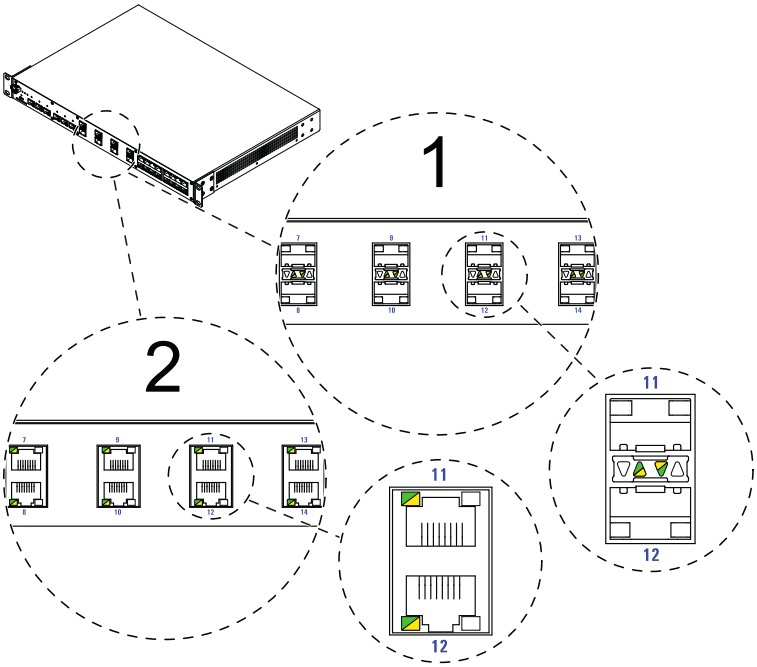


Table 25. Description of the display elements of Port group II.

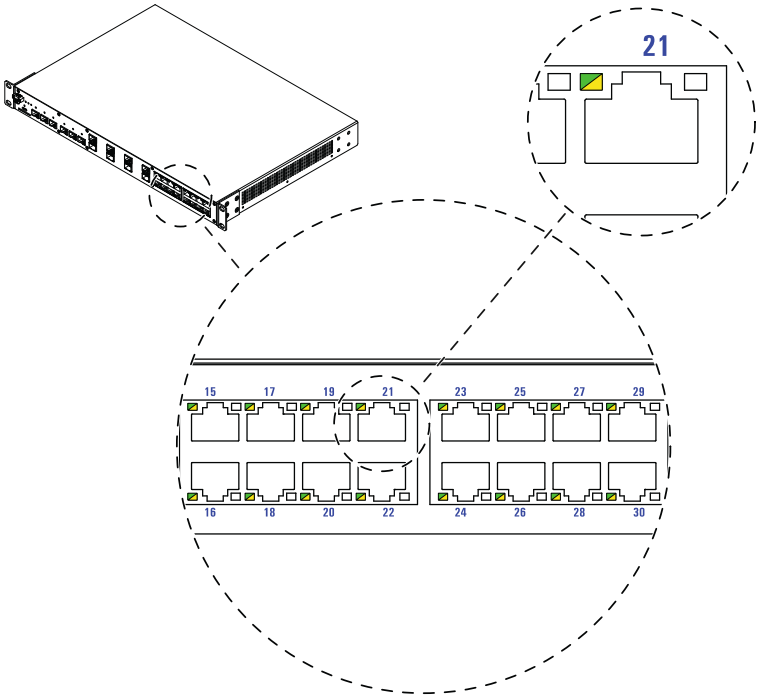
1	SFP slots[2]
2	RJ45 sockets[3]

2. For more information, see item 10 ... 11 in *Device name and product code* on page 28.

3. For more information, see item 10 ... 11 in *Device name and product code* on page 28.

Port Group III

Figure 31. Port status: Location of the display elements of Port group III on the device (front side of the device)



Port status LED

Table 26. Port status LED: Color, activity and meaning

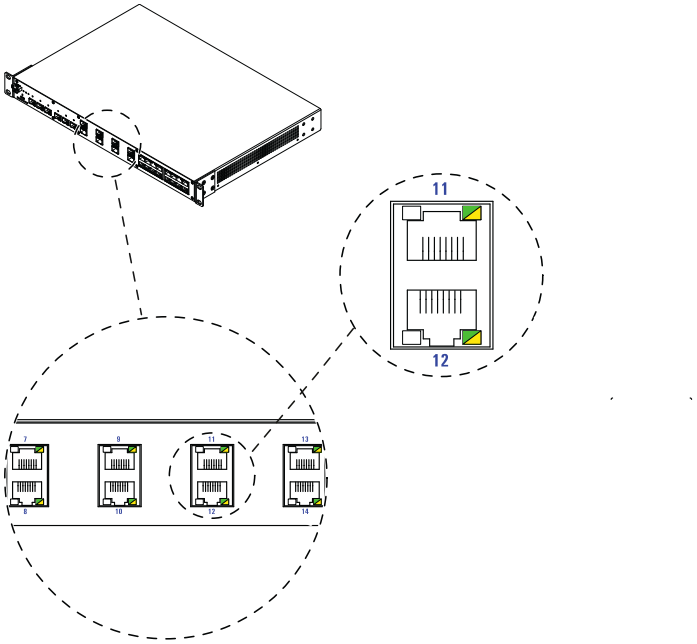
Color	Activity	Meaning
none	none	Device detects an invalid or missing link
yellow	flashing	Device is transmitting and/or receiving data
yellow	lights up	Device detects an unsupported SFP or a data rate mismatch
green	lights up	Device detects a valid link
green	flashes 1 × a period	Port is switched to stand-by

3.6.3. PoE status

PoE status display elements provide PoE-related information.

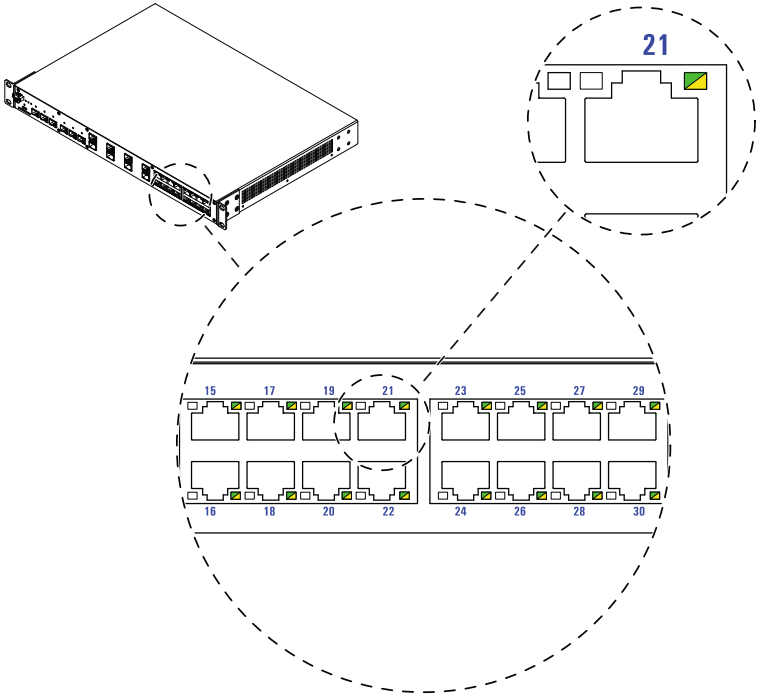
Port Group II

Figure 32. Port status: Location of the PoE status display elements of Port group II on the device (front side of the device)



Port Group III

Figure 33. Port status: Location of the PoE status display elements of Port group III on the device (front side of the device)



PoE status LED

Table 27. PoE status LED: Color, activity and meaning

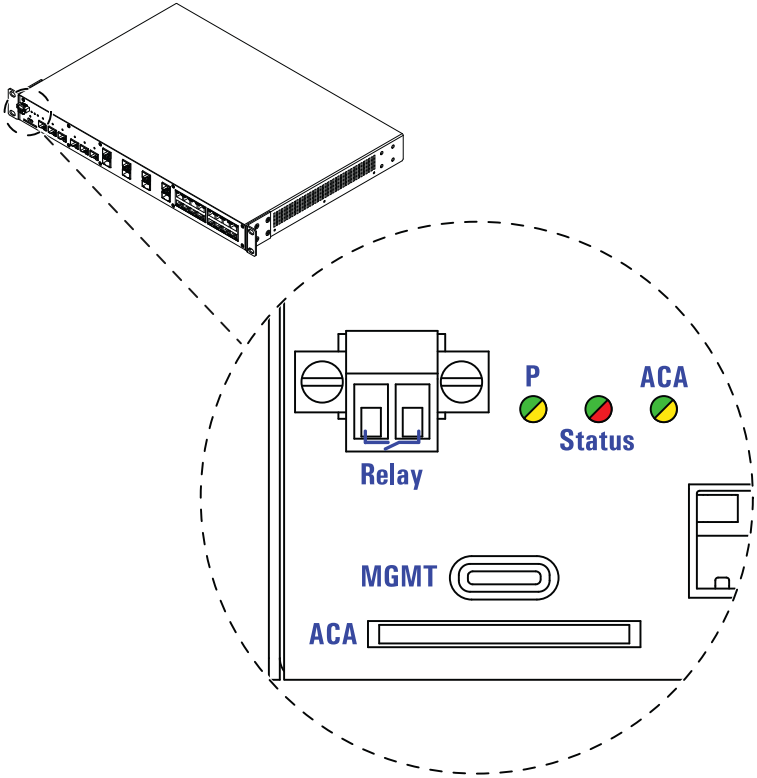
Color	Activity	Meaning
none	none	No powered device connected
yellow	flashes 1 × a period	Output budget has been exceeded Device has detected a connected powered device
yellow	flashes 3 × a period	PoE administrator status deactivated
green	lights up	Powered device is supplied with PoE voltage.

3.7. Input/output interfaces

3.7.1. Signal contact

Figure 34. Signal contact: 2-pin terminal block with screw locking casing

Figure 35. Signal contact: 2-pin terminal block with screw lock, location on the device (front of the device)



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

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 Manual Collection (User and Reference Manuals) at *https://www.doc.hirschmann.com*.

4. Installation

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

On delivery, the device is ready for operation.

To install and configure the device, perform the following work steps:

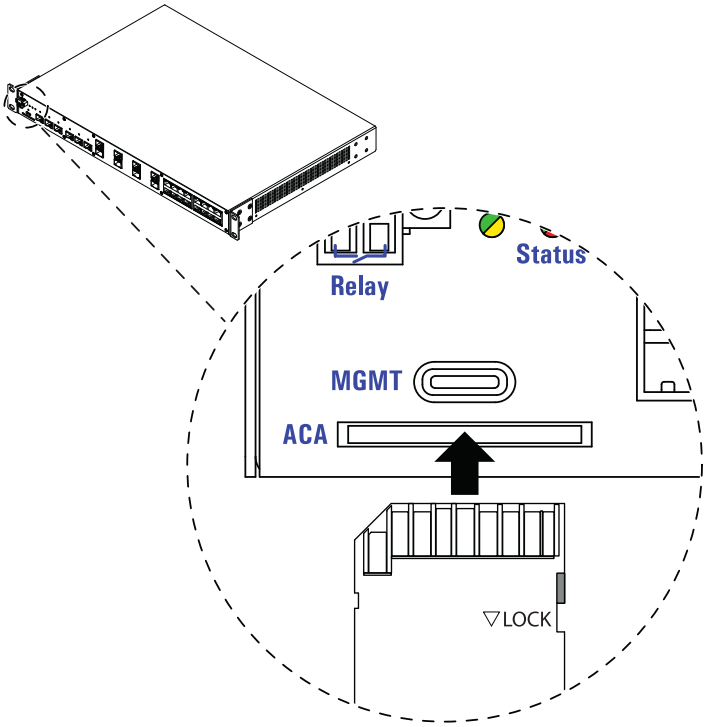
- *Checking the package contents* on page 66
- *Installing the SD card (optional)* on page 67
- *Selecting the installation location* on page 67
- *Mounting the device* on page 69
- *Grounding the device* on page 78
- *Installing an SFP transceiver (optional)* on page 79
- *Connecting data cables* on page 85
- *Filling out the inscription label* on page 86

4.1. Checking the package contents

- Check whether the package includes all items named in *Scope of delivery* on page 117.
- Check the individual parts for transport damage.

4.2. Installing the SD card (optional)

Figure 36. SD card interface: Location on the device (front side of the device)



Perform the following work steps:

- Deactivate the write protection on the SD card by pushing the write-protect lock towards the contacts of the card.
- Push the SD card into the slot with the beveled corner on the front left side.

4.3. Selecting the installation location

Select the assembly location according to the safety guidelines, see *Safety instructions* on page 13.

The device can be installed on a flat surface, vertically on a flat surface, or in a 19" standard switch cabinet.

When selecting the installation location, also make sure the following requirements are met:

- The installation location should be close to a power outlet.
- Adhere to the climatic threshold values listed in the technical data.
- Keep the ventilation slits free to ensure good air circulation.
- The installation location can be accessed for maintenance and repair work.
- The LED display elements are clearly visible.
- Twisted pair cables are at a sufficient distance from potential sources of electrical interference, such as power supply cables.
- The device has a separate power source with a ground connection. The power supply can be interrupted by means of a separate isolator or power switch. We recommend using overvoltage protection for all devices.

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

Table 28. Derating for different mounting positions

Mounting	Minimum clearance around the device casing	Temperature derating
Mounting in a switch cabinet (horizontal)	5 cm (2 in)	—
	0 cm (0 in)[4]	5 K
Mounting on a flat surface (horizontal)	5 cm (2 in)	—
Mounting on a vertical flat surface (ventilation slits at the top and bottom)	5 cm (2 in)	—

4. Only for distances to passive components.

4.4. Mounting the device

⚠ WARNING
ELECTRIC SHOCK **Failure to follow these instructions can result in death, serious injury, or equipment damage.** Never insert pointed objects (narrow screwdrivers, wires, etc.) into the device or into the connection terminals for electric conductors. Do not touch the connection terminals.

⚠ AVERTISSEMENT
CHOC ÉLECTRIQUE **Le non-respect de ces instructions peut entraîner la mort, des blessures graves ou des dommages matériels.** N'enfoncez jamais d'objets pointus (tournevis fins, fils ou autres) à l'intérieur de l'équipement ou dans les bornes de raccordement pour les cordons d'alimentation. Ne touchez pas aux bornes de raccordement.

⚠ WARNING

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

Exclusively install this device in a switch cabinet or in a restricted access location according to IEC/EN 62368-1, to which maintenance staff have exclusive access.

⚠ AVERTISSEMENT

CHOC ÉLECTRIQUE
Le non-respect de ces instructions peut entraîner la mort, des blessures graves ou des dommages matériels.

Installez cet équipement exclusivement dans une armoire électrique ou dans un emplacement à accès restreint conformément à la norme CEI/EN 62368-1, auquel seul le personnel de maintenance a accès.

⚠ CAUTION

OVERHEATING OF THE DEVICE
Failure to follow these instructions can result in minor injury or equipment damage.

Verify that all ventilation slots are clear when installing the device. Avoid touching the device while it is operating.

⚠ ATTENTION	
	SURCHAUFFE DE L'ÉQUIPEMENT **Le non-respect de ces instructions peut entraîner des blessures légères ou des dommages matériels.** Vérifiez que toutes les fentes d'aération sont dégagées lors de l'installation de l'équipement. Évitez de toucher l'équipement lorsqu'il est en marche.

You have the following option(s) for mounting your device:

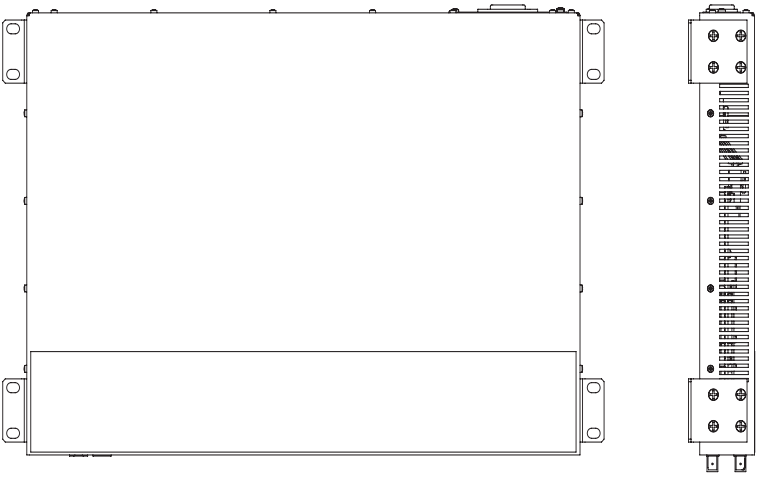
- *Mounting on a flat surface* on page 71
- *Mounting in a switch cabinet* on page 75
- *Mounting on a vertical flat surface* on page 73

4.4.1. Mounting on a flat surface

Prerequisites:

- Prepare the holes in the flat surface for mounting the device. For dimensions for drilling and mounting the device, see *Device variants GRS105/106/115/116/125/126* on page 101.
- Verify with the end user that the load-bearing capacity of the mounting points is in accordance with the weight, environment, and use case of the device.

Figure 37. Mounting on a flat surface



Perform the following work steps:

- Remove the screws on the pre-installed mounting brackets.
- Move the 2 pre-installed mounting brackets into the position shown in *Figure 37: Mounting on a flat surface* on page 72.
- Use the screws to secure the mounting brackets on the device.
- Attach 2 additional mounting brackets to the back of the device.

  You obtain the additional brackets as accessories, see *Accessories* on page 119.
- Fasten the device by screwing the brackets to the flat surface. Completely screw the device to the flat surface using screws through each mounting hole. Exclusively use screws suitable for the installation and application case to ensure flawless operation of the device.

Note: Optionally, the device can be rotated by 90° to optimize ventilation: Mount the device on a vertical flat surface with the ventilation slits at the top and bottom of the device. For more information, see *Mounting on a vertical flat surface* on page 73.

Note: The device may be used as a desktop device.

4.4.2. Mounting on a vertical flat surface

⚠ WARNING	
	FIRE HAZARD **Failure to follow these instructions can result in death, serious injury, or equipment damage.** Install the device in a fire enclosure according to IEC/ EN 62368-1 if you install the device vertically.

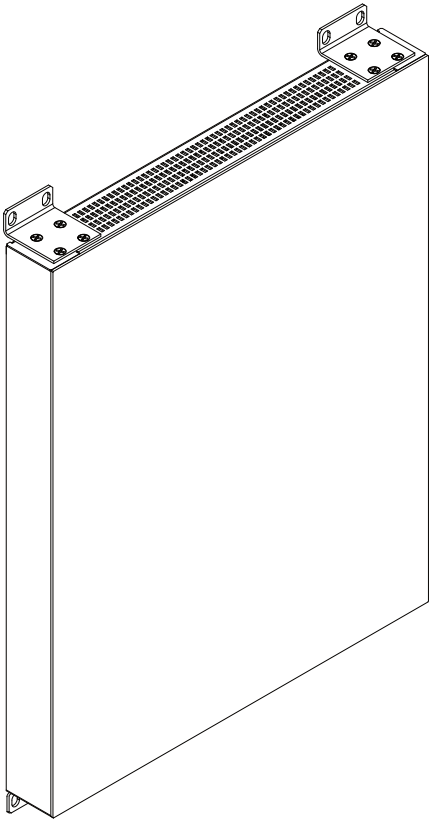
⚠ AVERTISSEMENT	
	RISQUE D'INCENDIE **Le non-respect de ces instructions peut entraîner la mort, des blessures graves ou des dommages matériels.** Installez l'équipement dans un boîtier coupe-feu conformément à la norme CEI/EN 62368-1 si vous installez l'équipement à la verticale.

Install the device in line with the criteria listed in *Mounting the device* on page 69.

Perform the following work steps:

- Remove the screws on the pre-installed mounting brackets.
- Move the 2 pre-installed mounting brackets on the front side into the position shown in *Mounting on a flat surface* on page 71.

Figure 38. Mounting vertically on a flat surface: Optional mounting on a vertical flat surface.



- Use the screws to secure the mounting brackets on the device.
- Attach 2 additional mounting brackets to the back of the device. For more information, see *Mounting on a flat surface* on page 71.

  You get the additional brackets as accessories, see *Accessories* on page 119.
- Fasten the device by screwing the brackets to the flat surface.

  Completely screw the device to the flat surface using screws through each mounting hole. Exclusively use screws suitable for the installation and application case to ensure flawless operation of the device.

4.4.3. Mounting in a switch cabinet

⚠ CAUTION	
	OVERHEATING OF THE DEVICE **Failure to follow these instructions can result in injury or equipment damage.** When installing the device, make sure any ventilation slots remain free. Maintain a clearance of at least 5 cm (2 in).

⚠ ATTENTION	
	SURCHAUFFE DE L'ÉQUIPEMENT **Le non-respect de ces instructions peut entraîner des blessures ou des dommages matériels.** Lors de l'installation de l'équipement, veillez à ce que les fentes d'aération restent dégagées. Laissez un espace libre d'au moins 5 cm.

Prerequisites:

- Install the device in the 19" switch cabinet using sliding or mounting rails.

  This provides a more stable position of your device in environments subject to vibration.

  For more information on sliding/mounting rails and how to install them, please contact your switch cabinet manufacturer.

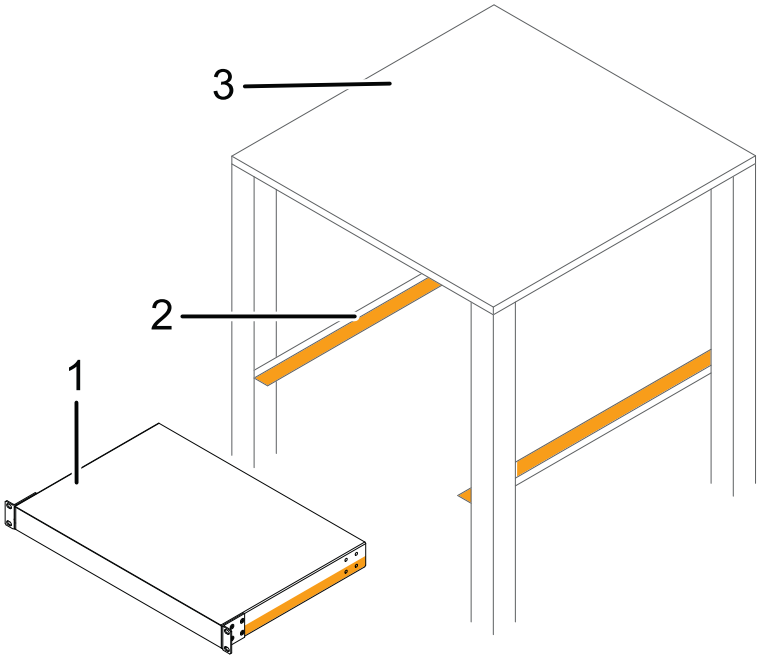
- The devices are designed to be mounted in a 19" switch cabinet.

  In the delivery state, there are 2 pre-mounted mounting brackets on the sides of the device.

- Ensure adequate ventilation. If necessary, install an additional fan in the switch cabinet to prevent the device from overheating.

- Measure the depth of the 19" cabinet so that all the lines to be connected can be fed in easily.

Figure 39. Assembly in a switch cabinet with sliding/ mounting rails

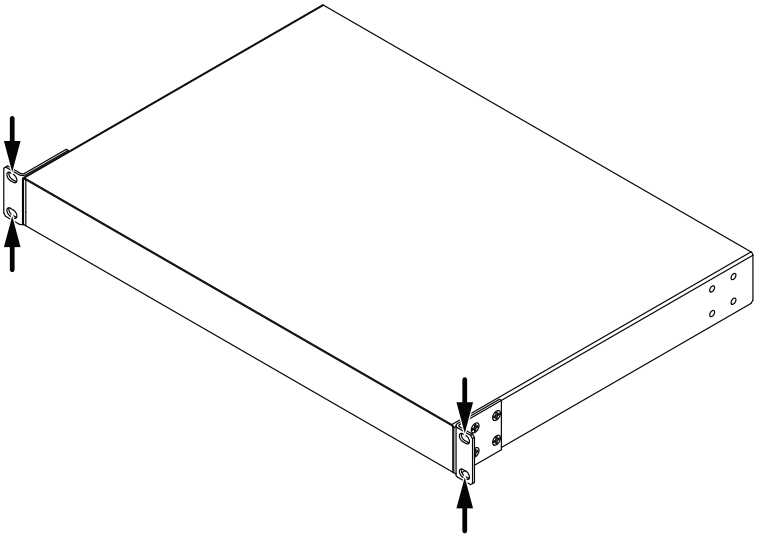


1	Device
2	Sliding/mounting rail
3	19" switch cabinet

Perform the following work steps:

- Assemble the sliding or mounting rails in the 19" switch cabinet as specified by the manufacturer.
- Position the device on the rails in the switch cabinet.
- Fasten the device in the switch cabinet by screwing it in with the mounting brackets.

Figure 40. Mounting in a switch cabinet: Mounting brackets with oblong holes



Note: When operating the device in an environment with continuous vibration loads, Hirschmann recommends to additionally fasten the device to the switch cabinet using 2 mounting brackets on the front or rear side of the device. Additional brackets are available as accessories, see *Accessories* on page 119.

4.5. Grounding the device

The power supply variants with characteristic value M9, MM, ML, G9, GG, and GL have a connection for protective grounding. For more information on the characteristic values, see *Device name and product code* on page 28.

The power supply variants with characteristic value L9 and LL have a connection for functional grounding.

Perform the following work steps:

- Ground the device via the grounding screw [5] with a tightening torque of 0.34 Nm (3 lb-in).

5. For grounding screw location, see *Grounding the device* on page 18.

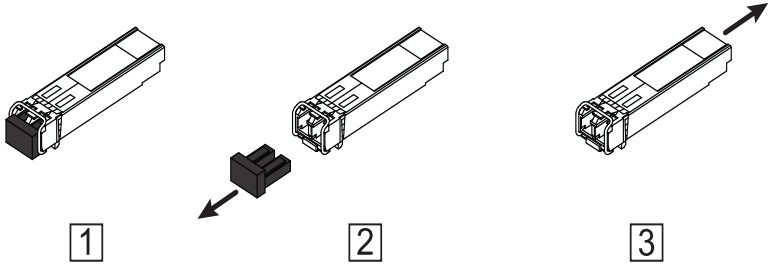
Note: The power supply variants with characteristic value G or M are grounded via the power supply connection and additionally via a grounding screw.

4.6. Installing an SFP transceiver (optional)

Prerequisites:

Exclusively use Hirschmann SFP transceivers. Transceivers are available as accessories, see *Accessories* on page 119.

Figure 41. Installing SFP transceivers: Installation sequence



Perform the following work steps:

- 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).

4.7. Connecting the signal contact

Perform the following work steps:

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

  For information on the prescribed tightening torque, see *General data* on page 97.

- Mount the terminal block on the device using screws.

4.8. Connecting the supply voltage

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

⚠ WARNING	
	ELECTRIC SHOCK **Failure to follow these instructions can result in death, serious injury, or equipment damage.** Connect only a supply voltage that corresponds to the type plate of your device.

⚠ AVERTISSEMENT	
	CHOC ÉLECTRIQUE **Le non-respect de ces instructions peut entraîner la mort, des blessures graves ou des dommages matériels.** Ne branchez qu'une tension d'alimentation correspondant à la plaque signalétique de votre équipement.

⚠ WARNING

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

Never insert pointed objects (narrow screwdrivers, wires, etc.) into the device or into the connection terminals for electric conductors.

Do not touch the connection terminals.

⚠ AVERTISSEMENT

CHOC ÉLECTRIQUE
Le non-respect de ces instructions peut entraîner la mort, des blessures graves ou des dommages matériels.

N'enfoncez jamais d'objets pointus (tournevis fins, fils ou autres) à l'intérieur de l'équipement ou dans les bornes de raccordement pour les cordons d'alimentation.

Ne touchez pas aux bornes de raccordement.

4.8.1. Supply voltage range 110 V DC ... 250 V DC

Corresponds to the supply voltage characteristic value **M**. For more information, see *Device name and product code* on page 28.

You have the option of supplying the supply voltage redundantly, with load distribution.

Both supply voltage inputs are electrically isolated.

Figure 42. 3-pin terminal block with screw lock

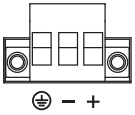


Table 29. Type and specification of the supply voltage, pin assignment on the device

Type of the voltages that can be connected	Specification of the supply voltage	Pin assignment	
DC voltage	Rated voltage range 110 V DC ... 250 V DC Voltage range including maximum tolerances 88 V DC ... 288 V DC	+ - ⏚	Plus terminal of the supply voltage Minus terminal of the supply voltage Protective conductor

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

- Remove the terminal block 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.

  For information on the prescribed tightening torque, see *General data* on page 97.

4.8.2. Supply voltage range 24 V DC ... 48 V DC

Note: Exclusively supply your device with SELV/ES1 voltage.

Corresponds to the supply voltage characteristic value **L**. For more information, see *Device name and product code* on page 28.

You have the option of supplying the supply voltage redundantly, with load distribution.

Both supply voltage inputs are electrically isolated.

Figure 43. 2-pin terminal block with screw lock

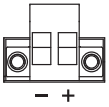


Table 30. Type and specification of the supply voltage, pin assignment on the device

Type of the voltages that can be connected	Specification of the supply voltage	Pin assignment	
DC voltage	Rated voltage range 24 V DC ... 48 V DC Voltage range including maximum tolerances 19.2 V DC ... 60 V DC	+ -	Plus terminal of the supply voltage Minus terminal of the supply voltage

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

- Remove the terminal block 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.

  For information on the prescribed tightening torque, see *General data* on page 97.

4.9. Operating the device

⚠ WARNING
ELECTRIC SHOCK **Failure to follow these instructions can result in death, serious injury, or equipment damage.** Exclusively connect the supply voltage that corresponds with the type plate of your device.

⚠ AVERTISSEMENT
CHOC ÉLECTRIQUE **Le non-respect de ces instructions peut entraîner la mort, des blessures graves ou des dommages matériels.** Ne branchez qu'une tension d'alimentation correspondant à la plaque signalétique de votre équipement.

Note: Observe the instructions in *General requirements for connecting electrical wires* on page 19.

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

Perform the following work steps:

- Plug the non-heating appliance cables into the device and a socket with an appropriate power source (supply voltage characteristic value G) and/or screw the terminal blocks onto the device (supply voltage characteristic value M or L).[6]

  For information on the prescribed tightening torque, see *General data* on page 97.

- Enable the supply voltage.

4.10. 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 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 ducts.
- 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.
- For best EMC performance, use shielded data cable, for example SF/UTP cables according to ISO/IEC 11801. To meet EN 50121-4, use shielded data cables at all transmission rates.
- Connect the data cables according to your requirements, see *Ethernet ports* on page 51.

Perform the following work steps:

- Connect the data cables.

6. For more information on the characteristic values, see *Device name and product code* on page 28.

Note: Verify that you connect only optical ports with the same optical transmission properties with each other.

4.11. Filling out the inscription label

The information field for the MAC address on the front of the device helps you to identify your device.

5. Basic settings

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

Perform the following work step:

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:

- Configuration via BOOTP
- Configuration via DHCP (Option 82)
- Configuration via DHCP (state on delivery)
- Configuration via USB-C interface
- AutoConfiguration Adapter ACA31
- Input via the Provize Explorer or Industrial HiVision application. You find further information about the applications Provize Explorer or Industrial HiVision at:

  Provize Explorer: *www.belden.com/get-ProvizeExplorer*

  Industrial HiVision: *https://www.belden.com/products/industrial-networking-cybersecurity/software-solutions/network-management-software/industrial-hivision-network-management-software*

For more information, see the Manual Collection (User and Reference Manuals) at *https://www.doc.hirschmann.com*.

5.1. Default settings

- Ethernet ports: link status is not evaluated (signal contact)
- IP address: The device looks for its IP address parameters using DHCP
- Management password:
  Login: user, password: public (read only)
  Login: admin, password: private (read/write)
- Optical 1000 Mbit/s ports: 1000 Mbit/s full duplex[7]
- All other ports: autonegotiation
- Rapid Spanning Tree Protocol (RSTP): enabled
- USB-C data rate: 115200 Baud
- Redundancy manager: disabled
- Ring redundancy: disabled
- Stand-by coupling: disabled

  Port 3 = control port, Port 4 = coupling port for redundant ring coupling

5.2. First login (Password change)

To help prevent undesired access to the device, it is imperative that you change the default password during initial setup.

7. Available port/slot speed depends on device variant.

Perform the following work steps:

- Open the Graphical User Interface, the Command Line Interface, or Provize Explorer the first time you log on to the device.
- Log on to the device with the default password "private". On successful login, the device prompts you to type in a new password.
- Type in your new password.

  To help increase security, choose a password that contains at least 8 characters which includes upper-case characters, lower-case characters, numerical digits, and special characters.
- Log on to the device again with your new password.

Note: If you lost your password, use the System Monitor to reset the password.

6. Monitoring ambient conditions

6.1. Monitoring the ambient air temperature

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

For more information, see *Climatic conditions during operation* on page 102.

The ambient air temperature is the temperature of the air at a distance of 5 cm (2 in) 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 (Command Line Interface) and the GUI (Graphical User Interface) 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.

Exclusively operate the device within the specified ambient air temperature range.

6.2. Monitoring the ambient humidity

Exclusively operate the device within the specified ambient humidity range.

For more information, see *General data* on page 97.

The humidity in the device is measured by an internal humidity sensor.
The measurements of the sensor may vary depending on the installation conditions of the device, for example the distance from other devices or other objects, and the thermal output of neighboring devices.

The measured humidity is displayed in the CLI and the GUI of the device.
The measured humidity is a guideline that indicates to you whether the rated humidity thresholds were reached or possibly have been exceeded.

For more information, see the Manual Collection (User and Reference Manuals) at *https://www.doc.hirschmann.com*.

7. Maintenance and service

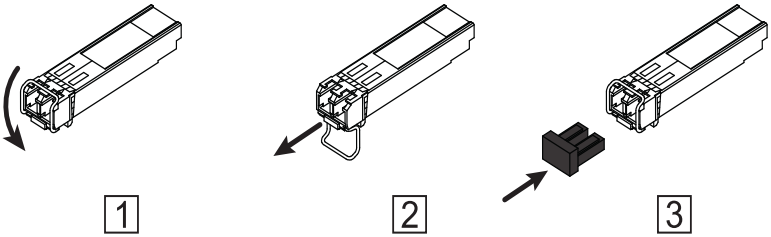
- When designing this device, Hirschmann largely avoided using high-wear parts. The parts subject to wear and tear are dimensioned to last longer than the lifetime of the product when it is operated normally. Operate this device according to the specifications.
- Relays are subject to natural wear. This 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 at:
  https://www.belden.com
- Depending on the pollution degree of the operating environment, check regularly that the cooling fins and surfaces of the device are not obstructed.
- Internal fuses are triggered only in the case of a detected error in the device. In case of damage or malfunction of the device, turn off the supply voltage and return the device to the plant for inspection.

You find information on settling complaints at:
https://my.belden.com

8. Disassembly

8.1. Removing an SFP transceiver (optional)

Figure 44. De-installing SFP transceivers: De-installation sequence

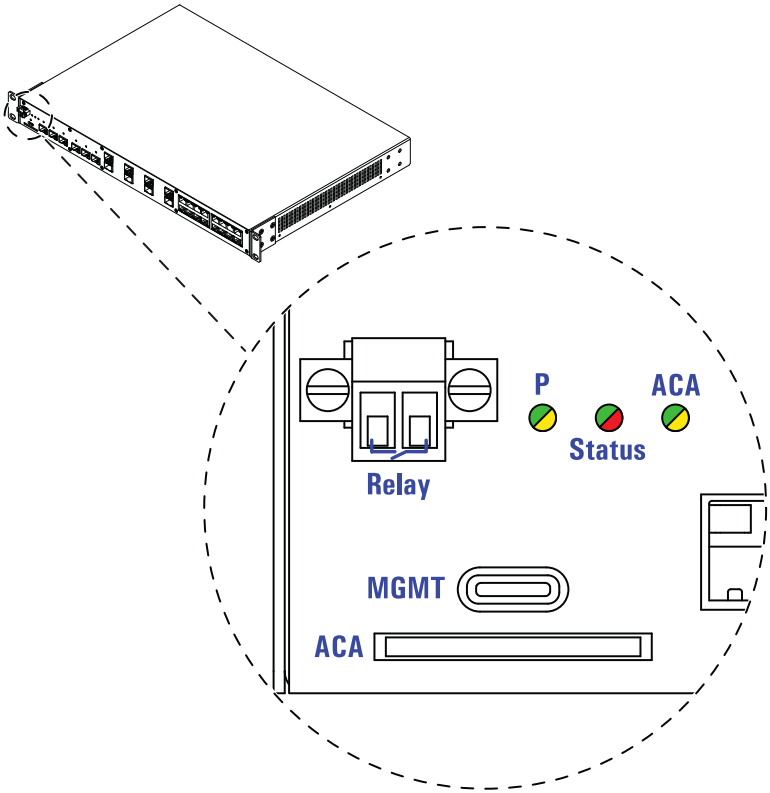


Perform the following work steps:

- 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).

8.2. Removing the SD card (optional)

Figure 45. SD card interface: Location on the device (front side of the device)



Perform the following work steps:

- Pull the SD card out of the SD card slot.

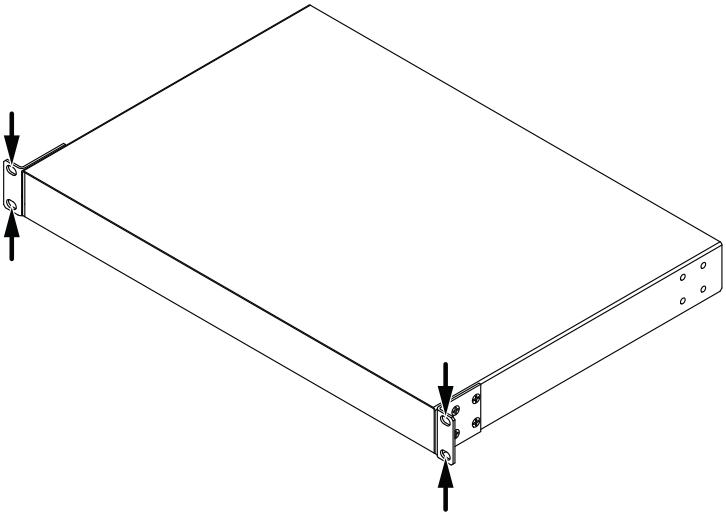
8.3. Removing the device

⚠ WARNING	
	ELECTRIC SHOCK **Failure to follow these instructions can result in death, serious injury, or equipment damage.** Disconnect the grounding only after disconnecting all other cables.

⚠ AVERTISSEMENT	
	CHOC ÉLECTRIQUE **Le non-respect de ces instructions peut entraîner la mort, des blessures graves ou des dommages matériels.** Ne débranchez la mise à la terre qu'après avoir débranché tous les autres câbles.

Perform the following work steps:

Figure 46. Removing the device: Mounting brackets with oblong holes



- Disconnect the data cables.
- Disable the supply voltage.

  Note: The device contains a built-in energy storage. When you disable the supply voltage, the device may thus continue to run for a few seconds before switching off.

- Disconnect the supply voltage.
- Remove terminal blocks and power supply cables from the device.
- Disconnect the grounding.
- To detach the device from a switch cabinet or a plain surface, remove the screws from the mounting brackets on the device.

9. Technical data

9.1. General data

Dimensions	*Device variants GRS105/106/115/116/125/126* on page 101	
Weight	GRS105/GRS106 with 1 Power supply unit	4.7 kg (10.36 lb)
	GRS115/GRS116 with 1 Power supply unit	
	GRS125/GRS126 with 1 Power supply unit	5.8 kg (12.79 lb)
	GRS105/GRS106 with 2 Power supply units	5.1 kg (11.24 lb)
	GRS115/GRS116 with 2 Power supply units	
	GRS125/GRS126 with 2 Power supply units	6.2 kg (13.67 lb)
Pollution degree	2	
Laser protection	Class 1 in compliance with IEC 60825-1	
Degree of protection	IP30	
Ground connection	Screw type	M3
	Tightening torque	0.34 Nm (3 lb-in)
	min. conductor cross-section	0.75 mm² (18 AWG)

9.2. Supply voltage

9.2.1. Supply voltage range 110 V AC ... 240 V AC

Table 31. Supply voltage

Power supply unit with supply voltage characteristic value G	Rated voltage	110 V AC ... 240 V AC, 50 Hz ... 60 Hz	
	Voltage range including maximum tolerances	88V AC ... 276 V AC	
	Connection type	Built-in connector for non-heating appliances (built-in C14 plug according to IEC 60320-1)	
		min. conductor cross-section	0.75 mm² (18 AWG)
		max. conductor cross-section	2.5 mm² (12 AWG)
	Power loss buffer	110 V AC: >26 ms 230 V AC: >140 ms	

Table 31. Supply voltage (continued)

Back-up fuse for each voltage input	Nominal rating: Characteristic:	20 A slow blow
Overload current protection on the device	Non-replaceable fuse	
Peak inrush current	<5 A	

9.2.2. Supply voltage range 110 V DC ... 250 V DC

Table 32. Supply voltage

Power supply unit with supply voltage characteristic value M	Rated voltage	110 V DC ... 250 V DC	
	Voltage range including maximum tolerances	88 V DC ... 288 V DC	
	Connection type	3-pin terminal block	
		Tightening torque	0.5 Nm (4.4 lb-in)
		min. conductor cross-section	1 mm² (16 AWG)
		max. conductor cross-section	2.5 mm² (12 AWG)
	Power loss buffer	110 V AC: >11 ms 250 V AC: >82 ms	
	Back-up fuse for each voltage input	Nominal rating:	20 A
		Characteristic:	slow blow
	Overload current protection on the device	Non-replaceable fuse	
	Peak inrush current	<5 A	

9.2.3. Supply voltage range 24 V DC ... 48 V DC

Corresponds to power supply characteristic value L in the product code.

Table 33. Supply voltage

Power supply unit with supply voltage characteristic value L	Rated voltage	24 V DC ... 48 V DC

Table 33. Supply voltage (continued)

Voltage range including maximum tolerances	19.2 V DC ... 60 V DC	
Connection type	2-pin terminal block	
	Tightening torque	0.34 Nm (3 lb-in)
	min. conductor cross-section	1 mm² (16 AWG)
	max. conductor cross-section	1.3 mm² (16 AWG)
Power loss buffer	20.4 V DC: >25 ms	
Back-up fuse for each voltage input	Nominal rating: Characteristic:	6.3 A slow blow
Overload current protection on the device	Non-replaceable fuse	
Peak inrush current	<7 A	

9.3. Power consumption/power output

Table 34. Power consumption/power output

Name	Powered Device (PD) connected		Maximum power consumption	Maximum power output
GRS105-...			31 W	107 Btu (IT)/h
GRS106-...			32 W	110 Btu (IT)/h
GRS115-...			42 W	143 Btu (IT)/h
GRS116-...			43 W	147 Btu (IT)/h
GRS125-...	without		34 W	116 Btu (IT)/h
GRS125-...	with 600 W	110 V AC	685 W	290 Btu (IT)/h
GRS125-...	with 600 W	240 V AC	667 W	229 Btu (IT)/h
GRS126-...	without		34 W	116 Btu (IT)/h
GRS126-...	with 600 W	110 V AC	685 W	290 Btu (IT)/h
GRS126-...	with 600 W	240 V AC	667 W	229 Btu (IT)/h

9.4. Signal contact

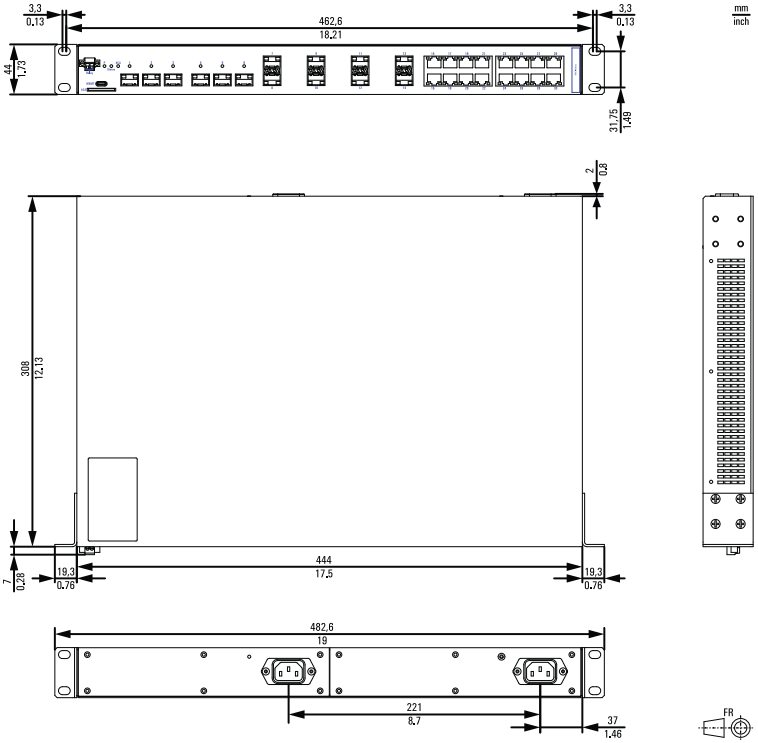
Table 35. Signal contact

Signal contact		
Nominal value	Switching current	max. 2 A, SELV/ES1
	Switching voltage	max. 30 V DC or max. 30 V AC, SELV/ES1
Connection type	2-pin terminal block	
	Tightening torque	0.34 Nm (3 lb-in)
	min. conductor cross-section	0.08 mm² (AWG28)
	max. conductor cross-section	2.5 mm² (AWG12)

9.5. Dimension drawings

9.5.1. Device variants GRS105/106/115/116/125/126

Figure 47. Dimension drawing: Example of GRS106-6F8F16TSGG



9.6. Climatic conditions during operation

Table 36. Climatic conditions during operation

Ambient air temperature[8]	Standard up to 2000 m ASL (6562 ft ASL)	-10 °C ... +60 °C (+14 °F ... +140 °F)
	2000 m ASL ... 3000 m ASL (6560 ft ASL ... 9842 ft ASL)	-10 °C ... +50 °C (+14 °F ... +122 °F)
	3000 m ASL ... 4000 m ASL (9842 ft ASL ... 13123 ft ASL)	-10 °C ... +45 °C (+14 °F ... +113 °F)

Note: Note the following de-ratings due to:

- Mounting, see *Selecting the installation location* on page 67.
- SFP Transceiver, see *Derating depending on SFP transceiver class* on page 103.

Maximum internal air temperature[9]	+75 °C (+167 °F)
Humidity	5 % ... 95 % (non-condensing)
Air pressure	min. 600 hPa (+4000 m ASL; +13123 ft ASL) max. 1060 hPa (-400 m ASL; -1312 ft ASL)

9.7. Climatic conditions during storage

Table 37. Climatic conditions during storage

Ambient temperature	-40 °C ... +85 °C (-40 °F ... +185 °F)	up to 3 months
	-40 °C ... +70 °C (-40 °F ... +158 °F)	up to 1 year
	-40 °C ... +50 °C (-40 °F ... +122 °F)	up to 2 years
	0 °C ... +30 °C (+32 °F ... +86 °F)	up to 10 years

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

9. Temperature measured by the temperature sensor within the device.

Table 37. Climatic conditions during storage (continued)

Humidity	1 % ... 95 % (non-condensing)
Air pressure	min. 540 hPa (+5000 m ASL; +16404 ft ASL) max. 1060 hPa (-400 m ASL; -1312 ft ASL)

9.8. Derating

Only use SFP transceivers with EEC extension for GRS105/106/115/116/125/126 device variants. The derating specifications in *Derating depending on SFP transceiver class* on page 103 only apply to SFP transceivers with EEC extension.

SFP transceivers become warm during operation. Depending on the type and number of SFP transceivers used, deratings are in place to keep the internal device temperature within permissible limits. If applicable, subtract the temperature derating in Kelvin (K) from the maximum device temperature in degrees Celsius (°C) to get the individual maximum operating temperature for your device. For derating purposes, SFP transceivers are classed into High Power (HP) and Low Power (LP) variants. For more information on the classification, see *Derating depending on SFP transceiver class* on page 103.

9.8.1. Derating depending on SFP transceiver class

Table 38. Derating for device variants GRS11x-6F8T...

Derating	GRS115	GRS116
0 SFP	—	—
2-6 SFP class LP	—	—
2 SFP class HP [10]	—	—
4 SFP class HP [10]	5 K	5 K
6 SFP class HP [10]	10 K	10 K

10. The derating is not influenced by the number of LP SFP transceivers used.

Table 39. Derating for device variants GRS11x-6F8F...

Derating	GRS115	GRS116
0 SFP	—	—
2-14 SFP class LP	—	—
2 SFP class HP [10]	—	—
4 SFP class HP [10]	—	5 K
6 SFP class HP [10]	5 K	10 K
8 SFP class HP [10]	10 K	10 K
>8 SFP class HP [10]	15 K	15 K

9.8.1.1. Power class classification of SFP transceivers

Table 40. Classification of Gigabit Ethernet (1000 Mbit/s) SFP transceivers

Product code	SFP power class	Order number
M-SFP-TX/RJ45 EEC	HP	942161001
M-SFP-TX/RJ45	HP	943977001
M-SFP-SX/LC	LP	943014001
M-SFP-SX/LC EEC	LP	943896001
M-SFP-MX/LC EEC	HP	942108001
M-SFP-LX/LC	LP	943015001
M-SFP-LX/LC EEC	LP	943897001
M-SFP-LX+/LC	LP	942023001
M-SFP-LX+/ LC EEC	LP	942024001
M-SFP-LH/LC	HP	943042001
M-SFP-LH/LC EEC	HP	943898001
M-SFP-LH+/LC EEC	HP	942119001
SFP-GIG-LX/LC	HP	942196001
SFP-GIG-LX/LC EEC	HP	942196002

Table 41. Classification of 2.5 Gigabit Ethernet (2500 Mbit/s) SFP transceivers

Product code	SFP power class	Order number
M-SFP-2.5-MM/LC EEC	LP	942162001
M-SFP-2.5-SM-/LC EEC	HP	942163001
M-SFP-2.5-SM/LC EEC	HP	942164002
M-SFP-2.5-LH/LC	HP	942220001
M-SFP-2.5-SM+/LC	HP	942331001

Table 42. Classification of 10 Gigabit Ethernet SFP+ transceivers

Product code	SFP power class	Order number
M-SFP-10-SR/LC-EEC	LP	942210001
M-SFP-10-LR/LC-EEC	HP	942211001
M-SFP-10-ER/LC-EEC	HP	942212001
SFP-10-DAC-05m	LP	942280001
SFP-10-DAC-1m	LP	942280002
SFP-10-DAC-2m	LP	942280003
SFP-10-DAC-4m	LP	942280004

Table 43. Classification of bidirectional Gigabit Ethernet SFP transceivers

Bidirectional Gigabit Ethernet SFP transceiver	SFP power class	Order number
M-SFP-BIDI Type A LX/LC EEC	HP	943974001
M-SFP-BIDI Type B LX/LC EEC	HP	943974002
M-SFP-BIDI Type A LH/LC EEC	HP	943975001
M-SFP-BIDI Type B LH/LC EEC	HP	943975002
M-SFP-BIDI Bundle LX/LC EEC (Type A + B)	HP	943974101
M-SFP-BIDI Bundle LH/LC EEC (Type A + B)	HP	943975101
SFP-GIG-BA LX/LC EEC	HP	942207001
SFP-GIG-BB LX/LC EEC	HP	942207002
SFP-GIG-BA LX+/LC EEC	HP	942208001
SFP-GIG-BB LX+/LC EEC	HP	942208002

9.9. Electromagnetic compatibility (EMC)

Note: Use shielded data cables for gigabit transmission via copper cables. Use shielded Cat6 Ethernet cables for 2.5 Gbit/s transmission rates via copper cables. Use shielded data cables for all transmission rates to meet the requirements according to EN 50121-4.

9.9.1. EMC interference emission

Table 44. EMC interference emission: Standard applications

Applicable standard	
Radiated emission	
FCC 47 CFR Part 15	Class A
EN 55032	Class A
EN 61000-6-4	
Conducted emission	
FCC 47 CFR Part 15	Class A
EN 55032	Class A
EN 61000-6-4	

Table 45. EMC interference emission: Railway applications (trackside)

Applicable standard	
Radiated emission	
FCC 47 CFR Part 15	Class A
EN 55032	Class A
EN 61000-6-4	
Conducted emission	
FCC 47 CFR Part 15	Class A
EN 55032	Class A
EN 61000-6-4	

9.9.2. EMC interference immunity

Table 46. Immunity: Standard applications

Applicable standard		
IEC 60068-2-6, test Fc	Vibration	5 Hz ... 8.4 Hz with 3.5 mm (0.14 in) amplitude
IEC 60068-2-6, test Fc	Vibration	8.4 Hz ... 150 Hz with 1 g
IEC 60068-2-27, test Ea	Shock	15 g at 11 ms

Table 47. EMC interference immunity: Standard applications

According to EN 61000-6-2

Applicable standard		
Electrostatic discharge		
EN 61000-4-2	Contact discharge	±4 kV
EN 61000-4-2	Air discharge	±8 kV
Electromagnetic field		
EN 61000-4-3	80 MHz ... 6000 MHz	max. 10 V/m
Fast transients (burst)		
EN 61000-4-4	Power supply connection	±2 kV
EN 61000-4-4	Data line	±1 kV
Voltage surges - AC supply connection		
EN 61000-4-5	line/ground	±2 kV
EN 61000-4-5	line/line	±1 kV
Voltage surges - data line		
EN 61000-4-5	line/ground	±1 kV
Conducted disturbances		
EN 61000-4-6	150 kHz ... 80 MHz	10 V

Table 48. EMC interference immunity: Railway applications (trackside)

According to EN 50121-4

Applicable standard		
Electrostatic discharge		
EN 61000-4-2	Contact discharge	±6 kV

Table 48. EMC interference immunity: Railway applications (trackside)

According to EN 50121-4

(continued)

Applicable standard		
EN 61000-4-2	Air discharge	±8 kV
Electromagnetic field		
EN 61000-4-3	800 MHz ... 6000 MHz	max. 20 V/m
Fast transients (burst)		
EN 61000-4-4	Power supply connection	±2 kV
EN 61000-4-4	Data line	±2 kV
Voltage surges - AC supply connection		
EN 61000-4-5	line/ground	±2 kV
EN 61000-4-5	line/line	±1 kV
Voltage surges - data line		
EN 61000-4-5	line/ground	±2 kV
Conducted disturbances		
EN 61000-4-6	150 kHz ... 80 MHz	10 V

9.10. Network range

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

9.10.1. Twisted pair port 10/100/1000 Mbit/s

Table 49. Network range: 10/100/1000 Mbit/s twisted pair port

10/100/1000 Mbit/s twisted pair port	
Length of a twisted pair segment	max. 100 m (328 ft) (for Cat5e cable)

9.10.2. Twisted pair port 100/1000/2500 Mbit/s

Table 50. Network range: 100/1000/2500 Mbit/s twisted pair port

100/1000/2500 Mbit/s twisted pair port	
Length of a twisted pair segment	max. 100 m (328 ft) (for Cat5e cable)

9.10.3. Gigabit Ethernet SFP transceiver

Table 51. F/O port 100/1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver)

Product code	Mode[11]	Wave length	Fiber	System attenuation	Example for F/O cable length[12]	Fiber attenuation	BLP[13]/Dispersion
M-SFP-SX/LC...	MM	850 nm	50/125 µm	0 dB ... 7.5 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	3.0 dB/km	400 MHz×km
M-SFP-SX/LC...	MM	850 nm	62.5/125 µm	0 dB ... 7.5 dB	0 km ... 0.275 km (0 mi ... 0.17 mi)	3.2 dB/km	200 MHz×km
M-SFP-MX/LC...	MM	1310 nm	50/125 µm	0 dB ... 12 dB	0 km ... 1.5 km (0 mi ... 0.93 mi)	1.0 dB/km	800 MHz×km
M-SFP-MX/LC...	MM	1310 nm	62.5/125 µm	0 dB ... 12 dB	0 km ... 0.50 km (0 mi ... 0.31 mi)	1,0 dB/km	500 MHz×km
M-SFP-LX/LC...	MM	1310 nm[14]	50/125 µm	0 dB ... 10.5 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	1.0 dB/km	800 MHz×km
M-SFP-LX/LC...	MM	1310 nm[15]	62.5/125 µm	0 dB ... 10.5 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	1.0 dB/km	500 MHz×km
M-SFP-LX/LC...	SM	1310 nm	9/125 µm	0 dB ... 10.5 dB	0 km ... 20 km (0 mi ... 12.43 mi)[16]	0.4 dB/km	3.5 ps/(nm×km)

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

Table 51. F/O port 100/1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver) (continued)

Product code	Mode[11]	Wave length	Fiber	System attenuation	Example for F/O cable length[12]	Fiber attenuation	BLP[13]/Dispersion
M-SFP-LX+/LC...	SM	1310 nm	9/125 µm	5 dB ... 20 dB	14 km ... 42 km (8.70 mi ... 26.10 mi)	0.4 dB/km	3.5 ps/(nm×km)
M-SFP-LH/LC...	LH	1550 nm	9/125 µm	5 dB ... 22 dB	23 km ... 80 km (14.29 mi ... 49.71 mi)	0.25 dB/km	19 ps/(nm×km)
M-SFP-LH+/LC	LH	1550 nm	9/125 µm	15 dB ... 30 dB	71 km ... 108 km (44.12 mi ... 67.11 mi)	0.25 dB/km	19 ps/(nm×km)
M-SFP-LH+/LC	LH	1550 nm	9/125 µm	15 dB ... 30 dB	71 km ... 128 km (44.12 mi ... 79.54 mi)	0.21 dB/km (typically)	19 ps/(nm×km)
M-SFP-LH+/LC...	LH	1550 nm	9/125 µm	13 dB ... 32 dB	62 km ... 116 km (38.52 mi ... 72.07 mi)	0.25 dB/km	19 ps/(nm×km)
M-SFP-LH+/LC...	LH	1550 nm	9/125 µm	13 dB ... 32 dB	62 km ... 138 km (38.52 mi ... 85.75 mi)	0.21 dB/km (typically)	19 ps/(nm×km)
SFP-GIG-LX/LC...	MM	1310 nm[17]	50/125 µm	0 dB ... 10.5 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	1.0 dB/km	800 MHz×km
SFP-GIG-LX/LC...	MM	1310 nm[18]	62.5/125 µm	0 dB ... 10.5 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	1.0 dB/km	500 MHz×km

11. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul

12. Including 3 dB system reserve when compliance with the fiber data is observed.

13. Using the bandwidth-length product is inappropriate for expansion calculations.

17. With F/O adapter compliant with IEEE 802.3-2002 Clause 38 (single-mode fiber offset-launch mode conditioning patch cord).

18. With F/O adapter compliant with IEEE 802.3-2002 Clause 38 (single-mode fiber offset-launch mode conditioning patch cord).

Table 51. F/O port 100/1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver) (continued)

Product code	Mode[11]	Wave length	Fiber	System attenuation	Example for F/O cable length[12]	Fiber attenuation	BLP[13]/Dispersion
SFP-GIG-LX/LC...	SM	1310 nm	9/125 µm	0 dB ... 10.5 dB	0 km ... 20 km (0 mi ... 12.43 mi)[19]	0.4 dB/km	3.5 ps/(nm×km)

9.10.4. Bidirectional Gigabit Ethernet SFP transceiver

Table 52. F/O port (bidirectional Gigabit Ethernet SFP transceiver)

Product code	Mode[20]	Wave length TX	Wave length RX	Fiber	System attenuation	Example for F/O cable length[21]	Fiber attenuation	BLP/Dispersion
M-SFP-BIDI Type A LX/LC EEC	SM	1310 nm	1550 nm	9/125 µm	0 dB ... 11 dB	0 km ... 20 km (0 mi ... 12.43 mi)	0.4 dB/km	3.5 ps/(nm×km)
M-SFP-BIDI Type B LX/LC EEC	SM	1550 nm	1310 nm	9/125 µm	0 dB ... 11 dB	0 km ... 20 km (0 mi ... 12.43 mi)	0.25 dB/km	19 ps/(nm×km)
M-SFP-BIDI Type A LH/LC EEC	LH	1490 nm	1590 nm	9/125 µm	5 dB ... 24 dB	23 km ... 80 km (14.29 mi ... 49.71 mi)	0.25 dB/km	19 ps/(nm×km)

11. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul
12. Including 3 dB system reserve when compliance with the fiber data is observed.
13. Using the bandwidth-length product is inappropriate for expansion calculations.
19. Including 2.5 dB system reserve when compliance with the fiber data is observed.
20. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul
21. Including 3 dB system reserve when compliance with the fiber data is observed.

Table 52. F/O port (bidirectional Gigabit Ethernet SFP transceiver) (continued)

Product code	Mode[20]	Wave length TX	Wave length RX	Fiber	System attenuation	Example for F/O cable length[21]	Fiber attenuation	BLP/Dispersion
M-SFP-BIDI Type B LH/LC EEC	LH	1590 nm	1490 nm	9/125 µm	5 dB ... 24 dB	23 km ... 80 km (14.29 mi ... 49.71 mi)	0.25 dB/km	19 ps/(nm×km)
SFP-GIG-BA LX/LC EEC	SM	1310 nm	1550 nm	9/125 µm	0 dB ... 15 dB	0 km ... 20 km (0 mi ... 12.43 mi)	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 ... 20 km (0 mi ... 12.43 mi)	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	12 km ... 40 km (7.45 mi ... 24.86 mi)	0.4 dB/km	3.5 ps/(nm×km)
SFP-GIG-BB LX+/LC EEC	SM	1550 nm	1310 nm	9/125 µm	3 dB ... 20 dB	12 km ... 40 km (7.45 mi ... 24.86 mi)	0.25 dB/km	19 ps/(nm×km)

9.10.5. 2.5 Gigabit Ethernet SFP transceiver

Table 53. F/O port 2.5 Gbit/s (SFP fiber optic Gigabit Ethernet transceiver)

Product code	Mode[22]	Wave length	Fiber	System attenuation	Example for F/O cable length	Fiber attenuation	BLP/Dispersion
M-SFP-2.5-MM/LC EEC	MM	850 nm	50/125 µm	0 dB ... 4 dB	0.55 km (0.34 mi)	3.5 dB/km	2000 MHz×km (OM3)

20. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul

21. Including 3 dB system reserve when compliance with the fiber data is observed.

22. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul

Table 53. F/O port 2.5 Gbit/s (SFP fiber optic Gigabit Ethernet transceiver) (continued)

Product code	Mode[22]	Wave length	Fiber	System attenuation	Example for F/O cable length	Fiber attenuation	BLP/Dispersion
M-SFP-2.5-MM/LC EEC	MM	850 nm	50/125 µm	0 dB ... 4 dB	0.4 km (0.25 mi)	3.5 dB/km	500 MHz×km (OM2)
M-SFP-2.5-MM/LC EEC	MM	850 nm	62.5/125 µm	0 dB ... 4 dB	0.17 km (0.11 mi)	3.5 dB/km	200 MHz×km (OM1)
M-SFP-2.5-SM-/LC EEC	SM	1310 nm	9/125 µm	0 dB ... 8.5 dB	5 km (3.11 mi)	0.4 dB/km	3.5 ps/(nm×km)
M-SFP-2.5-SM/LC EEC	SM	1310 nm	9/125 µm	0 dB ... 13 dB	20 km (12.43 mi)	0.4 dB/km	3.5 ps/(nm×km)
M-SFP-2.5-SM+/LC	SM	1310 nm	9/125 µm	12 dB ... 25 dB	45 km (27.96 mi)	0.4 dB/km	3.5 ps/(nm×km)
M-SFP-2.5-LH/LC	SM	1551 nm	9/125 µm	14 dB ... 28 dB	80 km[23] (49.70 mi)	0.25 dB/km	19 ps/(nm×km)

9.10.6. 10 Gigabit Ethernet SFP+ transceiver

Table 54. F/O port 10 Gbit/s (SFP+ fiber optic Gigabit Ethernet transceiver)

Product code	Mode[24]	Wave length	Fiber	System attenuation	Example for F/O cable length[25]	Fiber attenuation	BLP/Dispersion
M-SFP-10-SR/LC EEC	MM	850 nm	50/125 µm	0 dB ... 8.1 dB	0.066 km (0.041 mi)	3 dB/km	400 MHz×km

22. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul

23. 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 95 km (59 mi).

24. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul

25. Including 3 dB system reserve when compliance with the fiber data is observed.

Table 54. F/O port 10 Gbit/s (SFP+ fiber optic Gigabit Ethernet transceiver) (continued)

Product code	Mode[24]	Wave length	Fiber	System attenuation	Example for F/O cable length[25]	Fiber attenuation	BLP/Dispersion
M-SFP-10-SR/LC EEC	MM	850 nm	50/125 µm	0 dB ... 8.1 dB	0.082 km (0.051 mi)	3 dB/km	500 MHz×km (OM2)
M-SFP-10-SR/LC EEC	MM	850 nm	50/125 µm	0 dB ... 8.1 dB	0.3 km (0.186 mi)	3 dB/km	2000 MHz×km (OM3)
M-SFP-10-SR/LC EEC	MM	850 nm	50/125 µm	0 dB ... 8.1 dB	0.4 km (0.25 mi)	3 dB/km	4700 MHz×km (OM4)
M-SFP-10-SR/LC EEC	MM	850 nm	62.5/125 µm	0 dB ... 8.1 dB	0.026 km (0.016 mi)	3.2 dB/km	160 MHz×km
M-SFP-10-SR/LC EEC	MM	850 nm	62.5/125 µm	0 dB ... 8.1 dB	0.033 km (0.021 mi)	3.2 dB/km	200 MHz×km (OM1)
M-SFP-10-LR/LC EEC	SM	1310 nm	9/125 µm	0 dB ... 7.4 dB	10 km (6.21 mi)	0.4 dB/km	3.5 ps/(nm×km)
M-SFP-10-ER/LC EEC	LH	1550 nm	9/125 µm	3 dB ... 15 dB	10 km ... 40 km (6.21 mi ... 24.86 mi)	0.25 dB/km	19 ps/(nm×km)
M-SFP-10-ZR/LC EEC	LH	1550 nm	9/125 µm	12 dB ... 23 dB	40 km ... 80 km (24.86 mi ... 49.71 mi)	0.25 dB/km	19 ps/(nm×km)

24. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul

25. Including 3 dB system reserve when compliance with the fiber data is observed.

9.10.7. DAC cables

The maximum cable length of a DAC cable corresponds to its maximum network range.

Table 55. Network range: DAC cables

Product code	Cable length	Maximum network range
SFP-10-DAC-05m (Direct Attach Copper)	0.5 m (1.64 ft)	0.5 m (1.64 ft)
SFP-10-DAC-1m (Direct Attach Copper)	1 m (3.28 ft)	1 m (3.28 ft)
SFP-10-DAC-2m (Direct Attach Copper)	2 m (6.56 ft)	2 m (6.56 ft)
SFP-10-DAC-4m (Direct Attach Copper)	4 m (13.12 ft)	4 m (13.12 ft)

10. Scope of delivery

Table 56. Scope of delivery

Amount	Article
1 ×	Device
1 ×	Safety and general information sheet
1 ×	2-pin terminal block for signal contact
2 ×	Mounting bracket for installation on 19" devices, standard (pre-mounted)
1 × or 2 × (depending on device variant)	Exclusively for devices with supply voltage characteristic value M[26]: 3-pin terminal block for power supply
1 × or 2 × (depending on device variant)	Exclusively for devices with supply voltage characteristic value L[27]: 2-pin terminal block for power supply

26. For device variant, see *Rear view* on page 43.

27. For device variant, see *Rear view* on page 43.

11. Order numbers

11.1. Device variants

Device	Order number
GRS105-...	942287999
GRS106-...	942287999
GRS115-...	942287999
GRS116-...	942287999
GRS125-...	942287999
GRS126-...	942287999
GRS105-24TX/6SFP-1HV-2A	942287001
GRS105-24TX/6SFP-2HV-2A	942287002
GRS105-24TX/6SFP-2HV-3A	942287003
GRS105-16TX/14SFP-1HV-2A	942287004
GRS105-16TX/14SFP-2HV-2A	942287005
GRS105-16TX/14SFP-2HV-3A	942287006
GRS106-24TX/6SFP-1HV-2A	942287007
GRS106-24TX/6SFP-2HV-2A	942287008
GRS106-24TX/6SFP-2HV-3A	942287009
GRS106-16TX/14SFP-1HV-2A	942287010
GRS106-16TX/14SFP-2HV-2A	942287011
GRS106-16TX/14SFP-2HV-3A	942287012
GRS105-24TX/6SFP-2HV-3AUR	942287013
GRS105-16TX/14SFP-2HV-3AUR	942287014
GRS106-24TX/6SFP-2HV-3AUR	942287015
GRS106-16TX/14SFP-2HV-3AUR	942287016
GRS105-24TX/6SFP-1HV-2S	942287017
GRS105-24TX/6SFP-B	942287018
GRS115-24TX/6SFP-2HV-2A	942287019
GRS116-24TX/6SFP-2HV-2A	942287020
GRS125-24TX/6SFP-2HV-2A	942287021
GRS126-24TX/6SFP-2HV-2A	942287022

11.2. Accessories

Note that products recommended as accessories may have different characteristics to those of the device, which may limit the application range of the overall system. For example, if you add an accessory with IP20 to a device with IP65, the degree of protection of the overall system is reduced to IP20.

Table 57. General accessories

Article	Order number
2-pin terminal block (50 pieces)	943845010
2-pin terminal block with screw lock (50 pieces)	943845009
3-pin High Voltage Interlock terminal block (50 pieces)	943845008
AutoConfiguration Adapter ACA31	942074001
Network management software Industrial HiVision	943156xxx
Non-heating appliance cable (Euro model)	942271001
Mounting bracket for installation on 19" devices, standard (2 pieces)	943943001
Mounting bracket for installation on 19" devices, long (+50 mm/1.97 in)(2 pieces)	943943101
Protection cap for RJ45 socket (50 pieces)	943936001
Protection cap for SFP slot (25 pieces)	943942001

11.2.1. Gigabit Ethernet SFP transceiver

Table 58. Accessories: Gigabit Ethernet SFP transceiver

Gigabit Ethernet SFP transceiver	Certification type	Temperature range[28]	Order number
M-SFP-SX/LC	Standard level	0 °C ... +45 °C (+32 °F ... +113 °F)	943014001
M-SFP-SX/LC EEC	Standard level	-10 °C ... +60 °C (+14 °F ... +140 °F)	943896001
M-SFP-MX/LC EEC	Standard level	-10 °C ... +60 °C (+14 °F ... +140 °F)	942108001
M-SFP-LX/LC	Standard level	0 °C ... +45 °C (+32 °F ... +113 °F)	943015001
M-SFP-LX/LC EEC	Standard level	-10 °C ... +60 °C (+14 °F ... +140 °F)	943897001

28. The temperature range specifications refer to the use in the GRS device.

Table 58. Accessories: Gigabit Ethernet SFP transceiver (continued)

Gigabit Ethernet SFP transceiver	Certification type	Temperature range[28]	Order number
M-SFP-LX+/LC	Standard level	0 °C ... +45 °C (+32 °F ... +113 °F)	942023001
M-SFP-LX+/ LC EEC	Standard level	-10 °C ... +60 °C (+14 °F ... +140 °F)	942024001
M-SFP-LH/LC	Standard level	-5 °C ... +60 °C (+23 °F ... +140 °F)	943042001
M-SFP-LH/LC EEC	Standard level	-10 °C ... +60 °C (+14 °F ... +140 °F)	943898001
M-SFP-LH+/LC	Standard level	0 °C ... +45 °C (+32 °F ... +113 °F)	943049001
M-SFP-LH+/LC EEC	Standard level	-10 °C ... +60 °C (+14 °F ... +140 °F)	942119001
SFP-GIG-LX/LC	Entry level	0 °C ... +45 °C (+32 °F ... +113 °F)	942196001
SFP-GIG-LX/LC EEC	Entry level	-10 °C ... +60 °C (+14 °F ... +140 °F)	942196002

11.2.2. Bidirectional Gigabit Ethernet SFP transceiver

Table 59. Accessories: Bidirectional Gigabit Ethernet SFP transceiver

Bidirectional Gigabit Ethernet SFP transceiver	Certification type[29]	Temperature range[30]	Order number
M-SFP-BIDI Type A LX/LC EEC	Standard level	-10 °C ... +60 °C (+14 °F ... +140 °F)	943974001
M-SFP-BIDI Type B LX/LC EEC	Standard level	-10 °C ... +60 °C (+14 °F ... +140 °F)	943974002
M-SFP-BIDI Type A LH/LC EEC	Standard level	-10 °C ... +60 °C (+14 °F ... +140 °F)	943975001
M-SFP-BIDI Type B LH/LC EEC	Standard level	-10 °C ... +60 °C (+14 °F ... +140 °F)	943975002

28. The temperature range specifications refer to the use in the GRS device.

29. Use Entry level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC or UL 61010-2-20.

30. The temperature range specifications refer to the use in the GRS device.

Table 59. Accessories: Bidirectional Gigabit Ethernet SFP transceiver (continued)

Bidirectional Gigabit Ethernet SFP transceiver	Certification type[29]	Temperature range[30]	Order number
M-SFP-BIDI Bundle LX/LC EEC (Type A + B)	Standard level	-10 °C ... +60 °C (+14 °F ... +140 °F)	943974101
M-SFP-BIDI Bundle LH/LC EEC (Type A + B)	Standard level	-10 °C ... +60 °C (+14 °F ... +140 °F)	943975101
SFP-GIG-BA LX/LC EEC	Entry level	-10 °C ... +60 °C (+14 °F ... +140 °F)	942207001
SFP-GIG-BB LX/LC EEC	Entry level	-10 °C ... +60 °C (+14 °F ... +140 °F)	942207002
SFP-GIG-BA LX+/LC EEC	Entry level	-10 °C ... +60 °C (+14 °F ... +140 °F)	942208001
SFP-GIG-BB LX+/LC EEC	Entry level	-10 °C ... +60 °C (+14 °F ... +140 °F)	942208002

11.2.3. 2.5 Gigabit Ethernet SFP transceiver

Table 60. Accessories: 2.5 Gigabit Ethernet SFP transceiver

2.5 Gigabit Ethernet SFP transceiver	Certification type	Temperature range[31]	Order number
M-SFP-2.5-MM/LC EEC	Standard level	-10 °C ... +60 °C (+14 °F ... +140 °F)	942162001
M-SFP-2.5-SM-/LC EEC	Standard level	-10 °C ... +60 °C (+14 °F ... +140 °F)	942163001
M-SFP-2.5-SM/LC EEC	Standard level	-10 °C ... +60 °C (+14 °F ... +140 °F)	942164002
M-SFP-2.5-LH/LC	Standard level	0 °C ... +45 °C (+32 °F ... +113 °F)	942220001
M-SFP-2.5-SM+/LC	Standard level	0 °C ... +60 °C (+14 °F ... +140 °F)	942331001

29. Use Entry level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC or UL 61010-2-20.

30. The temperature range specifications refer to the use in the GRS device.

31. The temperature range specifications refer to the use in the GRS device.

11.2.4. 10 Gigabit Ethernet SFP transceiver

Table 61. Accessories: 10 Gigabit Ethernet SFP transceiver

10 Gigabit Ethernet SFP transceiver	Certification type	Temperature range[32]	Order number
M-SFP-10-SR/LC-EEC	Standard level	-10 °C ... +60 °C (+14 °F ... +140 °F)	942210001
M-SFP-10-LR/LC-EEC	Standard level	-10 °C ... +60 °C (+14 °F ... +140 °F)	942211001
M-SFP-10-ER/LC-EEC	Standard level	-10 °C ... +60 °C (+14 °F ... +140 °F)	942212001
SFP-10-DAC-05m	Standard level	0 °C ... +60 °C (+32 °F ... +140 °F)	942280001
SFP-10-DAC-1m	Standard level	0 °C ... +60 °C (+32 °F ... +140 °F)	942280002
SFP-10-DAC-2m	Standard level	0 °C ... +60 °C (+32 °F ... +140 °F)	942280003
SFP-10-DAC-4m	Standard level	0 °C ... +60 °C (+32 °F ... +140 °F)	942280004

32. The temperature range specifications refer to the use in the GRS device.

12. Underlying technical standards

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

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

If your device has a shipping approval according to DNV, you find the approval mark printed on the device label. You will find out whether your device has other shipping approvals at *https://www.belden.com* in the product information.

Table 62. List of technical standards

UL 62368-1	Audio/video, information and communication technology equipment – Part 1: Safety requirements
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 61000-3-2	Electromagnetic compatibility (EMC) – Part 3-2: Threshold values – threshold values for harmonic currents (device input current ≤16 A per conductor)
EN 61000-3-3	Electromagnetic compatibility (EMC) – Part 3-3: Threshold values – limitation of voltage changes, voltage fluctuations and flickering in public low power supply networks for devices with a rated current ≤16 A per conductor that are not subject to any special connection condition
EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
EN 61000-6-4	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emitted interference in industrial environments
EN 61131-2	Programmable controllers – Part 2: Equipment requirements and tests
FCC 47 CFR Part 15	Code of Federal Regulations
IEC 60825-1	Laser product safety
IEC/EN 62368-1	Equipment for audio/video, information and communication technology - Part 1: Safety requirements
IEEE 802.1D	Media Access Control Bridges
IEEE 802.1Q	Virtual Bridged Local Area Networks
IEEE 802.1w	Rapid Reconfiguration
IEEE 802.3	Ethernet

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:
https://www.belden.com

A list of local telephone numbers and email addresses for technical support directly from Hirschmann is available at:
https://my.belden.com

This site also includes a free of charge knowledge base and a software download section.

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