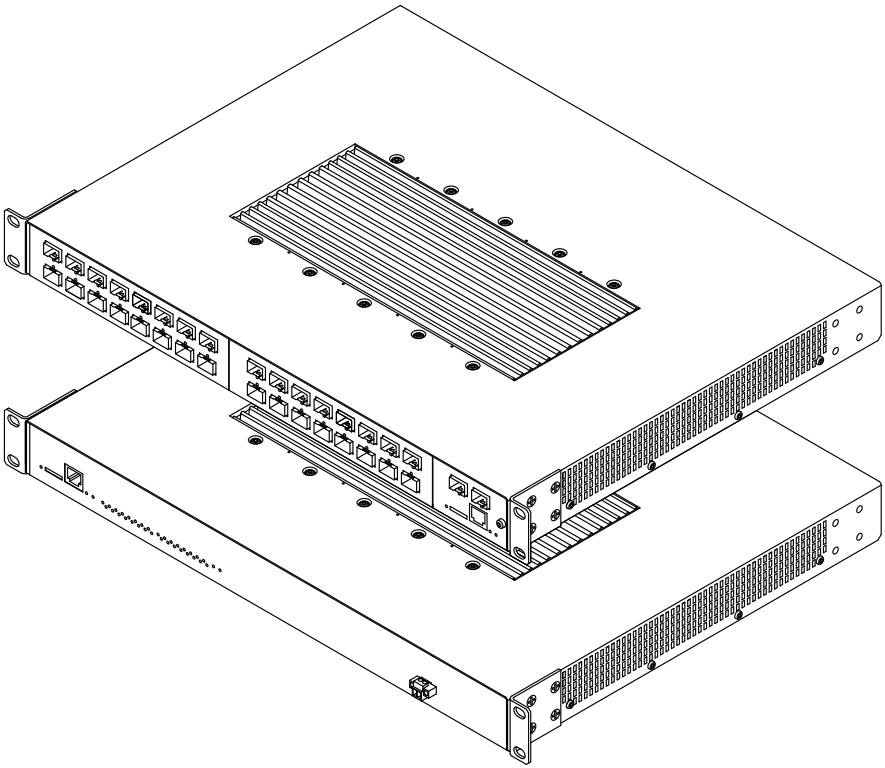
HIRSCHMANN
A BELDEN BRAND

User Manual
Installation
GREYHOUND Switch
GRS2000/GRS2100



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

Hirschmann Automation and Control GmbH
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 as PDF files for downloading on the Internet 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 on the Internet at the Hirschmann product pages:
https://www.hirschmann.com/en/QR/INET-Industrial-HiVision

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.

⚠ 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.

Contents

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.

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 67
- 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:

  General data on page 67

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 and cooling fins clear to ensure good air circulation.
- Make sure there is at least 5 cm (2 in) of space in front of the ventilation slits and cooling fins of the casing.
- Mount the device horizontally or vertically in a switch cabinet (*Mounting in a switch cabinet* on page 49) or on a flat surface (*Mounting on a flat surface* on page 47).
- Exclusively use 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:

  Accessories on page 80

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 1 separate grounding screw. The grounding screw is located next to the power supply connection on the front or rear side of the device, depending on device variant.

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

1.6.2. Shielding ground

The overall shield of connectable twisted pair cables is connected to the ground connection of the device casing as a conductor.

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

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 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.

1.6.4.1. 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: *General data* on page 67

1.6.4.2. 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.

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 connected voltage source is limited by a current limitation device or a fuse.
- The electrical threshold values for the signal contact are observed:

  Signal contact on page 68

1.7. LED or laser components

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

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.

2.2. FCC note

Supplier's Declaration of Conformity

47 CFR § 2.1077 Compliance Information

GRS2000/GRS2100

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 device 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 level characteristic value 2A, 2S, or 3A provide you with the option 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
- Horizontal mounting on a flat surface
- Vertical mounting on a flat surface

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)

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. You find further information on the Internet at the Hirschmann product pages: *https://www.hirschmann.com/en/QR/INET-Industrial-HiVision*

- V.24 interface (locally on the device via MGMT management interface)

The device provides you with a large range of functions, which the manuals for the operating software inform you about. You can download these manuals as PDF files from the Internet at: *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. Device name and product code: GRS2000/GRS2100

Item	Characteristic	Characteristic value	Description
1 ... 3	Product	GRS	GREYHOUND Switch Standard
4	Series	2	GREYHOUND 2000 Series
5	Port position	0	Front: Data cable connections, Management interfaces; Rear: Power supply connections
		1	Front: Management interfaces; Rear: Data cable connections, Power supply connections
6	Data rate	2	PG 1 ... PG 4: FE[1]
		3	PG 1 ... PG 4: FE, PG 5: GE
		4	PG 1 ... PG 4: FE/GE, PG 5: GE
		5	PG 1 ... PG 4: FE/GE, PG 5: 1/2.5 GE
7	Technology	0	Standard
8	-	-	(hyphen)
9	Port types: PG 1 + PG 3	A	PG 1: 4 × TP + 4 × SFP, PG 3: N/A
		B	PG 1: 4 × TP + 4 × SFP, PG 3: 8 × TP
		C	PG 1: 4 × TP + 4 × SFP, PG 3: 8 × SFP
		D	PG 1: 4 × TP + 4 × SFP, PG 3: 6 × DSx[4]
		E	PG 1: 8 × SFP, PG 3: N/A
		F	PG 1: 8 × SFP, PG 3: 8 × TP
		G	PG 1: 8 × SFP, PG 3: 8 × SFP
		H	PG 1: 8 × SFP, PG 3: 6 × DSx

1. Exclusively applies to data rate characteristic value 2: All port groups exclusively support connection speeds up to 100 Mbit/s (FE).
2. Exclusively applies to data rate characteristic values 3 and 4: Port group 5 exclusively supports connection speeds up to 1000 Mbit/s (GE).
3. Exclusively applies to data rate characteristic values 3 and 4: Port group 5 exclusively supports connection speeds up to 1000 Mbit/s (GE).
4. The letter “x” in “DSx” functions as a placeholder for all available DS-type connectors (DSC, DST, ...).

Table 1. Device name and product code: GRS2000/GRS2100 (continued)

Item	Characteristic	Characteristic value	Description
		I	PG 1: 6 × DSx, PG 3: N/A
		J	PG 1: 6 × DSx, PG 3: 8 × TP
		K	PG 1: 6 × DSx, PG 3: 6 × DSx
		L	PG 1: 8 × TP, PG 3: N/A
		M	PG 1: 8 × TP, PG 3: 8 × TP
10	F/O connections + SFPs: PG 1	0	N/A
		A	DSC: 100 Mbit/s MM
		B	DST: 100 Mbit/s MM
		C	DSC: 100 Mbit/s SM
		D	DST: 100 Mbit/s SM
		F	SFP: 100 Mbit/s MM/LC EEC
		H	SFP: 100 Mbit/s SM/LC EEC
		J	SFP: 1 Gbit/s SX/LC EEC
		L	SFP: 1 Gbit/s LX/LC EEC
11	Number of transceivers: PG 1	0	N/A
		2	2 × Pre-assembled transceivers
		4	4 × Pre-assembled transceivers
		6	6 × Pre-assembled transceivers
		8	8 × Pre-assembled transceivers
12	F/O connections + SFPs: PG 3	0	N/A
		A	DSC: 100 Mbit/s MM
		B	DST: 100 Mbit/s MM
		C	DSC: 100 Mbit/s SM
		D	DST: 100 Mbit/s SM
		F	SFP: 100 Mbit/s MM/LC EEC
		H	SFP: 100 Mbit/s SM/LC EEC
		J	SFP: 1 Gbit/s SX/LC EEC
		L	SFP: 1 Gbit/s LX/LC EEC
13	Number of transceivers: PG 3	0	N/A
		2	2 × Pre-assembled transceivers
		4	4 × Pre-assembled transceivers

Table 1. Device name and product code: GRS2000/GRS2100 (continued)

Item	Characteristic	Characteristic value	Description
		6	6 × Pre-assembled transceivers
		8	8 × Pre-assembled transceivers
14	-	-	(hyphen)
15	Port types: PG 2 + PG 4	0	PG 2: N/A, PG 4: N/A
		A	PG 2: 4 × TP + 4 × SFP, PG 4: N/A
		B	PG 2: 4 × TP + 4 × SFP, PG 4: 8 × TP
		C	PG 2: 4 × TP + 4 × SFP, PG 4: 8 × SFP
		D	PG 2: 4 × TP + 4 × SFP, PG 4: 6 × DSx
		E	PG 2: 8 × SFP, PG 4: N/A
		F	PG 2: 8 × SFP, PG 4: 8 × TP
		G	PG 2: 8 × SFP, PG 4: 8 × SFP
		H	PG 2: 8 × SFP, PG 4: 6 × DSx
		I	PG 2: 6 × DSx, PG 4: N/A
		J	PG 2: 6 × DSx, PG 4: 8 × TP
		K	PG 2: 6 × DSx, PG 4: 6 × DSx
		L	PG 2: 8 × TP, PG 4: N/A
		M	PG 2: 8 × TP, PG 4: 8 × TP
16	F/O connections + SFPs: PG 2	0	N/A
		A	DSC: 100 Mbit/s MM
		B	DST: 100 Mbit/s MM
		C	DSC: 100 Mbit/s SM
		D	DST: 100 Mbit/s SM
		F	SFP: 100 Mbit/s MM/LC EEC
		H	SFP: 100 Mbit/s SM/LC EEC
		J	SFP: 1 Gbit/s SX/LC EEC
		L	SFP: 1 Gbit/s LX/LC EEC
17	Number of transceivers: PG 2	0	N/A
		2	2 × Pre-assembled transceivers
		4	4 × Pre-assembled transceivers
		6	6 × Pre-assembled transceivers
		8	8 × Pre-assembled transceivers

Table 1. Device name and product code: GRS2000/GRS2100 (continued)

Item	Characteristic	Characteristic value	Description
18	F/O connections + SFPs: PG 4	0	N/A
		A	DSC: 100 Mbit/s MM
		B	DST: 100 Mbit/s MM
		C	DSC: 100 Mbit/s SM
		D	DST: 100 Mbit/s SM
		F	SFP: 100 Mbit/s MM/LC EEC
		H	SFP: 100 Mbit/s SM/LC EEC
		J	SFP: 1 Gbit/s SX/LC EEC
		L	SFP: 1 Gbit/s LX/LC EEC
19	Number of transceivers: PG 4	0	N/A
		A	2 × Pre-assembled transceivers
		B	4 × Pre-assembled transceivers
		C	6 × Pre-assembled transceivers
		D	8 × Pre-assembled transceivers
20	-	-	(hyphen)
21	Port types: PG 5	0	N/A
		A	PG 5: 2 × SFP
22	SFPs: PG 5	0	N/A
		J	SFP: 1 Gbit/s SX/LC EEC
		L	SFP: 1 Gbit/s LX/LC EEC
		M	SFP: 2.5 Gbit/s MM/LC EEC
		N	SFP: 2.5 Gbit/s SM/LC EEC
		P	SFP: 2.5 Gbit/s SM-/LC EEC
23	Number of transceivers: PG 5	0	N/A
		2	2 × Pre-assembled transceivers
24	-	-	(hyphen)
25	Operating temperature range	S	Standard: 0 °C … +60 °C (+32 °F … +140 °F)
		C	Standard: 0 °C … +60 °C (+32 °F … +140 °F) with Conformal Coating (CC)
		T	Extended: -40 °C … +70 °C (-40 °F … +158 °F)

Table 1. Device name and product code: GRS2000/GRS2100 (continued)

Item	Characteristic	Characteristic value	Description
		E	Extended: -40 °C … +70 °C (-40 °F … +158 °F) with Conformal Coating (CC)
26	Voltage range PSU 1	K	60 V DC ... 250 V DC or 100 V AC ... 240 V AC
27	Voltage range PSU 2	9	N/A
		K	60 V DC ... 250 V DC or 100 V AC ... 240 V AC
28 ... 29	Approvals / Declarations	Z9	CE; FCC; EN 61131; EN 62368-1
		Y9	“Z9” + cUL 62368-1
		X9	“Z9” + cUL 62368-1 + cUL 121201
		V9	“Z9” + IEC 61850-3, IEEE 1613
		VY	“V9” + cUL 62368-1
		VU	“V9” + cUL 62368-1 + DNV (GL)
		VT	“V9” + cUL 62368-1 + EN 50121-4
		U9	“Z9” + DNV (GL)
		UY	“U9” + cUL 62368-1
		UX	“U9” + cUL 62368-1 + cUL 121201
		UT	“U9” + cUL 62368-1 + EN 50121-4
		T9	“Z9” + EN 50121-4
		TY	“T9” + cUL 62368-1
30 ... 31	Customization	HH	Standard
32	Software configuration	E	No configuration installed
		B	Diagnostic user (BDEW)
33 ... 34	Software level	2S	HiOS Layer 2 Standard
		2A	HiOS Layer 2 Advanced
		3A	HiOS Layer 3 Advanced
35 ... 36	Software packages	99	Reserved
		UR	IPv4 Unicast Routing Package
		MR	IPv4 Multicast Routing Package

3.2. Device views

3.2.1. Front view

For the available number and types of connections and port groups on your device, check the product code: *Device name and product code* on page 22

Figure 1. Front view: Example of GRS2000... device variants (power supply characteristic value KK)

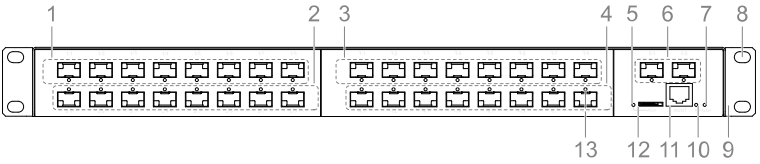


Table 2. Front view: Description of device elements - example of GRS2000... device variants (power supply characteristic value KK)

1	Port group 1 (PG 1)
2	Port group 2 (PG 2)
3	Port group 3 (PG 3)
4	Port group 4 (PG 4)
5	Status LED AutoConfiguration Adapter (ACA)
6	Port group 5 (PG 5): SFP slots/uplink
7	Status LED Device status (Status)
8	Oblong hole
9	Mounting bracket
10	Status LED Power supply status - Power (P)
11	Management interface (MGMT)
12	ACA41 interface (microSD card slot)
13	Status LED Port/Slot status[5]

5. Number of display elements varies depending on device variant. For the available number and types of connections check the product code: *Device name and product code* on page 22

Figure 2. Front view: Example of GRS2100... device variants (power supply characteristic value KK)

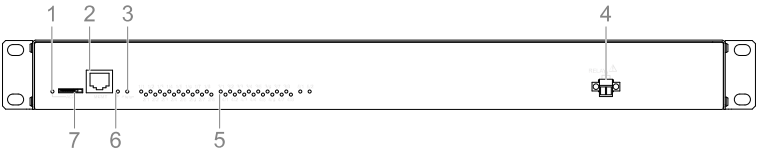
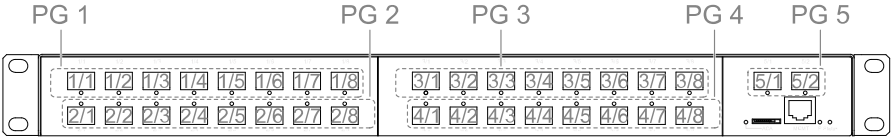


Table 3. Front view: Description of device elements - example of GRS2100... device variants (power supply characteristic value KK)

1	Status LED AutoConfiguration Adapter (ACA)
2	Management interface (MGMT)
3	Status LED Device status (Status)
4	Signal contact
5	Status LED Port/Slot status[6]
6	Status LED Power supply status - Power (P)
7	ACA41 interface (microSD card slot)

3.2.1.1. Port assignment

Table 4. Port assignment: Front view; numbering sequence identical for all device variants (exemplary)



Port	Description
1/1 ... 1/8	Port group 1 (PG 1)
2/1 ... 2/8	Port group 2 (PG 2)
3/1 ... 3/8	Port group 3 (PG 3)
4/1 ... 4/8	Port group 4 (PG 4)

6. Number of display elements varies depending on device variant. For the available number and types of connections check the product code: *Device name and product code* on page 22

Table 4. Port assignment: Front view; numbering sequence identical for all device variants (exemplary) (continued)

5/1 ... 5/2	Port group 5 (PG 5)

3.2.2. Rear view

Figure 3. Rear view: Example of GRS2000... device variants (power supply characteristic value KK)

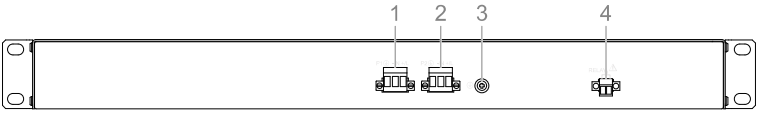


Table 5. Rear view: Description of device elements - example of GRS2000... device variants (power supply characteristic value KK)

1	Power supply connection 1 (P1)
2	Power supply connection 2 (P2)
3	Protective ground screw
4	Signal contact

Figure 4. Rear view: Example of GRS2100... device variants (power supply characteristic value KK)

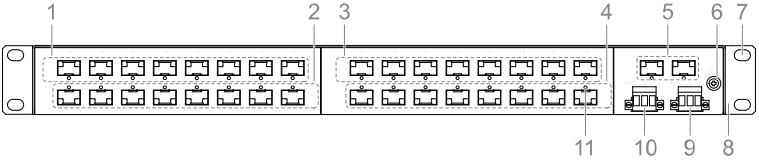


Table 6. Rear view: Description of device elements - example of GRS2100... device variants (power supply characteristic value KK)

1	Port group 1 (PG 1)
2	Port group 2 (PG 2)
3	Port group 3 (PG 3)
4	Port group 4 (PG 4)

Table 6. Rear view: Description of device elements - example of GRS2100... device variants (power supply characteristic value KK) (continued)

5	Port group 5 (PG 5): SFP slots/uplink
6	Protective ground screw
7	Oblong hole
8	Mounting bracket
9	Power supply connection 2 (P2)
10	Power supply connection 1 (P1)
11	Status LED Port/Slot status

3.3. Power supply

The following options for power supply are available:

Figure 5. Supply voltage: Example for the supply voltage location on GRS20xx... device variants (rear side of the device)

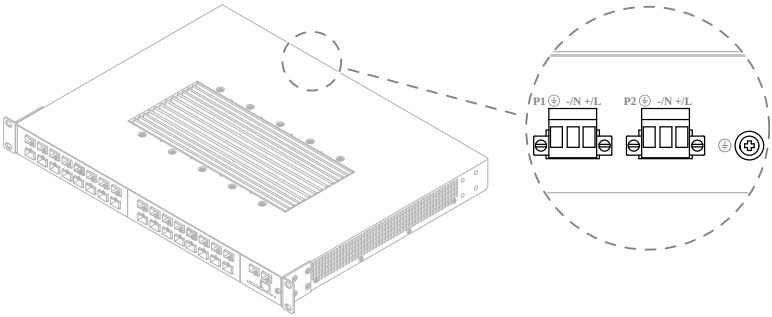
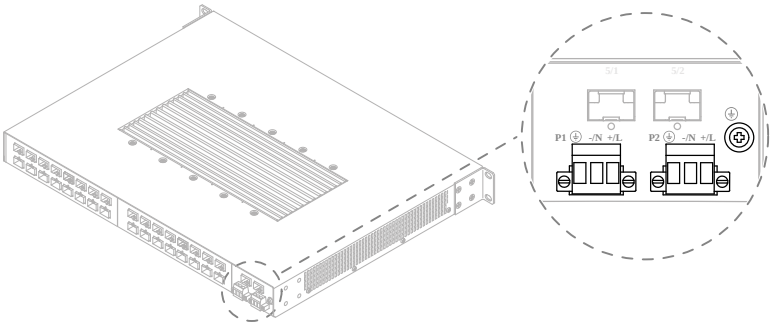


Figure 6. Supply voltage: Example for the supply voltage location on GRS21xx... device variants (rear side of the device)



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.

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. Description supply voltage 100 V AC ... 240 V AC (50 Hz ... 60 Hz), or 60 V DC ... 250 V DC

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

This GRS2000/GRS2100 supply voltage characteristic value offers the following power supply option(s):

- 100 V AC ... 240 V AC (50 Hz ... 60 Hz) with 3-pin terminal block
- 60 V DC ... 250 V DC with 3-pin terminal block

Figure 7. Connecting supply voltage 100 V AC ... 240 V AC (50 Hz ... 60 Hz), or 60 V DC ... 250 V DC: 3-pin terminal blocks with screw lock

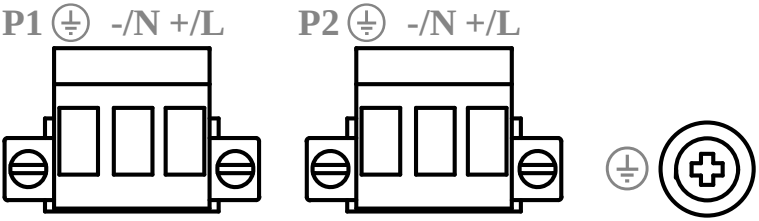


Table 7. Description supply voltage 100 V AC ... 240 V AC (50 Hz ... 60 Hz), or 60 V DC ... 250 V DC: Specifications

Type of supply voltage that can be connected	Specification of the supply voltage	Pin assign-ment	Meaning
AC voltage	Rated AC voltage range: 100 V AC ... 240 V AC, 50 Hz ... 60 Hz AC voltage range including maximum tolerances: 85 V AC ... 264 V AC, 47 Hz ... 63 Hz	⏚	PE (Protective grounding)
		N	Neutral conductor
		L	Outer conductor (phase)
DC voltage	Rated DC voltage range: 60 V DC ... 250 V DC DC voltage range including maximum tolerances: 48 V DC ... 280 V DC	⏚	PE (Protective grounding)
		+	Plus terminal of the supply voltage
		-	Minus terminal of the supply voltage

You find information on connecting the supply voltage here:

Connecting the supply voltage on page 53

3.4. Management Interfaces

3.4.1. Management interface MGMT (external management)

Figure 8. Management interface MGMT: Location on GRS2000... device variants (front side of the device).

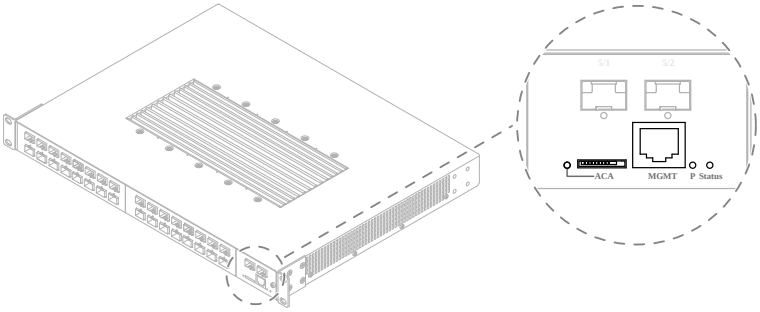
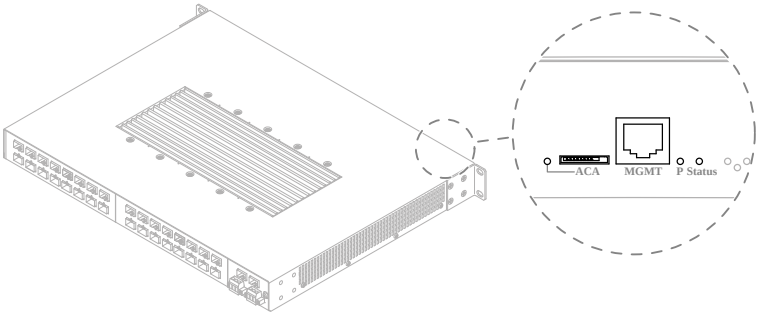


Figure 9. Management interface MGMT: Location on GRS2100... device variants (front side of the device).



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: *Accessories* on page 80

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

The interface has the following properties:

VT100 terminal settings	
Speed	9600 Baud

VT100 terminal settings	
Data	8 bit
Stopbit	1 bit
Handshake	off
Parity	none

3.4.1.1. ACA41 interface (microSD card)

Prerequisite:

Exclusively use Hirschmann microSD cards.

Figure 10. ACA41 interface (microSD card): Location on GRS2000... device variants (front side of the device).

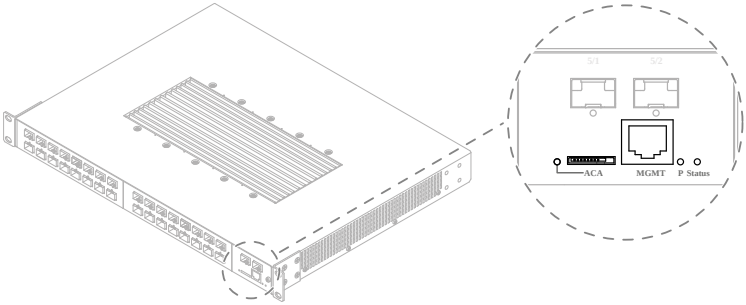
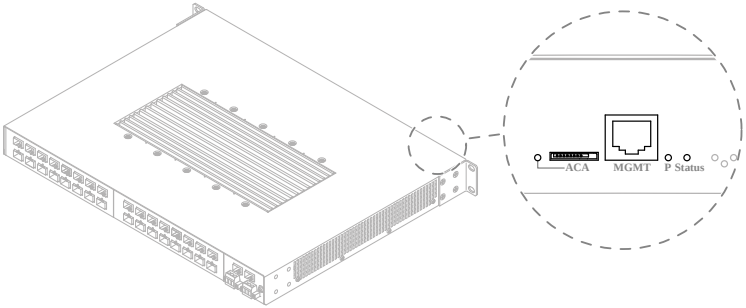


Figure 11. ACA41 interface (microSD card): Location on GRS2100... device variants (front side of the device).



The ACA41 microSD card interface allows you to connect the AutoConfiguration Adapter ACA41 storage medium. This storage medium is used for saving/loading the configuration data and diagnostic information, and for loading the software.

The LED display element next to the ACA41 microSD card interface informs you about the status of the interface.

3.5. Ethernet ports

You can connect end devices and other segments to the device ports using twisted pair (TP) 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). See item 6 in the product code: *Device name and product code* on page 22

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:

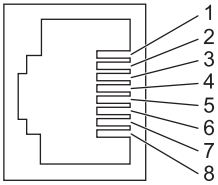
- Autonegotiation
- Autopolarity
- Autocrossing (if autonegotiation is activated)
- 10 Mbit/s half duplex mode, 10 Mbit/s full duplex mode
- 100 Mbit/s half duplex mode, 100 Mbit/s full duplex mode
- 1000 Mbit/s full duplex mode

Delivery state: Autonegotiation activated

The port casing is electrically connected to the front panel.

The pin assignment corresponds to MDI and MDI-X mode.

Table 8. 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−

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). See item 6 in the product code: *Device name and product code* on page 22

3.5.2. F/O port 100/1000 Mbit/s

This port is an SFP slot.

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

This port supports:

- 100 Mbit/s full duplex mode
- 1000 Mbit/s full duplex mode

Delivery state:

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

Note: The F/O connection speed 100/1000 Mbit/s is **NOT** available on PG5.

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). See item 6 in the product code: *Device name and product code* on page 22

3.5.3. 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.

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). See item 6 in the product code: *Device name and product code* on page 22

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 12. Device status: Example for LED display element location on GRS2000... device variants (front side of the device)

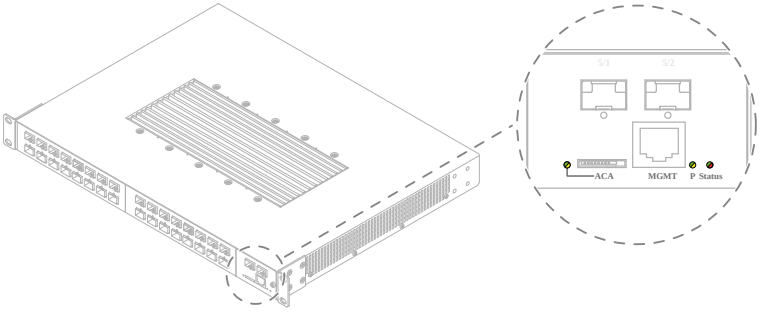


Figure 13. Device status: Example for LED display element location on GRS2100... device variants (front side of the device)

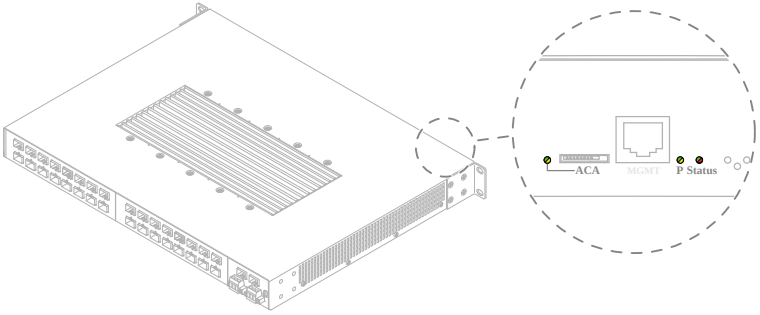


Table 9. Power LED: Color, activity and meaning

Color	Activity	Meaning
none	none	Supply voltage is too low or not available
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 10. 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 11. 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 status display elements provide port-related information.

Figure 14. Port status: Example for LED display element location on GRS2000... device variants (front side of the device)

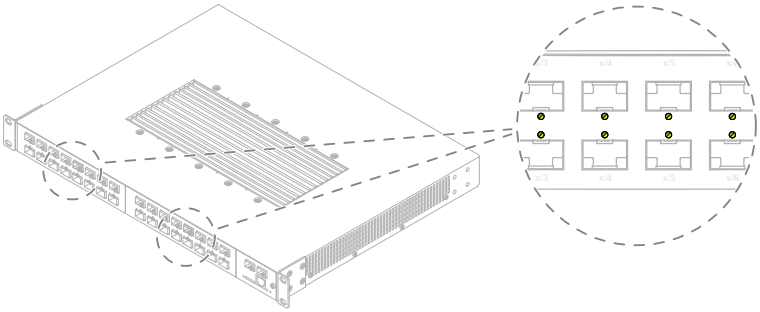
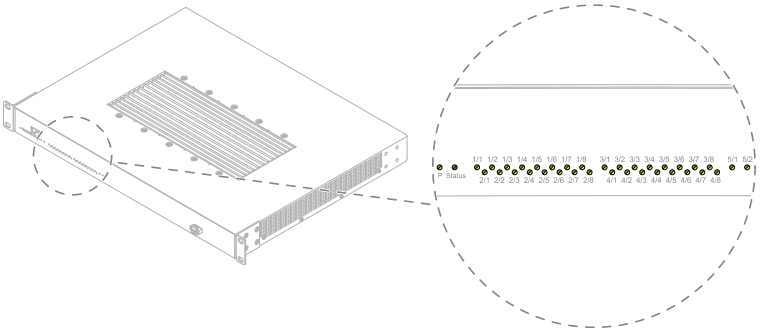


Figure 15. Port status: Example for LED display element location on GRS2100... device variants (front side of the device)



Note: Depending on the device variant, the position of the LED display elements vary. The LED display elements for PG 5 are located under the PG 5 SFP slots on the right hand side on the front of the device. See *Device views* on page 27 for more information on the location of LED display elements.

Table 12. 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

Table 12. Port status LED: Color, activity and meaning (continued)

Color	Activity	Meaning
green	lights up	Device detects a valid link
green	flashes 1 × a period	Port is switched to stand-by

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:

4.1. Checking the package contents

- Check whether the package includes all items named in *Scope of delivery* on page 83.
- Check the individual parts for transport damage.

4.2. Selecting the installation location

Select the assembly location according to the safety guidelines: *Safety instructions* on page 11

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, ensure the following requirements are met:

- The installation location is close to a power outlet.
- The climatic threshold values listed in the technical data are complied with at the installation location.
- Ventilation slits and cooling fins of the device are clear to ensure good air circulation.
- The installation location can be accessed for maintenance and repair work.
- The LED display elements are clearly visible when the device is installed at the installation location.
- Twisted pair cables can be routed in sufficient distance to potential sources of electrical interference, such as power supply cables.
- The device has a separate power source with a suitable ground connection. The power supply from this power source can be interrupted by means of a separate, easily accessible isolator or power switch. Hirschmann recommends the use of overvoltage protection for all devices.

4.3. Installing the ACA41 microSD card (optional)

Figure 16. Installing the ACA41 microSD card (optional): Mounting the microSD card and location on the device (front side of device variants GRS2000...)

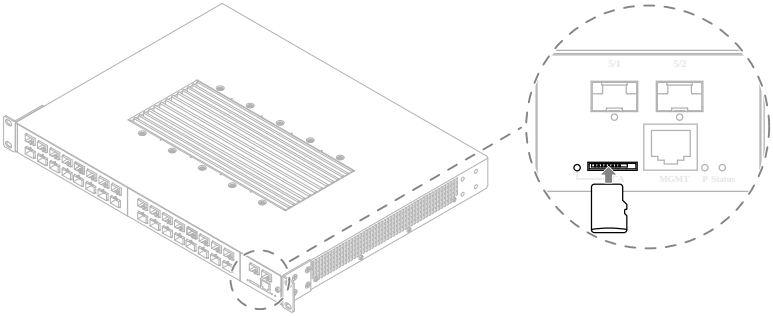
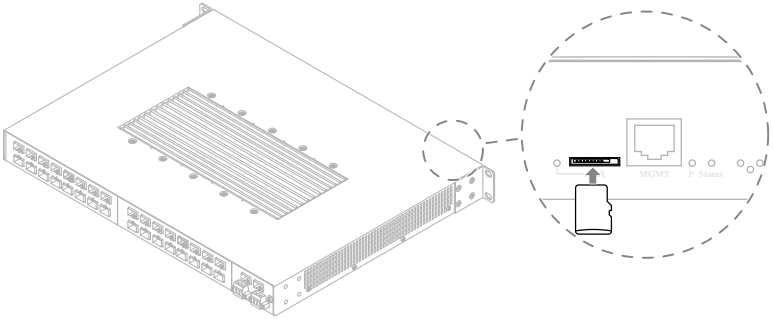


Figure 17. Installing the ACA41 microSD card (optional): Mounting the microSD card and location on the device (front side of device variants GRS2100...)



Perform the following work steps:

- Carefully push the ACA41 microSD card into the ACA41 microSD card slot on the device until the microSD card locks in place with a click.

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.

⚠ 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.

⚠ CAUTION

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

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

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

- *Mounting on a flat surface* on page 47
- *Mounting in a switch cabinet* on page 49

4.4.1. Mounting on a flat surface

⚠ WARNING

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

When mounting the device on an steeply inclined or vertical flat surface (for example on a wall), ensure the device is installed in a way that the ports and management interfaces are oriented either upwards or downwards, as shown below.
If the device is mounted with a different orientation than described (for example with the ventilation slits facing upwards and downwards), burning debris and plastics may fall through the larger openings of the device casing in case of fire, causing further fire hazards. See IEC/EN 62368-1 for more information.

Prerequisites:

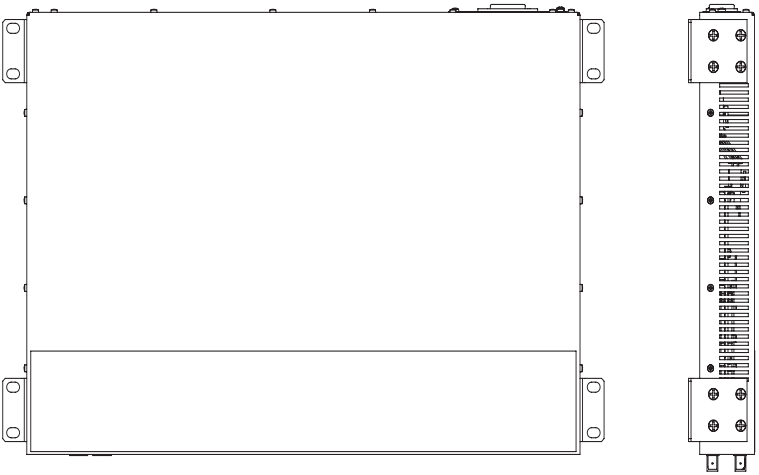
- Prepare the holes in the flat surface for mounting the device. You find dimensions for drilling and mounting the device in chapter

  Dimension drawings on page 69.

- 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.

- You have the required number of mounting brackets necessary for mounting the device on a flat surface (4 ×). In the delivery state, there are 2 pre-mounted mounting brackets on the sides of the device. You obtain additional brackets as accessories: *Accessories* on page 80

Figure 18. 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 18: Mounting on a flat surface* on page 48.
- 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: *Accessories* on page 80
- 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: The device must **NOT** be used as a desktop device.

4.4.2. 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).

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.

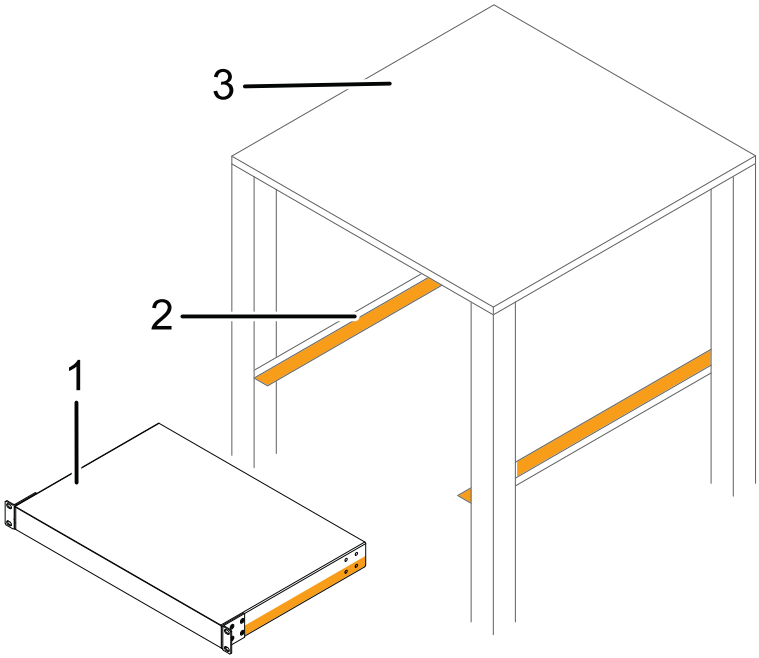
- The devices are designed to be mounted in a 19" switch cabinet.

  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.

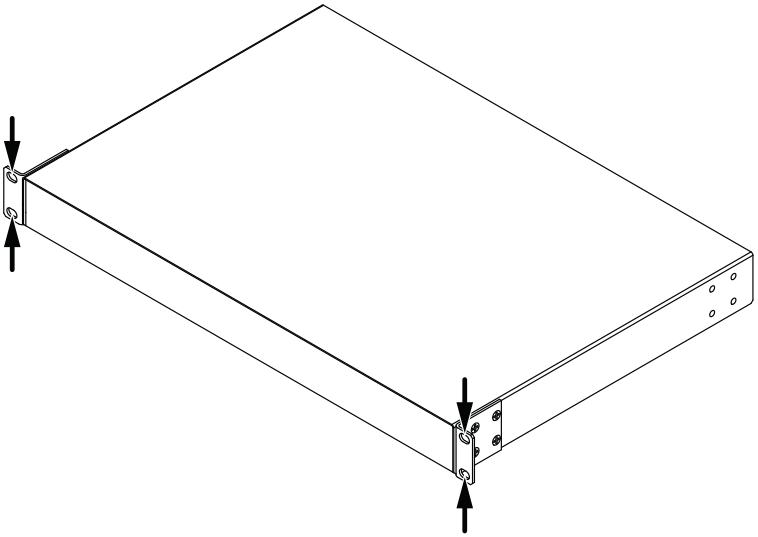
Figure 19. Assembly in a switch cabinet with sliding/ mounting rails
1 - device
2 - sliding/mounting rail
3 - 19" switch cabinet



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 20. Mounting in a switch cabinet: Mounting brackets with oblong holes

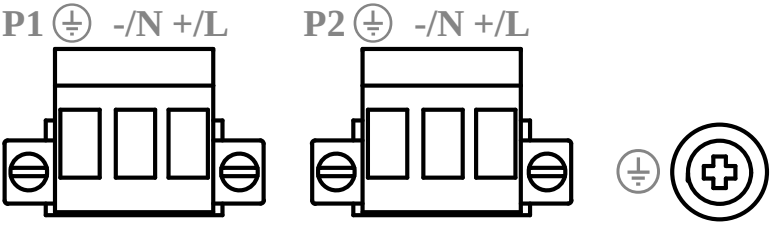


Note: When operating the device in an environment with continuous vibration loads, Hirschmann recommends to additionally fasten the device to the switch cabinet using 2 mounting brackets on the front or rear side of the device. Additional brackets are available as accessories: *Accessories* on page 80

4.5. Grounding the device

⚠ CAUTION	
	**ELECTRIC SHOCK** **Failure to follow these instructions can result in minor injury, or equipment damage.** Ground the device before connecting any other cables.

Figure 21. Grounding the device: Ground screw next to power supply connection(s) (exemplary view using device power supply characteristic value KK)



The device has a protective ground connection (protective ground screw) next to the power supply connection(s) on the front or rear side of the device, depending on device variant.

Perform the following work steps:

- Ground the device via the protective ground screw with a tightening torque of 0.34 Nm (3 lb-in).

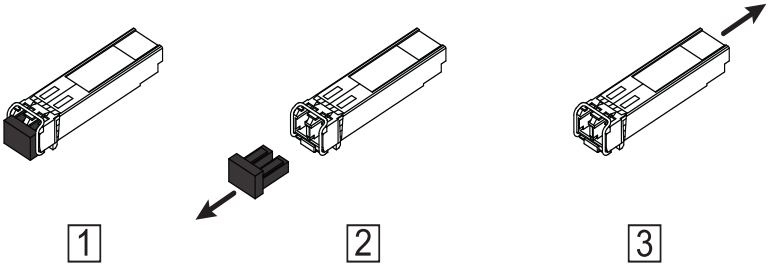
4.6. Installing an SFP transceiver (optional)

Prerequisites:

Exclusively use Hirschmann SFP transceivers.

See *Accessories* on page 80

Figure 22. 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.

  You find the prescribed tightening torque in chapter:

  General data on page 67
- Mount the terminal block on the device using screws.

4.8. Connecting the supply voltage

Note: 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.

⚠ 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.

4.8.1. Connecting supply voltage 100 V AC ... 240 V AC (50 Hz ... 60 Hz), or 60 V DC ... 250 V DC

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

Figure 23. Connecting supply voltage 100 V AC ... 240 V AC (50 Hz ... 60 Hz), or 60 V DC ... 250 V DC: 3-pin terminal blocks with screw lock

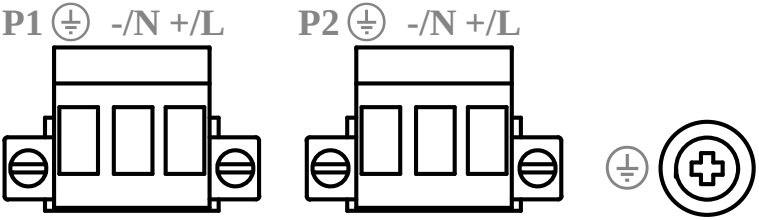


Table 13. Connecting supply voltage 100 V AC ... 240 V AC (50 Hz ... 60 Hz), or 60 V DC ... 250 V DC: Specifications

Type of supply voltage that can be connected	Specification of the supply voltage	Pin assignment	Meaning
AC voltage	Rated AC voltage range: 100 V AC ... 240 V AC, 50 Hz ... 60 Hz AC voltage range including maximum tolerances:	⏚	PE (Protective grounding)

Table 13. Connecting supply voltage 100 V AC ... 240 V AC (50 Hz ... 60 Hz), or 60 V DC ... 250 V DC: Specifications (continued)

Type of supply voltage that can be connected	Specification of the supply voltage	Pin assignment	Meaning
	85 V AC ... 264 V AC, 47 Hz ... 63 Hz	N	Neutral conductor
		L	Outer conductor (phase)
DC voltage	Rated DC voltage range: 60 V DC ... 250 V DC DC voltage range including maximum tolerances: 48 V DC ... 280 V DC	⏚	PE (Protective grounding)
		+	Plus terminal of the supply voltage
		-	Minus terminal of the supply voltage

Perform the following work steps:

- Verify the required conditions for connecting the voltage supply.

  See: *General requirements for connecting the supply voltage* on page 15

- Ensure all connections are voltage-free.
- Connect the power supply conductor wires to the terminal block(s) according to the pin assignment .
- Secure the conductor wires in the terminal block(s) by tightening the screws on the terminal block(s).
- Install the terminal block(s) on the device.

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.

Note: Note the safety instructions in chapter
General requirements for connecting electrical wires on page 15

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

Perform the following work steps:

- Enable the supply voltage.

You find detailed information on the operation of the device in the software user documentation. You find the software user documentation as PDF files on the Internet at: *https://www.doc.hirschmann.com*

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.
- To comply with EN 50121-4 EMC requirements, exclusively use shielded copper data cables.
- 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.
- Connect the data cables according to your requirements.
  See *Ethernet ports* on page 35

Perform the following work steps:

- Connect the data cables.

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

5. Basic settings

Note: 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:

- AutoConfiguration Adapter
- Configuration via BOOTP
- Configuration via DHCP (Option 82)
- Configuration via DHCP (state on delivery)
- Input via the V.24 interface
- Input via the Industrial HiVision application. You find further information about the application Industrial HiVision on the Internet at the Hirschmann product pages:
  Industrial HiVision
  https://www.hirschmann.com/en/QR/INET-Industrial-HiVision

You find more information in the “Basic Configuration User Manual”.

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
- V.24 data rate: 9600 Baud
- Redundancy manager: disabled
- Ring redundancy: disabled

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 user name "admin" and 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.

For further information, see *https://hirschmann-support.belden.com/en/kb/required-password-change-new-procedure-for-first-time-login*

6. Monitoring ambient conditions

6.1. Monitoring the ambient air temperature

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

See: *Climatic conditions during operation* on page 71

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 temperature displayed is thus only an approximate indication of the ambient conditions present during device operation.

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.

See: *General data* on page 67

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 refer to the software user manuals. You can download these manuals as PDF files from the Internet on the Hirschmann product pages (*https://www.doc.hirschmann.com*).

7. Maintenance and service

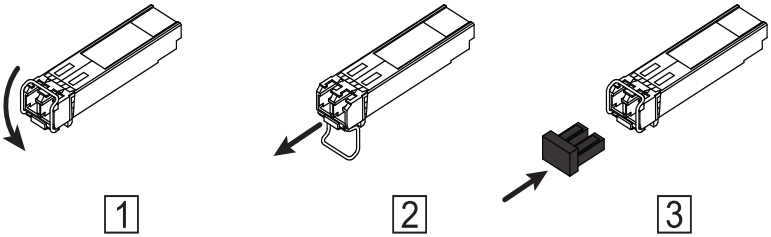
- When designing this device, Hirschmann largely avoided using high-wear parts. The parts subject to wear and tear are dimensioned to last longer than the lifetime of the product when it is operated normally. Operate this device according to the specifications.
- Relays are subject to natural wear. This 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 on the Hirschmann product pages on the Internet (*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 on the Internet at:
http://www.beldensolutions.com/en/Service/Repairs/index.phtml.

8. Disassembly

8.1. Removing an SFP transceiver (optional)

Figure 24. De-installing SFP transceivers: De-installation sequence



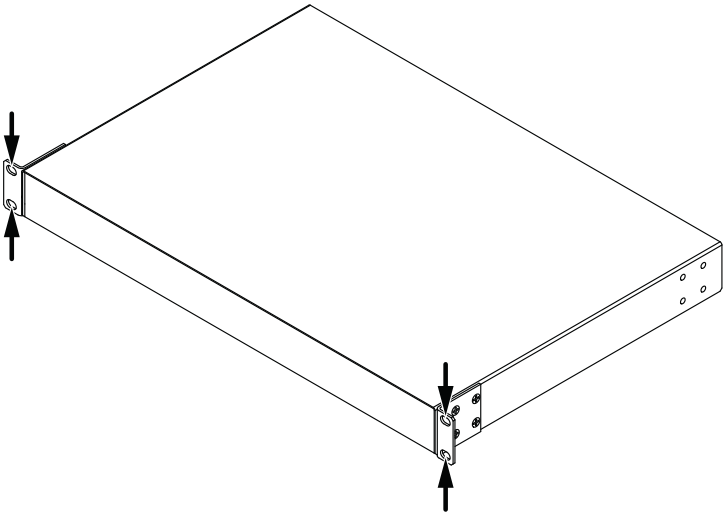
Perform the following work steps:

- 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 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.

Figure 25. Removing the device: Mounting brackets with oblong holes



Perform the following work steps:

- 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.

8.3. Removing the ACA41 microSD card (optional)

Figure 26. Removing the ACA41 microSD card (optional): Removing the microSD card and location on the device (front side of device variants GRS2000...)

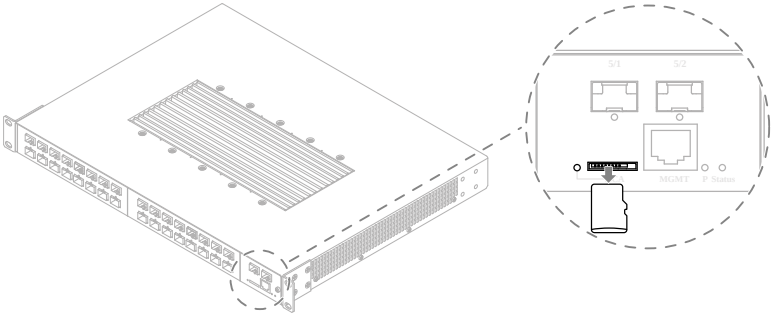
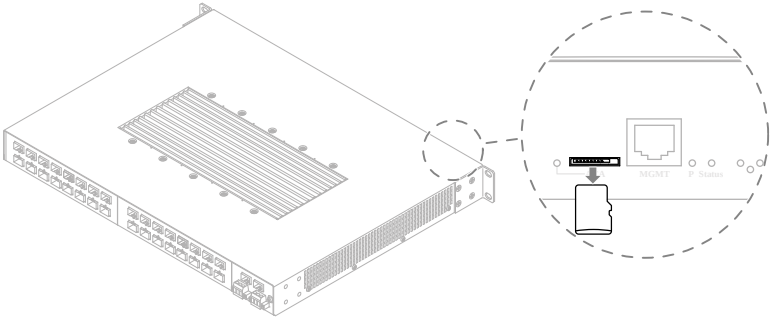


Figure 27. Removing the ACA41 microSD card (optional): Removing the microSD card and location on the device (rear side of device variants GRS2100...)



Perform the following work steps:

- Carefully push the ACA41 microSD card into the ACA41 microSD card slot until the release mechanism clicks noticeably.
- As shown, pull the ACA41 microSD card out of the ACA41 microSD card slot on the device.

9. Technical data

9.1. General data

Dimensions	See: *Dimension drawings* on page 69	
Weight	Depending on device variant	5.7 kg ... 6.5 kg (12.6 lb ... 14.3 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. Technical data supply voltage 100 V AC ... 240 V AC (50 Hz ... 60 Hz), or 60 V DC ... 250 V DC

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

Rated voltage range AC:	100 V AC ... 240 V AC, 50 Hz ... 60 Hz	
Voltage range AC incl. maximum tolerances:	85 V AC ... 264 V AC, 47 Hz ... 63 Hz	
Rated voltage range DC:	60 V DC ... 250 V DC	
Voltage range DC incl. maximum tolerances:	48 V DC ... 280 V DC	
Connection type	3-pin terminal block	
	Tightening torque	0.5 Nm (4.4 lb-in)
	min. conductor cross-section	AC voltage: 0.75 mm² (18 AWG) DC voltage: 1 mm² (16 AWG)
	max. conductor cross-section	2.5 mm² (12 AWG)
Power loss buffer	>100 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	

9.3. Power consumption/power output

Table 14. Power consumption/power output

Product code[8]	Maximum power consumption	Maximum power output
GRS2..0-….-00000-...	34 W	116 Btu (IT)/h
GRS2..0-….-I....-... GRS2..0-….-L....-...	40 W	136 Btu (IT)/h
GRS2..0-….-E....-... GRS2..0-….-K....-... GRS2..0-….-J....-... GRS2..0-….-M....-... GRS2..0-….-H....-... GRS2..0-….-G....-... GRS2..0-….-F....-...	49 W	167 Btu (IT)/h

9.4. Signal contact

Table 15. Signal contact

Signal contact		
Nominal value	Supply with AC voltage	I_{max} = 2 A at U_{max} = 250 V AC
	Supply with DC voltage	I_{max} = 2 A at U_{max} = 30 V DC I_{max} = 0.2 A at U_{max} = 125 V DC I_{max} = 0.1 A at U_{max} = 250 V DC
Connection type	2-pin terminal block	
	Tightening torque	0.34 Nm (3 lb-in)
	Minimum conductor cross-section	0.34 mm² ... 1.3 mm² (22 AWG ... 16 AWG)
	Maximum conductor cross-section	1.3 mm² (16 AWG)

8. Each character "." in the product codes in this table is a placeholder for any other single valid character from the product code of the device.

9.5. Dimension drawings

9.5.1. Dimension drawings

Figure 28. Dimension drawings: GRS2000... device variants

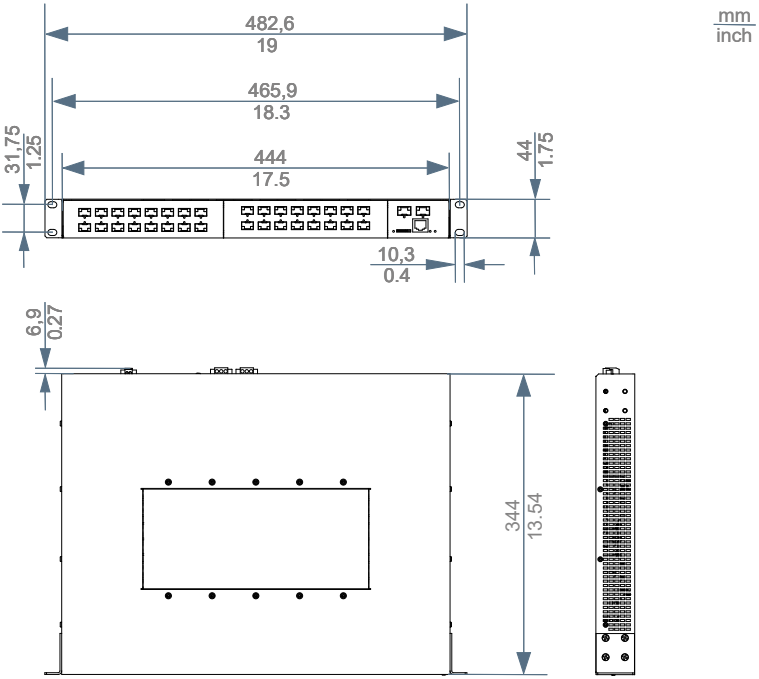
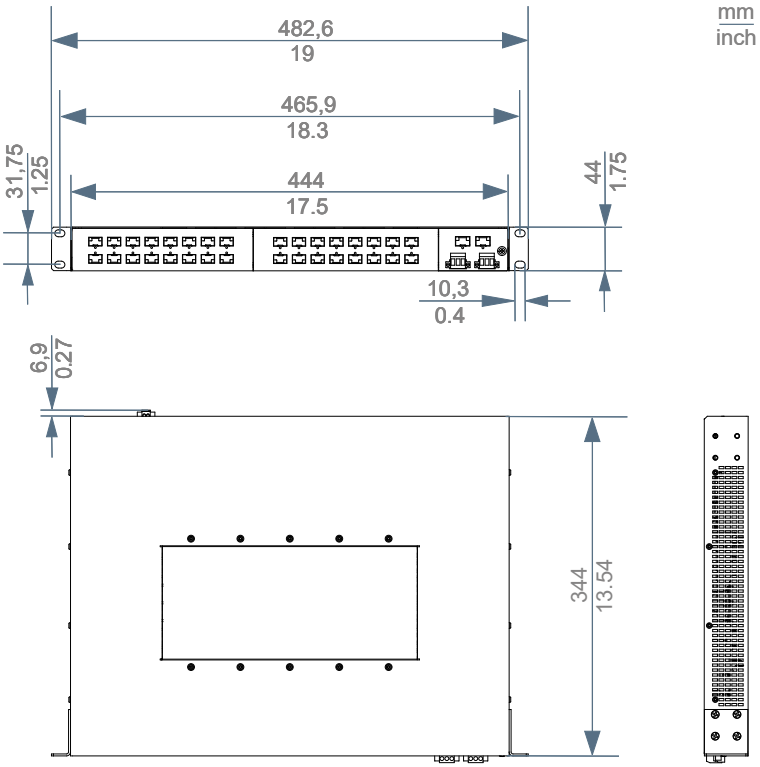


Figure 29. Dimension drawings: GRS2100... device variants



9.6. Climatic conditions during operation

Table 16. Climatic conditions during operation

Climatic conditions during operation			
Ambient air temperature[9]	up to 2000 m ASL (6562 ft ASL)	Operating temperature range characteristic value S	Standard: 0 °C … +60 °C (+32 °F … +140 °F)
		Operating temperature range characteristic value C	Standard: 0 °C … +60 °C (+32 °F … +140 °F) with Conformal Coating (CC)
		Operating temperature range characteristic value T	Extended: -40 °C … +70 °C (-40 °F … +158 °F) -40 °C ... +85 °C (-40 °F ... +185 °F) for 16 hours (tested in accordance with IEC 60068-2-2)[10]
		Operating temperature range characteristic value E	Extended: -40 °C … +70 °C (-40 °F … +158 °F) with Conformal Coating (CC) -40 °C ... +85 °C (-40 °F ... +185 °F) for 16 hours (tested in accordance with IEC 60068-2-2)[11]
	up to 4000 m ASL (13123 ft ASL)	Operating temperature range characteristic value S	Standard: 0 °C … +50 °C (+32 °F … +122 °F)
		Operating temperature range characteristic value C	Standard: 0 °C … +50 °C (+32 °F … +122 °F) with Conformal Coating (CC)
		Operating temperature range characteristic value T	Extended: -40 °C … +60 °C (-40 °F … +140 °F)
		Operating temperature range characteristic value E	Extended: -40 °C … +60 °C (-40 °F … +140 °F) with Conformal Coating (CC)
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. Temperature of the ambient air at a distance of 5 cm (2 in) from the device
10. Exclusively use SFP transceivers with extension “EEC”. If you use SFP transceivers without extension “EEC”, the standard temperature range applies.
11. Exclusively use SFP transceivers with extension “EEC”. If you use SFP transceivers without extension “EEC”, the standard temperature range applies.

9.7. Climatic conditions during storage

Table 17. Climatic conditions during storage

Climatic conditions during storage		
Ambient temperature	-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
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)

9.8. Derating

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. You find the classification in:
Derating depending on SFP tranceiver class on page 72

9.8.1. Derating depending on SFP tranceiver class

Exclusively applies to Operating temperature range characteristic values T and E.

Product code[12]	Number and type of SFPs	Derating
GRS2..0-G....-G....-...-T... GRS2..0-G....-G....-...-E...	25 ...32 × HP class SFP	5 K

12. Each character "." in the product codes in this table is a placeholder for any other single valid character from the product code of the device.

Note: Alternatively to a derating, the device can be installed with additional cooling. If a stable airflow of at least 100 LFM on the device can be provided, the derating is void.

9.8.1.1. Power class classification of SFP transceivers

Table 18. Power class classification of SFP transceivers: Fast Ethernet (100 Mbit/s) SFP transceivers

Fast Ethernet SFP transceiver	SFP power class	Order number
M-FAST SFP-MM/LC	HP	943865001
M-FAST SFP-MM/LC EEC	HP	943945001
M-FAST SFP-SM/LC	LP	943866001
M-FAST SFP-SM/LC EEC	LP	943946001
M-FAST SFP-SM+/LC	HP	943867001
M-FAST SFP-SM+/LC EEC	HP	943947001
M-FAST SFP-LH/LC	HP	943868001
M-FAST SFP-LH/LC EEC	HP	943948001

Table 19. Power class classification of SFP transceivers: Gigabit Ethernet (1000 Mbit/s) SFP transceivers

Product code	SFP power class	Order number
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

Table 20. Power class classification of SFP transceivers: 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	942164001
M-SFP-2.5-LH/LC	HP	942220001

9.9. Immunity

Table 21. Immunity: Standard applications

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

Applicable standard	Behavior	Frequency
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 22. Immunity: Marine applications

Applicable standard	Behavior	Frequency
IEC 60068-2-6, test Fc	Vibration	2 Hz ... 13.2 Hz with 1 mm (0.04 in) amplitude
IEC 60068-2-6, test Fc	Vibration	13.2 Hz ... 100 Hz with 0.7 g

Table 23. Immunity: Substation applications

EN 61850-3, IEEE 1613 – applies to devices with the approval code WW

Applicable standard	Behavior	Frequency
IEC 60068-2-6, test Fc	Vibration	2 Hz ... 9 Hz with 3 mm (0.11 in) amplitude
IEC 60068-2-6, test Fc	Vibration	9 Hz ... 200 Hz with 1.0 g
IEC 60068-2-6, test Fc	Vibration	200 Hz ... 500 Hz with 1.5 g
IEC 60068-2-27, test Ea	Shock	10 g at 11 ms
EN 60255-21-2	Bump	10 g at 16 ms

9.10. Electromagnetic compatibility (EMC)

9.10.1. EMC interference emission

Table 24. EMC interference emission: Standard applications

Applicable standard	Connection type	Specification
Radiated emission		
FCC 47 CFR Part 15		Class A
EN 55032		Class A

Table 25. EMC interference emission: Substation applications

Applicable standard	Connection type	Specification
Radiated emission		
FCC 47 CFR Part 15		Class A
EN 55032		Class A
EN 61000-6-4		Fulfilled
Conducted emission		
FCC 47 CFR Part 15	Supply connection	Class A
EN 55032	Supply connection	Class A
EN 55032	Telecommunication connections	Class A
EN 61000-6-4	Supply connection	Fulfilled
EN 61000-6-4	Telecommunication connections	Fulfilled

9.10.2. EMC interference immunity

Table 26. EMC interference immunity: Standard applications

Applicable standard	Connection type	Voltage
Electrostatic discharge		
Fast transients (burst)		

Table 26. EMC interference immunity: Standard applications (continued)

Applicable standard	Connection type	Voltage
EN 61000-4-4	Power supply connection	±2 kV
Voltage surges - DC supply connection		
Voltage surges - power supply connection		
EN 61000-4-5	line/ground	2 kV Supply voltage HV
EN 61000-4-5	line/line	1 kV Supply voltage HV
Conducted disturbances		
EN 61000-4-6	150 kHz ... 80 MHz	10 V
EN 61000-4-6	10 kHz ... 150 MHz	3 V

Table 27. EMC interference immunity: Railway applications (trackside)

Applicable standard	Connection type	Voltage
EN 61000-4-3	80 MHz ... 2700 MHz	max. 20 V/m

Table 28. EMC interference immunity: Substation applications

Applicable standard	Connection type	Voltage
Electrostatic discharge		
EN 61000-4-2 IEEE C37.90.3	Contact discharge	±8 kV
EN 61000-4-2 IEEE C37.90.3	Air discharge	±15 kV
Electromagnetic field		
EN 61000-4-3	80 MHz … 3000 MHz	max. 10 V/m
IEEE 1613	80 MHz … 1000 MHz (continuous wave)	max. 20 V/m
Fast transients (burst)		
EN 61000-4-4 IEEE C37.90.1	Power supply connection	±4 kV
EN 61000-4-4 IEEE C37.90.1	Data line	±4 kV
Voltage surges - DC supply connection		
EN 61000-4-5	line/ground	±2 kV

Table 28. EMC interference immunity: Substation applications (continued)

Applicable standard	Connection type	Voltage
IEEE 1613	line/ground	±5 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
Damped oscillation – DC supply connection		
EN 61000-4-12 IEEE C37.90.1	line/ground	±2.5 kV
EN 61000-4-12 IEEE C37.90.1	line/line	±1 kV
Damped oscillation – data line		
EN 61000-4-12 IEEE C37.90.1	line/ground	±2.5 kV
EN 61000-4-12	line/line	±1 kV

9.11. Network range

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

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). See item 6 in the product code: *Device name and product code* on page 22

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

Table 29. 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)

9.11.2. Fast Ethernet SFP transceiver

Table 30. F/O port 100BASE-FX (SFP Fiber Optic Fast Ethernet Transceiver)

Product code	Mode[13]	Wave length	Fiber	System attenuation	Example for F/O cable length[14]	Fiber attenuation	BLP/Dispersion
M-FAST-SFP-MM/LC...	MM	1310 nm	50/125 µm	0 dB ... 8 dB	0 km ... 5 km (0 mi ... 3.11 mi)	1.0 dB/km	800 MHz×km
M-FAST-SFP-MM/LC...	MM	1310 nm	62.5/125 µm	0 dB ... 11 dB	0 km ... 4 km (0 mi ... 2.49 mi)	1.0 dB/km	500 MHz×km
M-FAST-SFP-SM/LC...	SM	1310 nm	9/125 µm	0 dB ... 13 dB	0 km ... 25 km (0 mi ... 15.53 mi)	0.4 dB/km	3.5 ps/(nm×km)
M-FAST-SFP-SM+/LC...	SM	1310 nm	9/125 µm	10 dB ... 29 dB	25 km ... 65 km (15.53 mi ... 40.39 mi)	0.4 dB/km	3.5 ps/(nm×km)
M-FAST-SFP-LH/LC...	SM	1550 nm	9/125 µm	10 dB ... 29 dB	47 km ... 104 km (29.20 mi ... 64.62 mi)	0.25 dB/km	19 ps/(nm×km)
M-FAST-SFP-LH/LC...	SM	1550 nm	9/125 µm	10 dB ... 29 dB	55 km ... 140 km (14.29 mi ... 86.99 mi)	0.18 dB/km[15]	18 ps/(nm×km)
SFP-FAST-MM/LC	MM	1310 nm	50/125 µm	0 dB ... 8 dB	0 km ... 5 km (0 mi ... 3.11 mi)	1.0 dB/km	800 MHz
SFP-FAST-MM/LC EEC	MM	1310 nm	62.5/125 µm	0 dB ... 11 dB	0 km ... 4 km (0 mi ... 2.49 mi)	1.0 dB/km	500 MHz×km
SFP-FAST-SM/LC	SM	1310 nm	9/125 µm	0 dB ... 13 dB	0 km ... 25 km (0 mi ... 15.53 mi)	0.4 dB/km	3.5 ps/(nm×km)
SFP-FAST-SM/LC EEC	SM	1310 nm	9/125 µm	0 dB ... 13 dB	0 km ... 25 km (0 mi ... 15.53 mi)	0.4 dB/km	3.5 ps/(nm×km)

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

9.11.3. Gigabit Ethernet SFP transceiver

Table 31. F/O port 1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver)

Product code	Mode[16]	Wave length	Fiber	System attenuation	Example for F/O cable length[17]	Fiber attenuation	BLP[18]/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-MX/LC EEC	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 EEC	MM	1310 nm	62.5/125 µm	0 dB ... 12 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	1.0 dB/km	500 MHz×km
M-SFP-LX/LC...	MM	1310 nm[19]	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[19]	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)[20]	0.4 dB/km	3.5 ps/(nm×km)
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)

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

9.11.4. 2.5 Gigabit Ethernet SFP transceiver

Table 32. F/O port 2.5 Gbit/s (SFP fiber optic Gigabit Ethernet transceiver)

Product code	Mode[21]	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)
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-LH/LC	SM	1551 nm	9/125 µm	14 dB ... 28 dB	80 km[22] (49.70 mi)	0.25 dB/km	19 ps/(nm×km)

9.12. 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 33. General accessories

Article	Order number
2-pin terminal block with screw lock (10 pieces)	972272201
2-pin terminal block (50 pieces)	943845010
3-pin High Voltage Interlock terminal block (50 pieces)	943845008
AutoConfiguration Adapter ACA41	942342001
Network management software Industrial HiVision	943156xxx
Mounting bracket for installation on 19" devices, standard (2 pieces)	943943001

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

Table 33. General accessories (continued)

Article	Order number
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

9.12.1. Fast Ethernet SFP transceiver

Table 34. Accessories: Fast Ethernet SFP transceiver

Fast Ethernet SFP transceiver	Certification type[23]	Temperature range[24]	Order number
The following operating conditions apply to twisted pair transceivers: • Longer RSTP switching times and link loss detection times compared to twisted pair ports provided by the device directly. • It is currently not possible to set autocrossing manually.			
M-FAST SFP-MM/LC	Standard level	0 °C ... +60 °C (+32 °F ... +140 °F)	943865001
M-FAST SFP-MM/LC EEC	Standard level	-40 °C ... +70 °C (-40 °F ... +158 °F)	943945001
M-FAST SFP-SM/LC	Standard level	0 °C ... +60 °C (+32 °F ... +140 °F)	943866001
M-FAST SFP-SM/LC EEC	Standard level	-40 °C ... +70 °C (-40 °F ... +158 °F)	943946001
M-FAST SFP-SM+/LC	Standard level	0 °C ... +60 °C (+32 °F ... +140 °F)	943867001
M-FAST SFP-SM+/LC EEC	Standard level	-40 °C ... +70 °C (-40 °F ... +158 °F)	943947001
M-FAST SFP-LH/LC	Standard level	0 °C ... +60 °C (+32 °F ... +140 °F)	943868001
M-FAST SFP-LH/LC EEC	Standard level	-40 °C ... +70 °C (-40 °F ... +158 °F)	943948001

23. Use Entry level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC or UL 61010-2-201.
Use Standard level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC, UL 61010-2-201, DNV, Lloyd's Register, Bureau Veritas, UL 121201 (Hazardous Locations), IEC 61850-3, EN 50121-4, ATEX or IECEx.
You find further information on certifications on the Internet at the Hirschmann product pages:
https://www.belden.com
24. The temperature range specifications refer to the use in the GRS device.

9.12.2. Gigabit Ethernet SFP transceiver

Table 35. Accessories: Gigabit Ethernet SFP transceiver

Gigabit Ethernet SFP transceiver	Certification type	Temperature range[25]	Order number
The following operating conditions apply to twisted pair transceivers: • Longer RSTP switching times and link loss detection times compared to twisted pair ports provided by the device directly. • Cannot be used with Fast Ethernet ports. • Exclusively supports the autonegotiation mode including autocrossing.			
M-SFP-SX/LC	Standard level	0 °C ... +60 °C (+32 °F ... +140 °F)	943014001
M-SFP-SX/LC EEC	Standard level	-40 °C ... +70 °C (-40 °F ... +158 °F)	943896001
M-SFP-MX/LC EEC	Standard level	-40 °C ... +70 °C (-40 °F ... +158 °F)	942108001
M-SFP-LX/LC	Standard level	0 °C ... +60 °C (+32 °F ... +140 °F)	943015001
M-SFP-LX/LC EEC	Standard level	-40 °C ... +70 °C (-40 °F ... +158 °F)	943897001
M-SFP-LX+/LC	Standard level	0 °C ... +60 °C (+32 °F ... +140 °F)	942023001
M-SFP-LX+/ LC EEC	Standard level	-40 °C ... +70 °C (-40 °F ... +158 °F)	942024001
M-SFP-LH/LC	Standard level	-5 °C ... +70 °C (+23 °F ... +158 °F)	943042001
M-SFP-LH/LC EEC	Standard level	-40 °C ... +70 °C (-40 °F ... +158 °F)	943898001

9.12.3. 2.5 Gigabit Ethernet SFP transceiver

Table 36. Accessories: 2.5 Gigabit Ethernet SFP transceiver

2.5 Gigabit Ethernet SFP transceiver	Certification type	Temperature range[26]	Order number
M-SFP-2.5-MM/LC EEC	Standard level	-40 °C ... +70 °C (-40 °F ... +158 °F)	942162001
M-SFP-2.5-SM-/LC EEC	Standard level	-40 °C ... +70 °C (-40 °F ... +158 °F)	942163001
M-SFP-2.5-SM/LC EEC	Standard level	-40 °C ... +70 °C (-40 °F ... +158 °F)	942164001
M-SFP-2.5-LH/LC	Standard level	0 °C ... +60 °C (+32 °F ... +140 °F)	942220001

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

9.13. Scope of delivery

Table 37. Scope of delivery

Amount	Article
1 ×	Device
1 ×	Safety and general information sheet
1 × or 2 × (depending on device variant)	Terminal block for the supply voltage (depending on number and type of PSUs)
1 ×	2-pin terminal block for signal contact
2 ×	Mounting bracket for installation on 19" devices, standard (pre-mounted)

9.14. Order numbers

GRS2000 series devices are available as fixed variants with fixed order numbers or open variants. You find the order numbers of all fixed device variants in *Table 38: Order numbers: Fixed device variants* on page 83.

Table 38. Order numbers: Fixed device variants

Device name	Device product code	Order number
GRS2030-12TX/6SFP-1HV-2A	GRS2030-B0000-00000-A00-TK9VYHHE2A99	942336001
GRS2030-4TX/14SFP-1HV-2A	GRS2030-C0000-00000-A00-TK9VYHHE2A99	942336002
GRS2030-24TX/2SFP-1HV-2A	GRS2030-M0000-L0000-A00-TK9VYHHE2A99	942336003
GRS2030-26SFP-1HV-2A	GRS2030-G0000-E0000-A00-TK9VYHHE2A99	942336004
GRS2030-12TX/14SFP-1HV-2A	GRS2030-C0000-L0000-A00-TK9VYHHE2A99	942336005
GRS2030-32TX/2SFP-1HV-2A	GRS2030-M0000-M0000-A00-TK9VYHHE2A99	942336006
GRS2030-34SFP-1HV-2A	GRS2030-G0000-G0000-A00-TK9VYHHE2A99	942336007
GRS2030-16TX/18SFP-1HV-2A	GRS2030-G0000-M0000-A00-TK9VYHHE2A99	942336008
GRS2040-12TX/4SFP-2HV-2A	GRS2040-B0000-00000-000-TKKVYHHE2A99	942336025
GRS2040-4TX/12SFP-2HV-2A	GRS2040-C0000-00000-000-TKKVYHHE2A99	942336026
GRS2040-24TX/2SFP-2HV-2A	GRS2040-M0000-L0000-A00-TKKVYHHE2A99	942336027
GRS2040-26SFP-2HV-2A	GRS2040-G0000-E0000-A00-TKKVYHHE2A99	942336028
GRS2040-12TX/14SFP-2HV-2A	GRS2040-C0000-L0000-A00-TKKVYHHE2A99	942336029
GRS2040-32TX/2SFP-2HV-2A	GRS2040-M0000-M0000-A00-TKKVYHHE2A99	942336030

Table 38. Order numbers: Fixed device variants (continued)

Device name	Device product code	Order number
GRS2040-34SFP-2HV-2A	GRS2040-G0000-G0000-A00-TKKVYHHE2A99	942336031
GRS2040-16TX/18SFP-2HV-2A	GRS2040-G0000-M0000-A00-TKKVYHHE2A99	942336032

9.15. 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 on the Hirschmann website at: *https://www.belden.com* in the product information.

Table 39. List of technical standards

ANSI/ISA 12.12.01	Non-incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations
DNV-CG-0339	Environmental test specification for electrical, electronic and programmable equipment and systems.
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
IEC/EN 62368-1	Equipment for audio/video, information and communication technology - Part 1: Safety requirements

Table 39. List of technical standards (continued)

FCC 47 CFR Part 15	Code of Federal Regulations
IEEE 802.1D	Media Access Control Bridges
IEEE 802.1Q	Virtual Bridged Local Area Networks
IEEE 802.1w	Rapid Reconfiguration
IEEE 802.3	Ethernet
NEMA TS 2	Traffic Controller Assemblies with NTCIP Requirements (#environmental #requirements)
IEEE 1613	IEEE Standard Environmental and Testing Requirements for Communication Networking Devices in Electric Power Substations
IEC 62443-4-2	Security for industrial automation and control systems.
IEC 60068-1	Environmental testing
IEC 60825-1	Laser product safety
cUL 62368-1	Audio/video, information and communication technology equipment – Part 1: Safety requirements
IEC/EN 61850-3	Communication networks and systems for power utility automation - Part 3: General requirements.

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://hirschmann-support.belden.com

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

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