



HIRSCHMANN

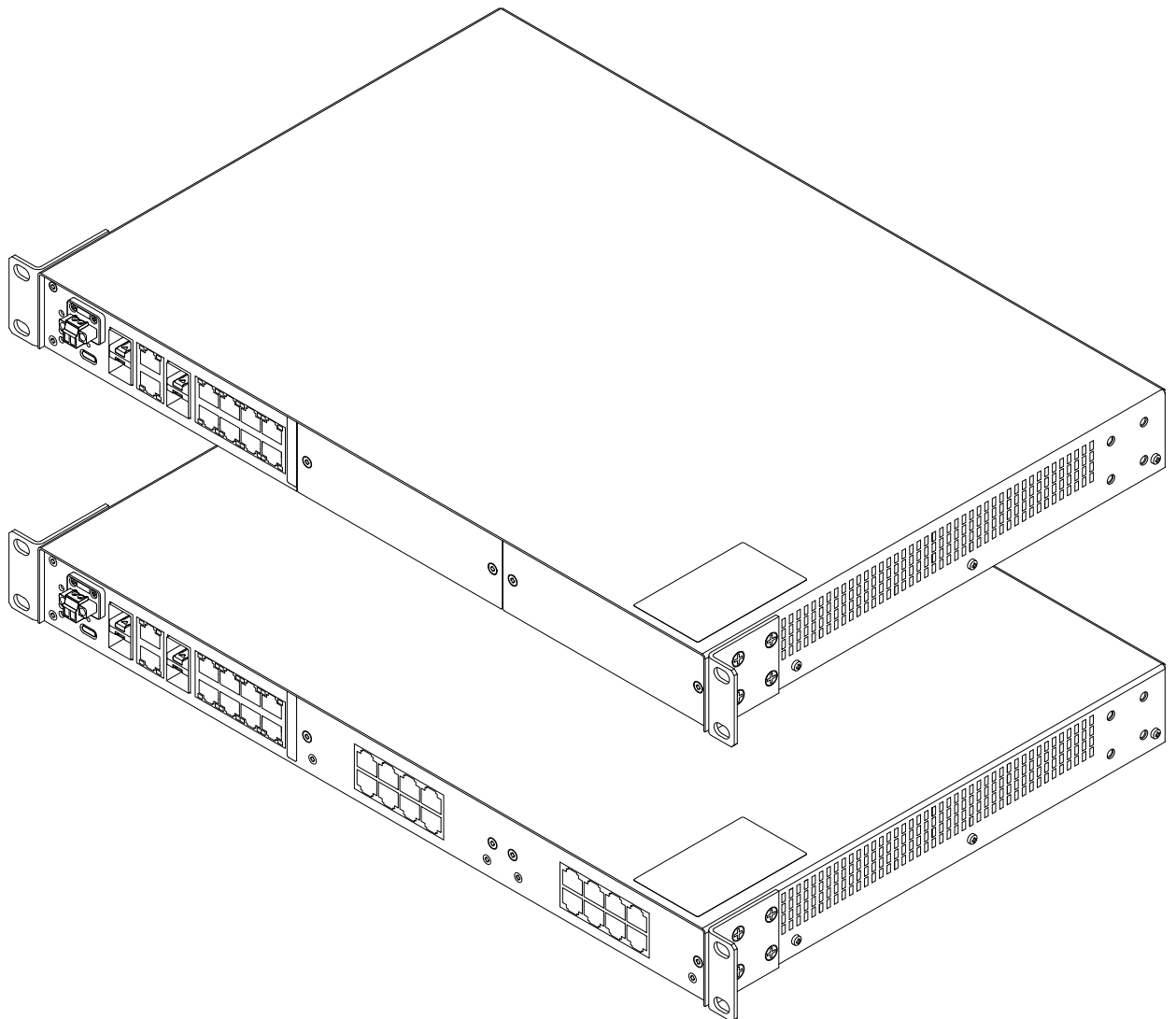
A **BELDEN** BRAND

User Manual

Installation

Industrial Ethernet Workgroup Switch

GRS103 Family



The naming of copyrighted trademarks in this manual, even when not specially indicated, should not be taken to mean that these names may be considered as free in the sense of the trademark and tradename protection law and hence that they may be freely used by anyone.

© 2022 Hirschmann Automation and Control GmbH

Manuals and software are protected by copyright. All rights reserved. The copying, reproduction, translation, conversion into any electronic medium or machine scannable form is not permitted, either in whole or in part. An exception is the preparation of a backup copy of the software for your own use.

The performance features described here are binding only if they have been expressly agreed when the contract was made. This document was produced by Hirschmann Automation and Control GmbH according to the best of the company's knowledge. Hirschmann reserves the right to change the contents of this document without prior notice. Hirschmann can give no guarantee in respect of the correctness or accuracy of the information in this document.

Hirschmann can accept no responsibility for damages, resulting from the use of the network components or the associated operating software. In addition, we refer to the conditions of use specified in the license contract.

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

Contents

1	About this manual	7
2	General safety instructions	8
2.1	Warning symbols	8
2.2	Intended use	10
2.3	National and international safety regulations	10
2.4	Installation site requirements	10
2.5	Qualification requirements for personnel	10
2.5.1	Media modules	11
2.6	Device casing	11
2.6.1	ESD Guidelines	11
2.7	Strain relief	12
2.8	Shielded ground	12
2.9	Electrical connections	13
2.9.1	Grounding the device	13
2.9.2	Requirements for connecting electrical wires	13
2.9.3	Requirements for connecting the supply voltage	14
2.9.4	Requirements for connecting the signal contact	14
2.10	LED or laser components	16
2.11	Recycling note	16
3	Approvals	17
3.1	CE marking	17
3.2	UKCA marking	18
3.3	FCC note	19
3.4	Relevant for installations in 19" switch cabinets according to UL 60950-1/UL 62368-1	19
4	Key	21
5	Description	22
5.1	General device description	22
5.1.1	GRS103 basic devices	23

5.1.2	Modular GRS103 basic devices	24
5.1.3	GRS103 media modules	25
5.2	Device views	30
5.2.1	Basic device	30
5.2.2	Modular basic device	30
5.2.3	Rear view	31
5.2.4	Port assignment	31
5.3	Power supply	32
5.3.1	Basic device	32
5.3.2	PoE supply voltage for M1-8TP-RJ45 PoE media module	33
5.4	Ethernet ports	33
5.4.1	10/100 Mbit/s twisted pair port	33
5.4.2	10/100 Mbit/s PoE port	34
5.4.3	10/100/1000 Mbit/s twisted pair port	35
5.4.4	10/100/1000 Mbit/s twisted pair port	36
5.4.5	100 Mbit/s F/O port	36
5.4.6	100/1000 Mbit/s Combo port	37
5.5	Management interfaces	37
5.5.1	Signal contact	37
5.5.2	USB-C interface: ACA22-USB-C	38
5.6	Display elements	39
5.6.1	Device status	39
5.6.2	Port status	41
6	Installation	42
6.1	Checking the package contents	42
6.2	Installing an SFP transceiver (optional)	43
6.3	Mounting a cover panel	43
6.4	Mounting a media module	43
6.5	Installing the device	44
6.5.1	Selecting the installation location	45
6.5.2	Mounting on a flat surface	45
6.5.3	Mounting on a vertical flat surface	47
6.5.4	Mounting in a switch cabinet	49
6.6	Grounding the device	52
6.7	Connecting the signal contact (optional)	52

6.8	Connecting the supply voltage	53
6.9	Connecting the PoE supply voltage to the M1-8TP-RJ45 PoE media module (optional)	53
6.10	Connecting data cables	55
6.11	Support of PoE	55
6.12	Filling out the inscription label	56
7	Operating the device	57
8	Making basic settings	58
8.1	Default settings	58
8.2	First login (Password change)	59
9	Monitoring the ambient conditions	60
9.1	Monitoring the ambient air temperature	60
10	Maintenance and service	61
11	Disassembly	62
11.1	Removing an SFP transceiver (optional)	62
11.2	Removing a media module	62
11.3	Removing the device	63
12	Technical data	65
12.1	General technical data	65
	12.1.1 Basic device	65
	12.1.2 Media modules	66
12.2	Supply voltage	66
	12.2.1 Basic device	66
	12.2.2 Media modules	66
12.3	Power consumption/power output	67
12.4	Signal contact	68
12.5	Climatic conditions during operation	68
	12.5.1 Basic device	68
	12.5.2 Media modules	68
12.6	Climatic conditions during storage	69

12.7	Dimension drawings	70
12.8	EMC	71
12.9	Immunity	71
12.10	Network range	73
12.10.1	10/100/1000 Mbit/s twisted pair port	73
12.10.2	Fast Ethernet SFP transceiver	73
12.10.3	Bidirectional Fast Ethernet SFP transceiver	74
12.10.4	Gigabit Ethernet SFP transceiver	75
12.10.5	Bidirectional Gigabit Ethernet SFP transceiver	76
13	Scope of delivery	78
13.1	Basic device	78
13.2	Media modules	78
14	Order numbers	79
15	Accessories	80
16	Underlying technical standards	83
A	Further support	84

1 About this manual

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

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

2 General safety instructions

Note: 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.

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

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



WARNING

UNCONTROLLED MACHINE ACTIONS

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

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

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

2.1 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.

2.2 Intended use

- Use the product only for the application cases described in the Hirschmann product information, including this manual.
- Operate the product only according to the technical specifications. See [“General technical data” on page 65.](#)
- Connect to the product only components suitable for the requirements of the specific application case.

2.3 National and international safety regulations

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

2.4 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. See [“General technical data” on page 65.](#)
- ▶ 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.

2.5 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.

2.5.1 Media modules

Only qualified personnel are authorized to install or remove media modules.

2.6 Device casing

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

- Never insert sharp objects (small screwdrivers, wires, etc.) into the inside of the device.
- Verify that the electrical installation meets locally or nationally applicable safety regulations.
- 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.
- Do not touch the casing during operation or shortly after switching off the device. Hot surfaces can cause injury.
- If you are operating the device in a 19" switch cabinet: install sliding/mounting rails for supporting the weight of the device.
- Exclusively use Hirschmann mounting brackets.
- Exclusively use the provided screws when you reposition the attached mounting brackets or install additional mounting brackets. You obtain the additional brackets as accessories.
[See "Accessories" on page 80.](#)
- Mount the device horizontally or vertically, in a 19" switch cabinet ([figure 22 on page 50](#)) or on a flat surface ([figure 20 on page 46](#)).
- Only switch on the device when the casing is closed.

2.6.1 ESD Guidelines

Media modules are equipped with electrostatically sensitive components. These can be destroyed by the effect of an electric field or by charge equalization when touching the printed circuit board or the contacts, or their lifetime can be affected. Media modules are therefore delivered packed in a conductive ESD protection bag. The packaging is reusable.

Make sure you adhere to the following protection measures for electrostatically endangered assemblies:

- Create electrical equipotential bonding between yourself and your environment, e.g. using a wristband, which you clamp to the basic device (knurled screw of an interface card). When the power supply cable is connected, the basic device is grounded via the power supply connection.
- Only now do you take the card out of the conductive bag.
- Outside the basic device, only store the cards in a conductive ESD protective bag.
- ESD protective field equipment is available for the safe handling of electrostatically endangered assemblies.

Further information about electrostatic sensitive modules can be found in DIN EN 61340-5-1 (2007-08) and DIN EN 61340-5-2 (2007-08).

2.7 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.

2.8 Shielded ground

The shielded ground wire of the twisted pairs cables is connected to the front panel as a conductor.

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

2.9 Electrical connections

2.9.1 Grounding the device

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

The device is grounded via the power supply connection(s).

2.9.2 Requirements for connecting electrical wires

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

The following requirements apply without restrictions:

- ▶ The electrical wires are voltage-free.
- ▶ The cables used are permitted for the temperature range of the application case.
- ▶ The device is grounded via the voltage supply socket (see [figure 10](#)).
- ▶ Exclusively switch on the device when it is installed.
- ▶ Only switch on the device when the casing is closed.
- ▶ Relevant for North America:
Exclusively use +60/+75 °C (+140/+167 °F) or +75 °C (+167 °F) copper (Cu) wire.

2.9.3 Requirements for connecting the supply voltage

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

The supply voltage is electrically isolated from the casing.

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

Prerequisites:

All of the following requirements are complied with:

- ▶ The supply voltage corresponds to the voltage specified on the type plate of the device.
- ▶ The power supply conforms to overvoltage category I or II.
- ▶ The power supply has an easily accessible disconnecting device (for example a switch or a plug). This disconnecting device is clearly identified. So in the case of an emergency, it is clear which disconnecting device belongs to which power supply cable.
- ▶ Install a fuse in the outer conductor of the power supply. Connect the neutral conductor to the ground potential. If the neutral conductor is not connected to the ground potential, also install an external fuse in the neutral conductor.

Regarding the properties of this fuse:

[See "Power supply" on page 32.](#)

The wire diameter of the power supply cable is at least 0.75 mm² (North America: AWG18) on the supply voltage input.

- ▶ The cross-section of the ground conductor is the same size as or bigger than the cross-section of the power supply cables.
- ▶ Use a power supply cable which is suitable for the voltage, the current and the physical load.
- ▶ Install an external fuse in the conductor that is not on ground potential.
- ▶ The power supply 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 power supply is potential-free. For power supply modules capable of PoE, exclusively use a potential-free SELV power supply.
- ▶ With redundant power supply: A positive grounding is prohibited.

Note: When using devices with redundant power supply, remove both non-heating device couplings to disconnect the device from the power supply. When using PoE modules, also disconnect or remove the PoE voltage.

2.9.4 Requirements for connecting the signal contact

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

The following requirements apply without restrictions:

- ▶ The 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 is limited by a current limitation device or a fuse. Observe the electrical threshold values for the signal contact.
[See “Technical data” on page 65.](#)

2.10 LED or laser components

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

2.11 Recycling note

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

3 Approvals

3.1 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 at the disposal of the relevant authorities at the following address:

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

You find the EU conformity declaration as PDF file for downloading on the Internet at: <https://www.doc.hirschmann.com/certificates.html>

The product can be used in the industrial sector.

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

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.

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

3.2 UKCA marking

The labeled devices comply with the following UK regulations:

- ▶ **S.I. 2012 No. 3032**
Restriction of the Use of Certain Hazardous Substances in Electrical and
Electronical Equipment Regulations
- ▶ **S.I. 2016 No. 1101**
Electrical Equipment (Safety) Regulations 2016
- ▶ **S.I. 2016 No. 1091**
Electromagnetic Compatibility Regulations 2016



The UKCA conformity declaration will be available to the relevant authorities at the following address:

Belden UK Ltd.
1 The Technology Centre, Station Road
Framlingham, IP13 9EZ, United Kingdom

You find the UKCA conformity declaration as PDF file for downloading on the Internet at: <https://www.doc.hirschmann.com/certificates.html>

The product can be used in the industrial sector.

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

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.

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

3.3 FCC note

Supplier's Declaration of Conformity 47 CFR § 2.1077 Compliance Information

GRS103
GRS103 modules

U.S. Contact Information

Belden – 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.

3.4 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).

4 Key

The symbols used in this manual have the following meanings:

▶	Listing
□	Work step
■	Subheading

5 Description

5.1 General device description

The GRS103 device is a managed switch with up to 22 × 10/100 Mbit/s Twisted pair ports and 4 × 10/100/1000 Mbit/s Combo ports. The GRS103 variants consist of either a single device, or – depending on the device variant – a basic device with up to 2 × pluggable media modules. The modular GRS103 device variants GRS103-6TX/4C... use the M1 family of media modules, which are also compatible with MACH102 devices.

The device meets the relevant industry standards, provides very high operational reliability, even under extreme conditions, and also long-term reliability and flexibility.

The device allows you to set up switched Industrial Ethernet networks according to standard IEEE 802.3.

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

- ▶ Number of ports
- ▶ Transmission speed
- ▶ Types of connectors
- ▶ Temperature range
- ▶ Supply voltage range
- ▶ Certifications
- ▶ Software level
- ▶ Modularity

The device works without a fan.

If desired and depending on the device variant, the power can be supplied redundantly.

The following installation options are available:

- ▶ Horizontal mounting in a 19" rack
- ▶ Horizontal mounting on a flat surface
- ▶ Vertical mounting on a flat surface
- ▶ Desktop device

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

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

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:
<http://www.hirschmann.com/en/QR/INET-Industrial-HiVision>
- ▶ USB-C interface (locally on the device)

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

5.1.1 GRS103 basic devices

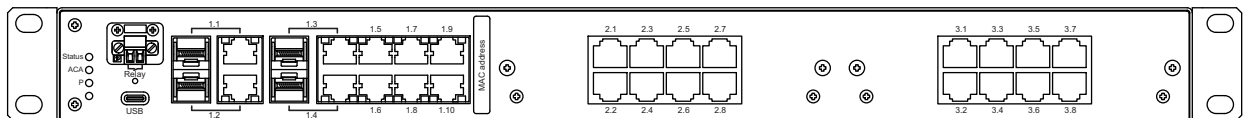


Figure 1: Front view using example of device variant GRS103-22TX/4C

The GRS103 basic device comprises all function units such as: switch function, management function, redundancy function, voltage connection, management connection, slots for media modules (depending on the device variant).

Fixed-variant devices (non-modular)	Description
GRS103-22TX/4C-1HV-2S	Software level HiOS Layer 2 Standard, 1 PSU
GRS103-22TX/4C-1HV-2A	Software level HiOS Layer 2 Advanced, 1 PSU
GRS103-22TX/4C-2HV-2S	Software level HiOS Layer 2 Standard, 2 PSUs
GRS103-22TX/4C-2HV-2A	Software level HiOS Layer 2 Advanced, 2 PSUs

Table 1: Overview non-modular devices

- ▶ The Fast Ethernet ports (10/100 Mbit/s) of the basic devices are suitable for connecting end devices or network segments according to the standards IEEE 802.3 100BASE-TX/10BASE-T. These ports support autonegotiation and autopolarity. The ports are RJ45 sockets. The casings of the RJ45 sockets are electrically connected to the front panel of the device. The pin assignment is identical to MDI-X. When the autonegotiation function is enabled, these ports also support autocrossing.
- ▶ The Gigabit Ethernet Combo ports (alternatively connectable via F/O or TX) of the basic devices are suitable for connecting end devices or network segments according to the standards IEEE 802.3 1000BASE-X/100BASE-FX (SFP slot) and IEEE 802.3 1000BASE-T/100BASE-TX / 10BASE-T (RJ45 socket).
A plugged SFP module switches off the TX port.

5.1.2 Modular GRS103 basic devices



Figure 2: Front view using example of device variant GRS103-6TX/4C

The GRS103-6TX/4C... device variants from the Industrial Ethernet family GRS103 are modular switches. The devices consist of a basic switch device and, depending on the device variant, pluggable media modules for additional ports.

Up to 2 pluggable media modules each provide an additional 8 Fast Ethernet interfaces. There are various types of media modules available with different connectors.

For the sake of simplicity, the basic switch device with various plugged-in media modules will be referred to as GRS103 in this document.

Modular-variant devices	Description
GRS103-6TX/4C-1HV-2S	Software level HiOS Layer 2 Standard, 1 PSU
GRS103-6TX/4C-1HV-2A	Software level HiOS Layer 2 Advanced, 1 PSU

Table 2: Overview modular devices

Modular-variant devices	Description
GRS103-6TX/4C-2HV-2S	Software level HiOS Layer 2 Standard, 2 PSUs
GRS103-6TX/4C-2HV-2A	Software level HiOS Layer 2 Advanced, 2 PSUs

Table 2: Overview modular devices

5.1.3 GRS103 media modules

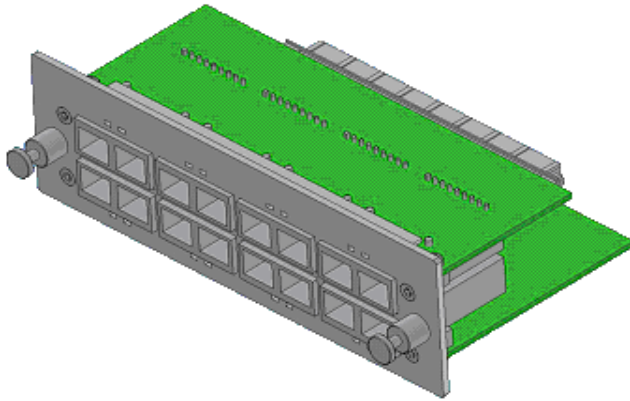


Figure 3: Media module for GRS103, Example: M1-8MM-SC

The modular GRS103 device variants GRS103-6TX/4C... use the M1 family of media modules, which are also compatible with MACH102 devices. The GRS103 media modules form the interface from the device to the LAN.

The media modules are hot-plug-compatible. This means that you have the option to replace modules with modules of the same kind during operation.

The media modules have 8 Fast Ethernet ports each and only differ in the type of port.

The different interfaces of the GRS103 media modules provide you with the following interface-specific functions:

- ▶ Specific functions TP/TX port
 - ▶ Link Control
 - ▶ Auto Polarity Exchange

- ▶ Autonegotiation
- ▶ Autocrossing (device may be connected with a crossed-over or an uncrossed cable)
- ▶ Specific functions of fiber optic interface
 - ▶ Link Down monitoring

GRS103 media modules Module type	TP ports 10/100 Mbit/s	TP ports 10/100 Mbit/s PoE	F/O ports Multimode 100 Mbit/s	F/O ports Singlemode 100 Mbit/s	SFP ports Multimode Singlemode Longhaul 100 Mbit/s
M1-8TP-RJ45	8, RJ45	–	–	–	–
M1-8TP-RJ45 PoE	–	8, RJ45	–	–	–
M1-8MM-SC	–	–	8, DSC	–	–
M1-8SM-SC	–	–	–	8, DSC	–
M1-8SFP	–	–	–	–	8, SFP

Table 3: Media connections per GRS103 media module (number and type)

■ Media module M1-8TP-RJ45

The media module M1-8TP-RJ45 has 8 × 10/100 Mbit ports for connecting end devices or network segments according to the standards IEEE 802.3 100BASE-TX / IEEE 802.3 10 BASE-T.

These ports support autonegotiation and autopolarity. The ports are RJ45 sockets. The casings of the RJ45 sockets are electrically connected to the front panel of the device. The pin assignment is identical to MDI-X. When the autonegotiation function is enabled, these ports also support autocrossing.

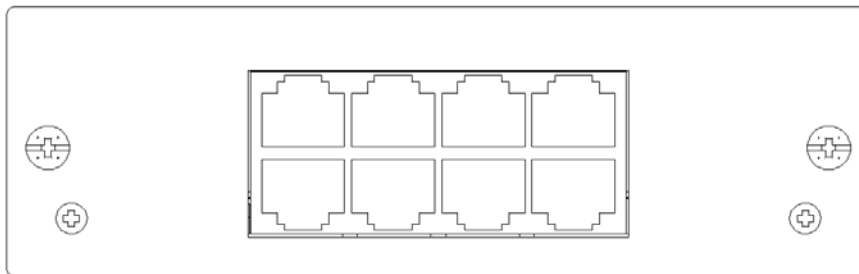


Figure 4: Media module M1-8TP-RJ45

■ Media module M1-8TP-RJ45 PoE

The M1-8TP-RJ45 PoE media module supports Power over ETHERNET (PoE). It has 8 10/100 Mbit/s TP PoE ports.

The 10/100 Mbit/s PoE port allows you to connect network components as a PoE voltage sink according to the standard IEEE 802.3 10BASE-T/100BASE-TX and IEEE 802.3af/IEEE 802.3at.

This port is an RJ45 socket.

- ▶ Autonegotiation
- ▶ Autopolarity
- ▶ Autocrossing (if autonegotiation is activated)

The devices support the connection and a remote power supply of e.g., IP phones (Voice-over-IP), webcams, sensors, print servers, and WLAN access points via 10BASE-T/100BASE-TX. With PoE, these end devices are powered by the twisted pair cable.

You can connect PoE terminal devices (PD, Powered Device, Type 1 or Type 2) from Class 0 to Class 4. Connect only PDs with a collective power budget at PSE < 124 W.

Example: 7 × Class 3 PD + 1 × Class 2 PD = 114.8 W, thus permitted

8 × Class 3 PD = 123.2 W, thus permitted

6 × Class 3 PD + 1 × Class 4 PD = 122.4 W, thus permitted

Class	Available power at PSE	Available power at PD	Classification signature
0	15.4 W	0.44 W ... 12.95 W	0 mA ... 5 mA
1	4 W	0.44 W ... 3.84 W	8 mA ... 13 mA
2	7 W	3.84 W ... 6.49 W	16 mA ... 21 mA
3	15.4 W	6.49 W ... 12.95 W	25 mA ... 31 mA
4	30 W (only 802.3at/Type 2)	12.95 W ... 25.5 W	35 mA ... 45 mA

Table 4: PoE power classes according to IEEE 802.3

The PoE power is supplied via the wire pairs transmitting the signal (Alternative A/phantom supply).

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

The following conditions are met in accordance with IEEE 802.3af/ IEEE 802.3at:

- ▶ Endpoint PSE
- ▶ Alternative A

The pin assignment corresponds to MDI-X.

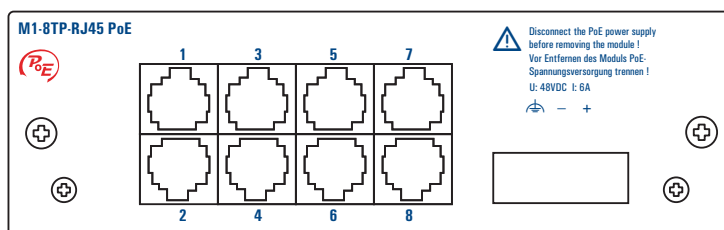


Figure 5: Media module M1-8TP-RJ45 PoE

Note: Only trained service personnel are authorized to plug the M1-8TP-RJ45 PoE media module into the basic device or remove from the basic device.

Note: This module requires an external power supply.

See [“Media modules” on page 66](#).

■ **Media module M1-8MM-SC**

The M1-8MM-SC media module has 8 FX ports for connecting terminal devices or network segments in compliance with the IEEE 802.3u 100BASE-FX Multimode standard. The optical ports are configured in 100 Mbit/s Fullduplex (FDX) and support FEF1. They have a DSC design.

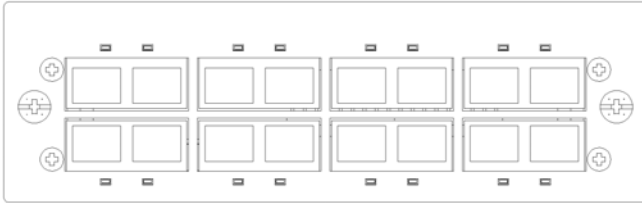


Figure 6: *Media module M1-8MM-SC*

■ **Media module M1-8SM-SC**

The M1-8SM-SC media module has 8 FX ports for connecting terminal devices or network segments in compliance with the IEEE 802.3u 100BASE-FX Singlemode standard. The optical ports are configured in 100 Mbit/s Fullduplex (FDX) and support FEF1. They have a DSC design.

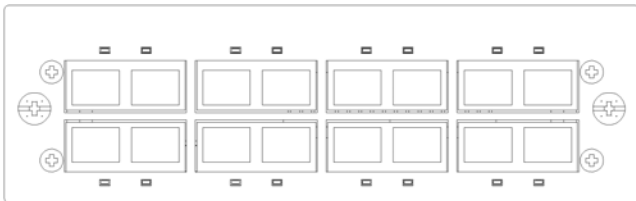


Figure 7: *Media module M1-8SM-SC*

■ **Media module M1-8SFP**

The M1-8MM-SC media module has 8 FX ports for connecting end devices or network segments in compliance with the IEEE 802.3u 100BASE-FX Multimode/Singlemode/Longhaul standard. The optical ports are configured in 100 Mbit/s full duplex (FDX) and support FEF1. These ports are SFP slots and are designed for the M-FAST SFP-... Hirschmann SFP module types.

See [“Accessories” on page 80](#).

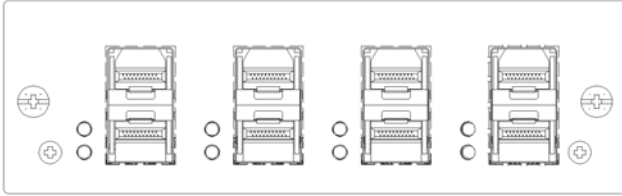
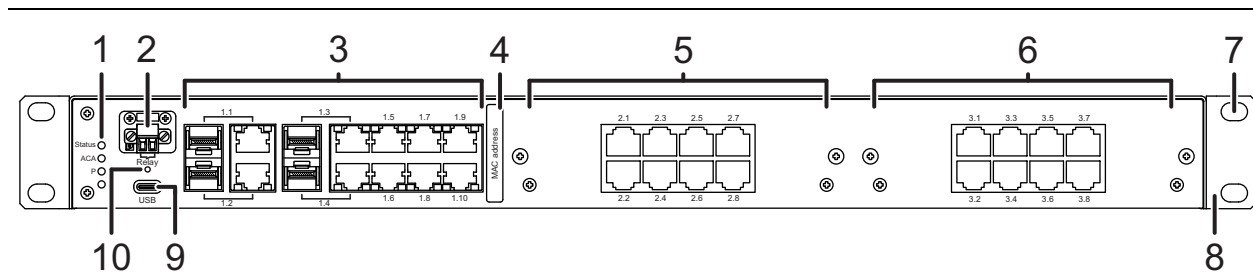


Figure 8: Media module M1-8SFP: Front view

5.2 Device views

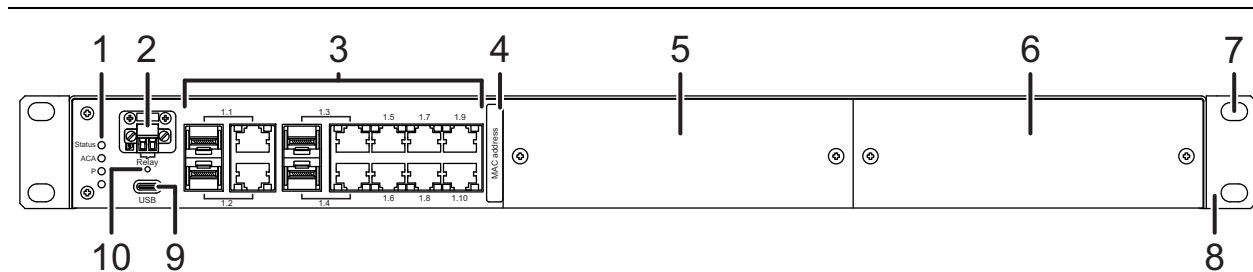
5.2.1 Basic device



1	LED display elements for device status
2	Signal contact 2-pin terminal block
3	Port group I 4 × Combo port for 10/100/1000 Mbit/s TP connections or 100/1000 Mbit/s F/O connections 6 × 10/100 Mbit/s twisted pair port
4	MAC address of device (label)
5	Port group II 8 × 10/100 Mbit/s twisted pair port (not present in GRS103-6TX/4C...)
6	Port group III 8 × 10/100 Mbit/s twisted pair port (not present in GRS103-6TX/4C...)
7	Oblong hole
8	Mounting bracket
9	ACA22 interface
10	Screw hole for ACA installation

Table 5: Front view using example of device variant GRS103-22TX/4C

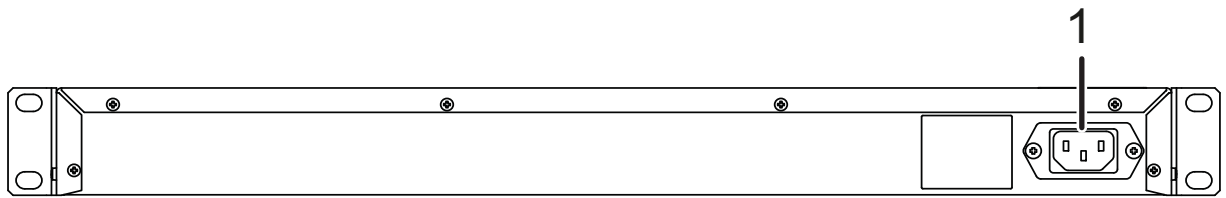
5.2.2 Modular basic device



1	LED display elements for device status
2	Signal contact 2-pin terminal block
3	Port group I 4 × Combo port for 10/100/1000 Mbit/s TP connections or 100/1000 Mbit/s F/O connections 6 × 10/100 Mbit/s twisted pair port
4	MAC address of device (label)
5	Media module slot 1
6	Media module slot 2
7	Oblong hole
8	Mounting bracket
9	ACA22 interface
10	Screw hole for ACA installation

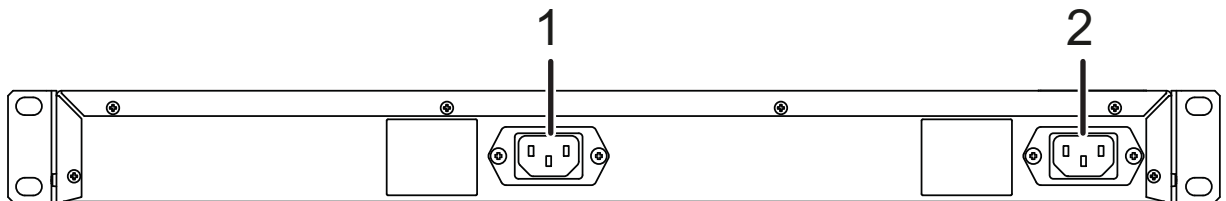
Table 6: Front view using example of device variant GRS103-6TX/4C

5.2.3 Rear view



1 Power supply unit 1

Table 7: Rear view: Device variants with non-redundant power supply



1 Power supply unit 2

2 Power supply unit 1

Table 8: Rear view: Device variants with redundant power supply

5.2.4 Port assignment

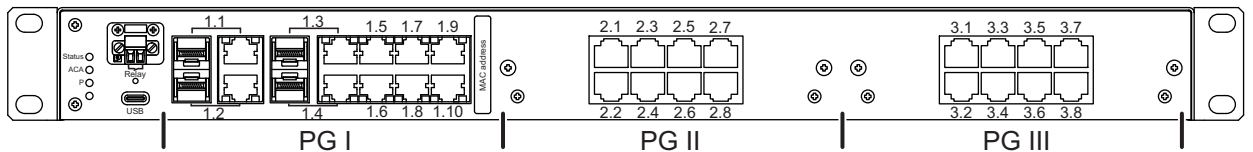


Table 9: Port assignment: Front view; numbering sequence identical for all device variants

5.3 Power supply

WARNING

ELECTRIC SHOCK

Connect only a supply voltage that corresponds to the type plate of your device.

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

Note: Note the safety instructions in [“Requirements for connecting electrical wires”](#) on page 13.

5.3.1 Basic device

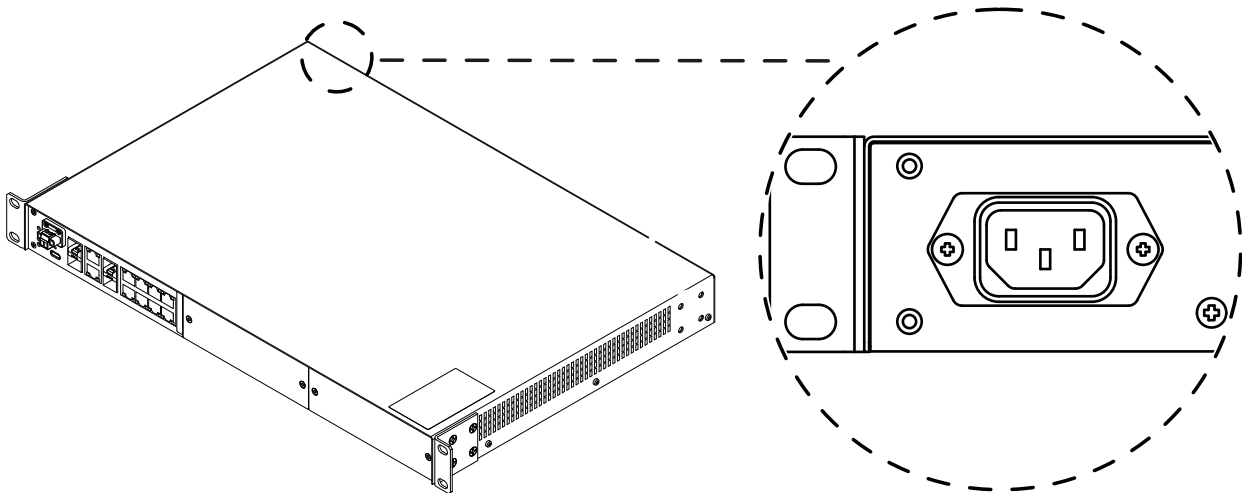


Figure 9: Power supply: Position of supply voltage inputs on the device

The supply voltage is electrically isolated from the casing.

For devices with 2 supply voltage connections:

The supply voltage can be connected redundantly. Both inputs are uncoupled. The load is not distributed. With redundant supply, the standard power supply supplies the device on its own. The redundant power supply becomes active automatically if the standard power supply fails. Normally the redundant power supply runs in stand-by mode.

Note: With non-redundant supply of the mains voltage, the device reports a power failure. You can prevent this message by applying the supply voltage via both inputs, or by changing the configuration in the Management.

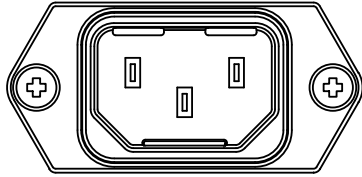


Figure 10: Supply voltage: Non-heating-appliance cable connection with built-in C14 plug (according to IEC 60320-1)

5.3.2 PoE supply voltage for M1-8TP-RJ45 PoE media module

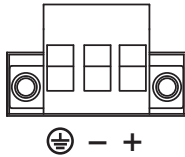


Figure 11: 3-pin terminal block for external PoE power supply

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

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

To supply the module with PoE voltage you need an external power supply unit.

- Make sure that the external power supply unit you use to provide the PoE voltage fulfills the following basic prerequisites:
 - ▶ Insulation requirements according to IEEE 802.3af/IEEE 802.3at (insulation resistance 48 V DC output to “rest of the world” 2250 V DC for 1 minute).
 - ▶ Output power <124 W and sufficient to provide the power for the connected PDs.
 - ▶ Current limitation <5 A or a 5 A slow blow fuse.

5.4 Ethernet ports

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

5.4.1 10/100 Mbit/s twisted pair port

This port is an RJ45 socket.

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

This port supports:

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

Delivery state: Autonegotiation activated

The port casing is electrically connected to the front panel.

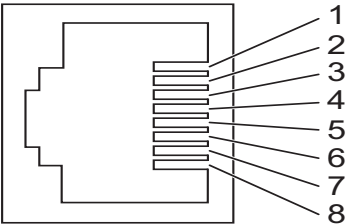
	Pin	Function
	1	RD+ Receive path
	2	RD- Receive path
	3	TD+ Transmission path
	6	TD- Transmission path
	4, 5, 7, 8	–

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

5.4.2 10/100 Mbit/s PoE port

This port is an RJ45 socket.

The 10/100 Mbit/s PoE port allows you to connect network components as a PoE voltage sink according to the standard IEEE 802.3 10BASE-T/100BASE-TX and IEEE 802.3af/IEEE 802.3at.

This port supports:

- ▶ Autonegotiation
- ▶ Autopolarity
- ▶ Autocrossing (if autonegotiation is activated)
- ▶ 100 Mbit/s half-duplex mode, 100 Mbit/s full duplex mode
- ▶ 10 Mbit/s half-duplex mode, 10 Mbit/s full duplex mode
- ▶ Power over Ethernet (PoE)

Delivery state: Autonegotiation activated

The port casing is electrically connected to the front panel.

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

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

The pin assignment corresponds to MDI-X.

Pin	Function	PoE voltage
1	RD+ Receive path	Minus terminal
2	RD- Receive path	Minus terminal
3	TD+ Transmission path	Plus terminal
6	TD- Transmission path	Plus terminal
4, 5, 7, 8	—	—

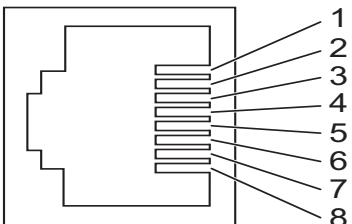


Table 11: Pin assignment 10/100-Mbit/s PoE port, RJ45 socket, MDI-X mode, phantom supply

5.4.3 10/100/1000 Mbit/s twisted pair port

This port is an RJ45 socket.

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

This port supports:

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

Delivery state: Autonegotiation activated.

The port casing is electrically connected to the front panel.

The pin assignment corresponds to MDI-X.

Pin	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-

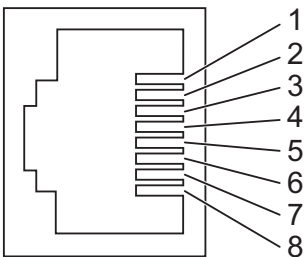


Table 12: Pin assignments of the 10/100/1000 Mbit/s twisted pair port in 1000 Mbit/s mode, RJ45 socket, MDI-X mode

■ Support of PoE

Note: PoE/PoE+ is exclusively available with PoE-capable media modules. The Switch basic device has no PoE-capable ports. Exclusively media module M1-8TP-RJ45 PoE supports Power over Ethernet (PoE).

Prerequisites:

- ▶ At least 1 media module with PoE functionality (M1-8TP-RJ45 PoE) is mounted in the basic device.

The 10/100 Mbit/s PoE port allows you to connect network components as a PoE voltage sink according to the standard IEEE 802.3 10BASE-T/100BASE-TX and IEEE 802.3af.

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

For more details see chapter [“General technical data” on page 65](#).

5.4.4 10/100/1000 Mbit/s twisted pair port

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)
- ▶ 1000 Mbit/s full duplex
- ▶ 100 Mbit/s half duplex, 100 Mbit/s full duplex,
- ▶ 10 Mbit/s half duplex, 10 Mbit/s full duplex

Delivery state: Autonegotiation

The socket casings are electrically connected to the front panel.

The pin assignment corresponds to MDI-X.

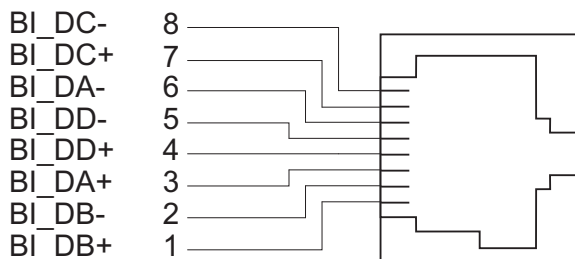


Figure 12: Pin assignment of the 1000 Mbit/s twisted pair port

5.4.5 100 Mbit/s F/O port

Note: Exclusively on media modules.

This port is a DSC socket, or an SFP slot.

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

This port supports:

- ▶ Full or half duplex mode

Default setting: Full duplex

Note: Verify that the LH ports are connected only with LH ports, SM ports only with SM ports, and MM ports only with MM ports.

5.4.6 100/1000 Mbit/s Combo port

This port is a combo portSFP slot.

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

This port supports:

- ▶ Autonegotiation
- ▶ Full duplex mode

Delivery state: Autonegotiation activated

Verify that you connect LH ports only with LH ports, SX ports only with SX ports, and LX ports only with LX ports.

5.5 Management interfaces

5.5.1 Signal contact



Figure 13: Signal contact: 2-pin terminal block with screw locking casing

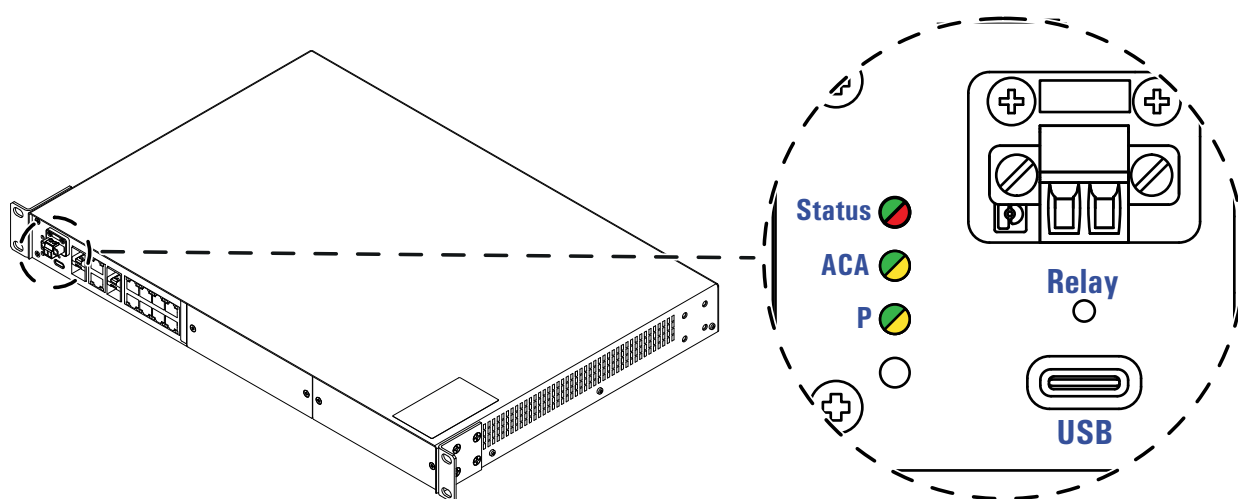


Figure 14: Signal contact: 2-pin terminal block with screw lock; position on the device

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 potential-free signal contact (relay contact, closed circuit) reports through a break in contact:

- ▶ The detected failure of at least one of the two supply voltages (supply voltage 1 or 2 is below the threshold value).
- ▶ A detected continuous malfunction in the device.
- ▶ The detected defective link status of at least one port. The link state can be masked for each port in the graphic user interface. In delivery state, link monitoring is inactive.
- ▶ Exceeding or falling below the set temperature threshold values.
- ▶ Removal of the ACA22.

Connect the signal contact via a 2-pin terminal block with screw lock.

- ▶ The signal contact (“Relay“, pin assignment of terminal block see [figure 24](#)) is used to monitor the device function, and thus supports remote diagnostics. You can specify the type of function monitoring in the management.
- ▶ You can use the Management to set the signal contact manually and thus control external devices.

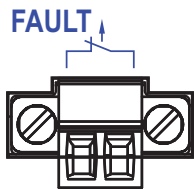


Figure 15: 2-pin terminal block

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

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

5.5.2 USB-C interface: ACA22-USB-C

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

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

The USB-C interface has the following properties:

- ▶ Supports the USB host mode and USB device mode
- ▶ Supports USB 2.0 (data rate max. 480 Mbit/s)
- ▶ Connector: type C
- ▶ Supplies current of max. 500 mA
- ▶ Voltage not electrically insulated
- ▶ Supported file system: FAT32

Note: A USB storage medium or USB cable is used exclusively for the configuration of your device. Do not charge external devices using the ACA22-USB-C interface.

Note: The ACA22 storage medium can remain permanently connected to the device.

5.6 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.

5.6.1 Device status

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

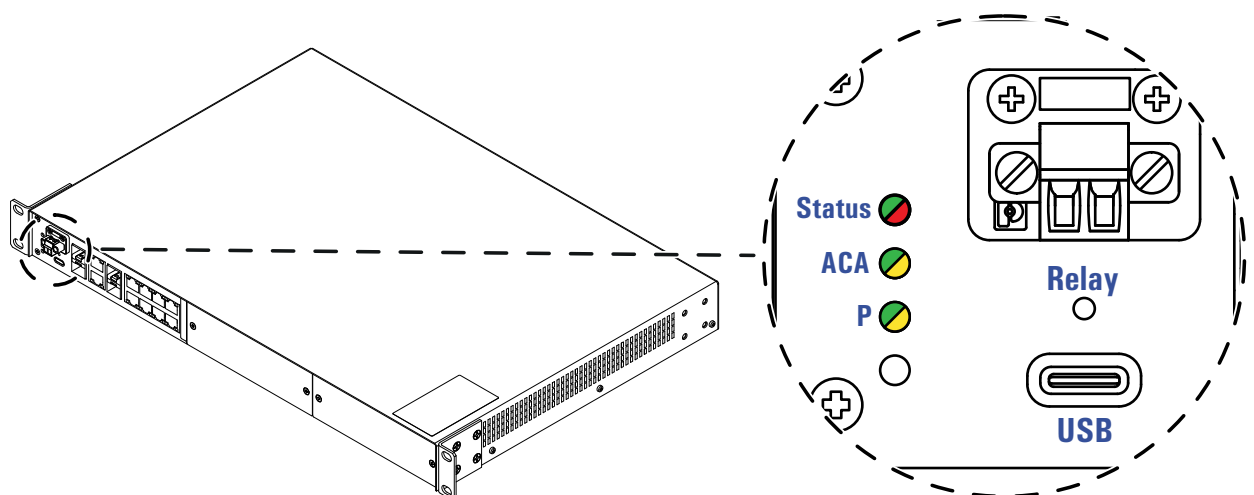


Figure 16: Device status: Device status LED locations on the device

LED	Display	Color	Activity	Meaning
P Power	Supply voltage	-	none	Supply voltage is too low
		yellow	lights up	Device variants with redundant power supply: Supply voltage 1 or 2 is on
			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 Device variants with single power supply: Supply voltage 1 is on
Status	Device status	-	none	Device is starting and/or is not ready for operation.
		green	lights up	Device is ready for operation Characteristics can be configured
		red	lights up	Device is ready for operation Device has detected at least one error in the monitoring results
			flashes 1 × a period	The boot parameters used when the device has been started differ from the boot parameters saved. Start the device again.
			flashes 4 × a period	Device has detected another device with an identical IP address
		red/ green	flashing alternately	Device is in recovery mode.
ACA	AutoCo nfigurati on Adapter	-	none	ACA storage medium not connected
		green	lights up	ACA storage medium connected
			flashes 3 × a period	Device writes to/reads from the storage medium
		yellow	lights up	ACA storage medium inoperative

If the manual setting is active on the signal contact “FAULT”, then the error display is independent of the setting of the signal contact.

5.6.2 Port status

These LEDs display port-related information.

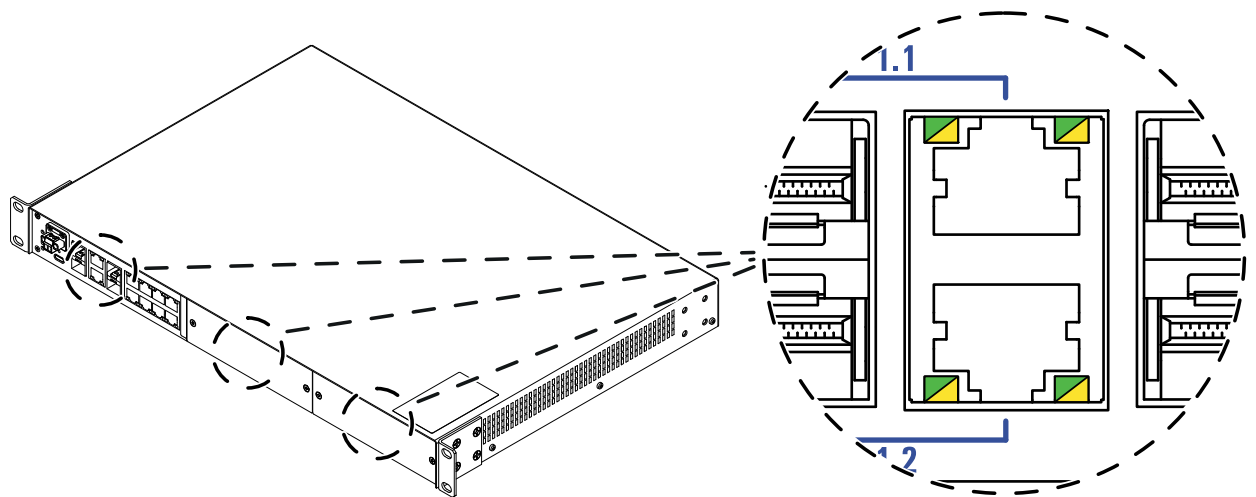


Figure 17: Port status: Port status LED locations on the device

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

On the M1-8TP-RJ45 PoE media module, the left LED informs you about data and link state. The right LED informs you about PoE voltage supply on a port.

Display	Color	Activity	Meaning
Poe voltage supply	–	none	No PoE voltage on the port.
	yellow	lights up	The port is supplied with PoE voltage.
		flashes 1 × a period	Output budget has been exceeded
			Device has detected a connected powered device
flashes 3 × a period ^a	PoE administrator status deactivated		

Table 13: Activity of the right LED on the M1-8TP-RJ45 PoE media module

a. Only valid if the port administrator status is enabled.

6 Installation

The device was developed for practical application in a harsh industrial environment.

On delivery, the device is ready for operation.

To install the device, perform the following work steps:

- ▶ [Checking the package contents](#)
- ▶ [Installing an SFP transceiver \(optional\)](#)
- ▶ [Mounting a cover panel](#)
- ▶ [Mounting a media module](#)
- ▶ [Installing the device](#)
- ▶ [Grounding the device](#)
- ▶ [Connecting the signal contact \(optional\)](#)
- ▶ [Connecting the supply voltage](#)
- ▶ [Connecting the PoE supply voltage to the M1-8TP-RJ45 PoE media module \(optional\)](#)
- ▶ [Connecting data cables](#)
- ▶ [Support of PoE](#)
- ▶ [Filling out the inscription label](#)

Note: Note the safety instructions in [“Requirements for connecting electrical wires”](#) on page 13.

6.1 Checking the package contents

- Check whether the package includes all items named in the section [“Scope of delivery”](#) on page 78.
- Check the individual parts for transport damage.

6.2 Installing an SFP transceiver (optional)

Prerequisites:

Exclusively use Hirschmann SFP transceivers.

See [“Accessories” on page 80](#).

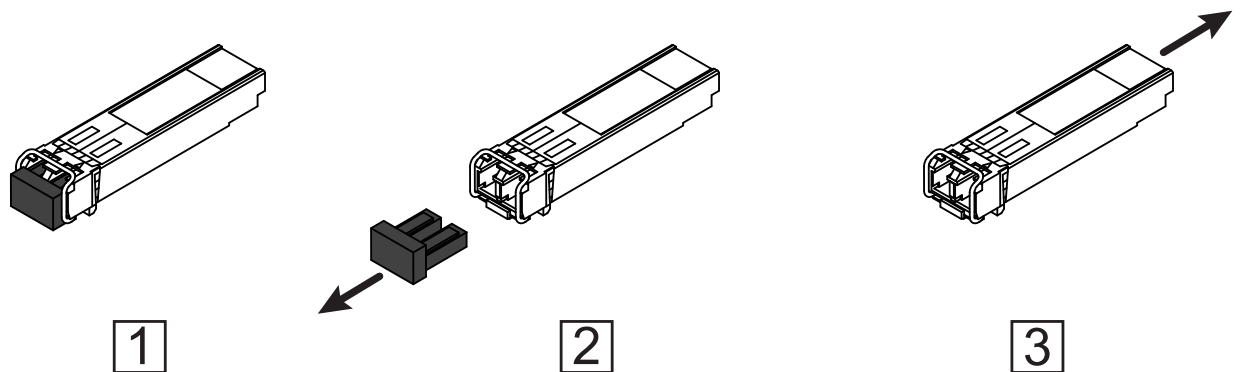


Figure 18: Installing SFP transceivers: Installation sequence

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).

6.3 Mounting a cover panel

Seal the media module slot on the device with a cover panel.

- Place the cover panel onto the media module slot of the device.
- Fasten the cover panel to the device by tightening the 2 screws.

6.4 Mounting a media module

On delivery, the device is ready for operation.

The modular GRS103 device variants GRS103-6TX/4C... use the M1 family of media modules, which are also compatible with MACH102 devices.

- Note the chapters [“ESD Guidelines” on page 11](#) and [“General safety instructions”](#).

The media modules are hot-plug-compatible. This means that you have the option to replace modules with modules of the same kind during operation.

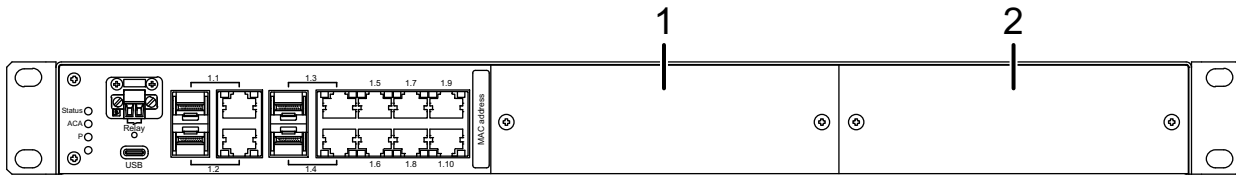


Figure 19: GRS103 device equipped with media modules

1 - media module 1

2 - media module 2

- To attach a media module, first remove the 2 screws on the protective cover of the media module slot and remove the protective cover.
- Plug the media module into the desired slot.
- Fasten the 2 screws at the corners of the media module.
- Fit the media modules in sequence from left to right.

6.5 Installing the device

WARNING

ELECTRIC SHOCK

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.

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

WARNING

ELECTRIC SHOCK

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.

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



CAUTION

OVERHEATING OF THE DEVICE

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

Failure to follow these instructions can result in minor injury or equipment damage.

6.5.1 Selecting the installation location

Select the assembly location according to the safety guidelines ([see on page 8 “General safety instructions”](#)).

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.
- ▶ Make sure there is at least 5 cm (2 in) of space in front of the ventilation slits of the casing.
- ▶ 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: The shielding ground of the connectable twisted pair cables is connected to the front panel as a conductor.

6.5.2 Mounting on a flat surface

Install the device in line with the criteria listed in [“Installing the device” on page 44](#).

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 [figure 20](#).

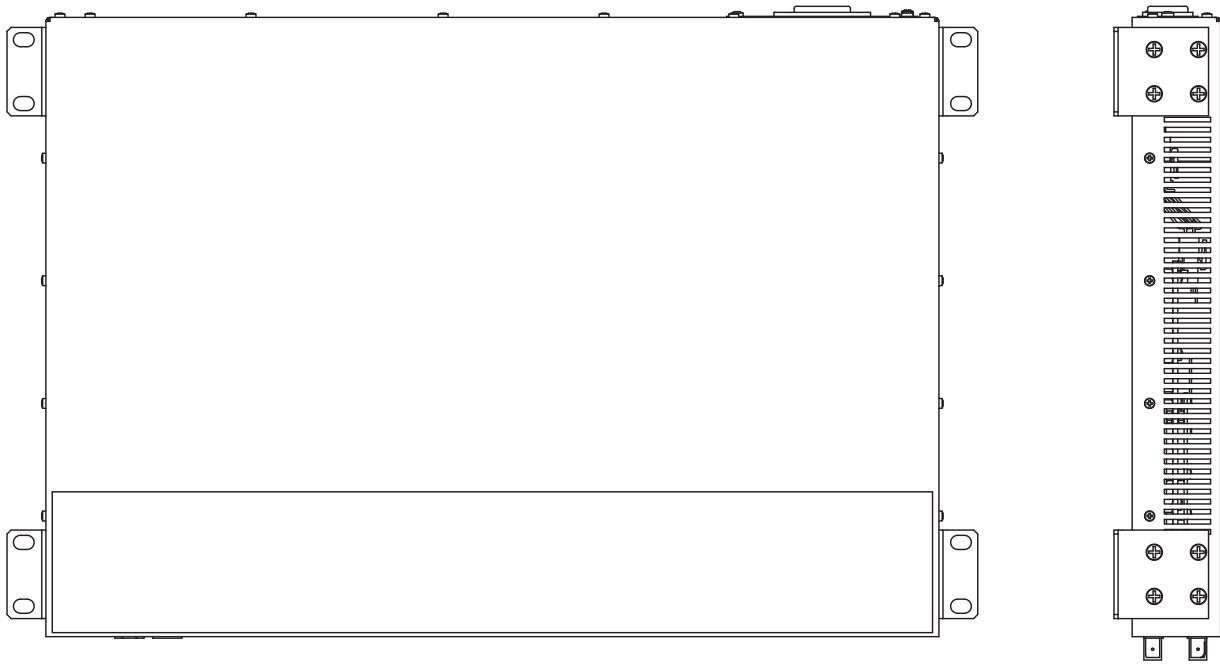


Figure 20: Mounting on a flat surface

- Use the screws to secure the mounting brackets on the device.
- Attach 2 additional mounting brackets to the back of the device.
(see figure 20)
You obtain the additional brackets as accessories.
See “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: 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. See figure 21.

6.5.3 Mounting on a vertical flat surface



WARNING

FIRE HAZARD

Install the device in a fire enclosure according to IEC/EN 62368-1 if you install the device vertically.

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

Install the device in line with the criteria listed in [“Installing the device” on page 44](#).

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 [figure 20](#).

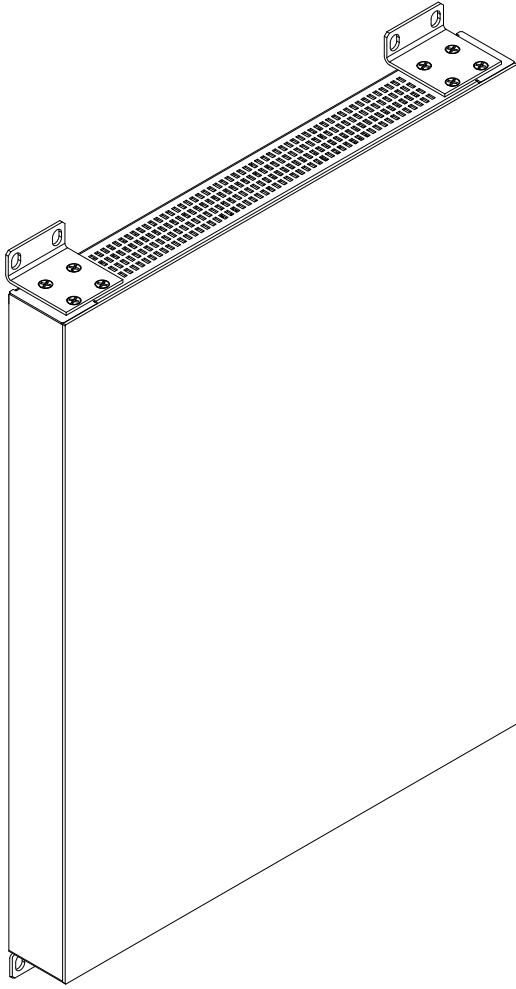


Figure 21: Mounting vertically on a flat surface: Optional mounting on a vertical flat surface.

- Use the screws to secure the mounting brackets on the device.
- Attach 2 additional mounting brackets to the back of the device.
(see [figure 20](#))
You obtain the additional brackets as accessories.
[See “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.

6.5.4 Mounting in a switch cabinet



CAUTION

OVERHEATING OF THE DEVICE

When installing the device, make sure any ventilation slots remain free. Maintain a clearance of at least 5 cm (2 in).

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

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.

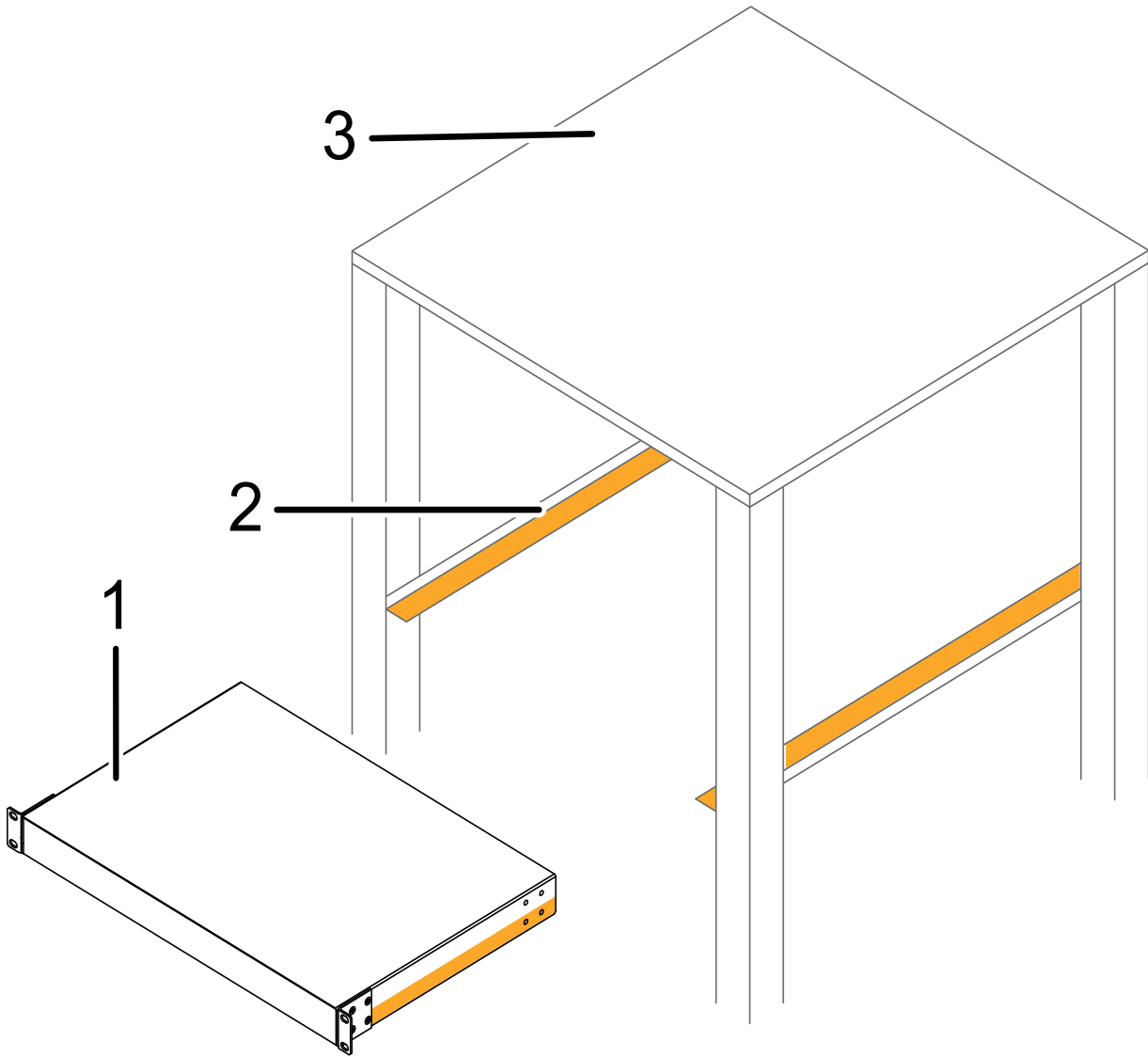


Figure 22: Assembly in a switch cabinet with sliding/mounting rails

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.

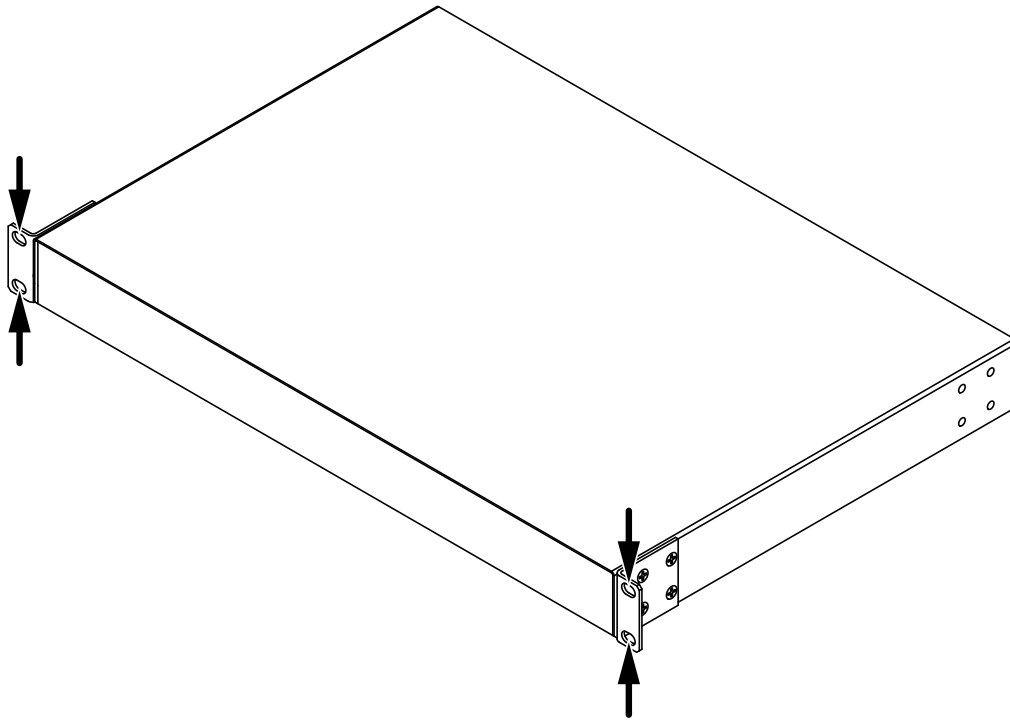


Figure 23: Mounting in a switch cabinet: Mounting brackets with oblong holes

Note: When operating the device in an environment with continuous vibration loads, it is necessary to additionally fasten the device to the switch cabinet using 2 mounting brackets on the front or rear side of the device. You obtain the additional brackets as accessories.

See [“Accessories” on page 80](#).

6.6 Grounding the device

The device is grounded via the power supply connection(s).

6.7 Connecting the signal contact (optional)

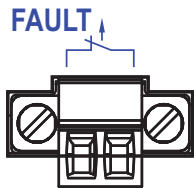


Figure 24: 2-pin terminal block

Note: Observe the electrical threshold values for the signal contact ([see on page 68 “Signal contact”](#)).

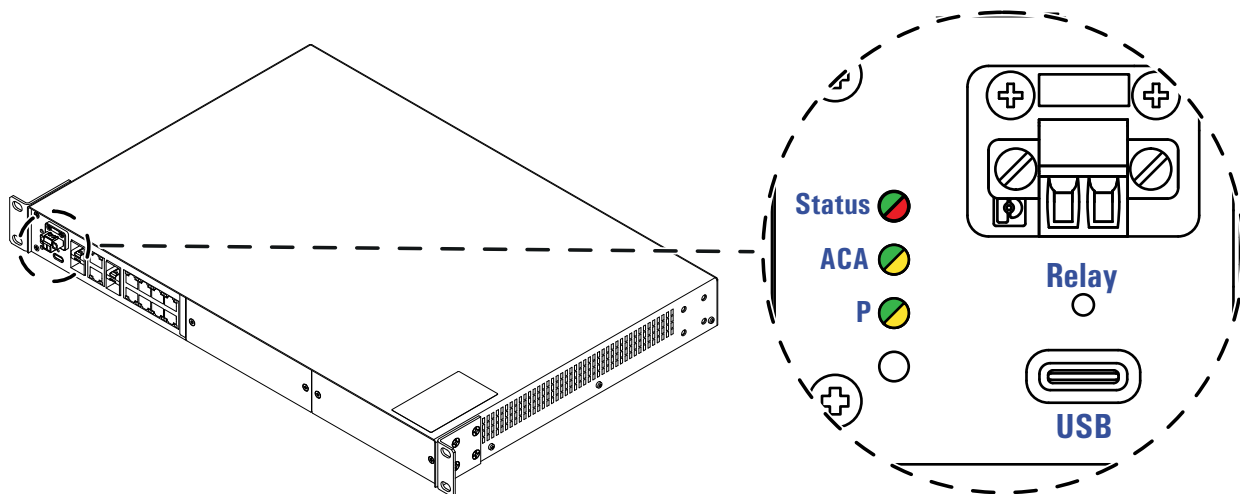


Figure 25: Signal contact: 2-pin terminal block with screw lock; position on the device

Perform the following work steps:

- Pull the terminal block off the device and connect the signal lines.
- Mount the terminal block for the signal contact on the front of the device using the screw lock. Check whether the terminal block is correctly plugged and screwed on.

6.8 Connecting the supply voltage

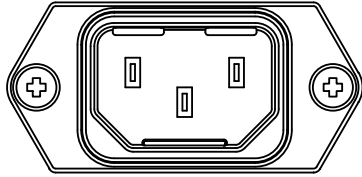


Figure 26: Supply voltage: Non-heating-appliance cable connection with built-in C14 plug (according to IEC 60320-1)

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

- On the rear side of the device, plug a non-heating device cable with C13 coupling according to IEC 60320-1 into the power supply connection (built-in C14 plug) of the device.

6.9 Connecting the PoE supply voltage to the M1-8TP-RJ45 PoE media module (optional)

WARNING

ELECTRIC SHOCK

Supply only 48 V DC (PoE) SELV or ES1 or 54 V DC (PoE+) SELV or ES1 to the M1-8TP-RJ45 PoE media module.

For the PoE power supply to the M1-8TP-RJ45 PoE media module, use a fuse of 5 A with slow-blow characteristic.

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

WARNING

FIRE HAZARD

Disconnect the PoE voltage supply before removing the M1-8TP-RJ45 PoE media module.

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

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

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

The following values apply to the PoE supply voltage of the module:

Rated voltage	48 V DC SELV
Minimum voltage	46 V DC
Maximum voltage	57 V DC

To supply the module with PoE voltage you need an external power supply unit.

- Make sure that the external power supply unit you use to provide the PoE voltage fulfills the following basic prerequisites:
 - ▶ Insulation requirements according to IEEE 802.3af/IEEE 802.3at (insulation resistance 48 V DC output to “rest of the world” 2250 V DC for 1 minute).
 - ▶ Output power <124 W and sufficient to provide the power for the connected PDs.
 - ▶ Current limitation <5 A or a 5 A slow blow fuse.

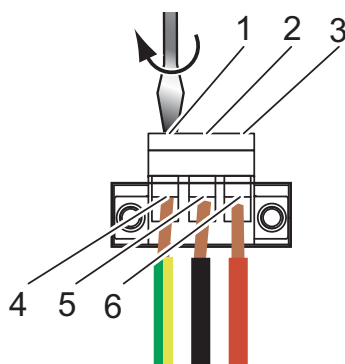


Figure 27: Connecting the supply voltage via the 3-pin terminal block

- 1 - Fastening screw for functional earth*
- 2 - Fastening screw for supply voltage: -*
- 3 - Fastening screw for supply voltage: +*
- 4 - Connection for functional earth*
- 5 - Connection for supply voltage: -*
- 6 - Connection for supply voltage: +*

Note: Make sure the following requirements are met:

- ▶ Supply line length < 3 m
- ▶ Supply line cross section is suitable for 5 A

- Pull the terminal block(s) off the switch and connect the voltage supply lines as follows:
- First connect the protective conductor to the protective conductor terminal.
- Connect the PoE voltage to the 3-pin terminal block.

6.10 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 the buildings.
- When using copper cables, provide a sufficient separation between the power supply cables and the data cables. Ideally, install the cables in separate cable channels.
- Verify that power supply cables and data cables do not run parallel over longer distances. To reduce inductive coupling, verify that the power supply cables and data cables cross at a 90 ° angle.
- Use shielded data cables for gigabit transmission via copper cables, for example SF/UTP cables according to ISO/IEC 11801. To meet EN 50121-4 and marine application requirements, use shielded data cables at all transmission rates.
- Connect the data cables according to your requirements.
[See “Ethernet ports” on page 33.](#)

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

6.11 Support of PoE

Note: PoE/PoE+ is exclusively available with PoE-capable media modules. The Switch basic device has no PoE-capable ports. Exclusively media module M1-8TP-RJ45 PoE supports Power over Ethernet (PoE).

Prerequisites:

- ▶ At least 1 media module with PoE functionality (M1-8TP-RJ45 PoE) is mounted in the basic device.

The 10/100 Mbit/s PoE port allows you to connect network components as a PoE voltage sink according to the standard IEEE 802.3 10BASE-T/100BASE-TX and IEEE 802.3af/IEEE 802.3at.

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

For more details see chapter [“General technical data” on page 65](#).

6.12 Filling out the inscription label

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

7 Operating the device



WARNING

ELECTRIC SHOCK

Connect only a supply voltage that corresponds to the type plate of your device.

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

Note: Note the safety instructions in [“Requirements for connecting electrical wires”](#) on page 13.

By connecting the voltage supply via the voltage supply socket(s), you start the operation of the device.

8 Making basic settings

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

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

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

- ▶ Configuration via DHCP (state on delivery)
- ▶ Configuration via DHCP (Option 82)
- ▶ Configuration via BOOTP
- ▶ Input via the USB-C interface
- ▶ AutoConfiguration Adapter
- ▶ Input via the HiView or Industrial HiVision application. You find further information about the applications HiView or Industrial HiVision on the Internet at the Hirschmann product pages:

HiView

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

Industrial HiVision

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

Further information on the basic settings of the device can be found in the “Basic Configuration” user manual.

8.1 Default settings

IP address: The device looks for the IP address using DHCP

- ▶ Password for management:
 - Login: user; password: public (read only)
 - Login: admin; password: private (read and write)
- ▶ Parameters that can be set via the management are set to pre-defined values in accordance with the MIB
- ▶ USB-C data rate: 115200 Baud
- ▶ Ring redundancy: disabled
- ▶ Ethernet ports: link status is not evaluated (signal contact)
- ▶ Optical 100 Mbit/s ports: 100 Mbit/s full duplex
All other ports: autonegotiation
- ▶ Optical 1000 Mbit/s ports: 1000 Mbit/s full duplex
All other ports: autonegotiation
- ▶ Redundancy manager disabled

- ▶ Rapid Spanning Tree enabled
- ▶ ACA22-USB-C management port:
Default IP address: 192.168.248.100, Subnet: 255.255.255.0

8.2 First login (Password change)

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

Perform the following steps:

- Open the Graphical User Interface, the Command Line Interface, or HiView the first time you log on to the device.
- Log on to the device with the default password “private”. 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.
- When you log on to the device with the Command Line Interface, then the device prompts you to confirm your new password.
- Log on to the device again with your new password.

Note: If you lost your password, then 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>

9 Monitoring the ambient conditions

9.1 Monitoring the ambient air temperature

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

See [“General technical data” on page 65](#).

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.

10 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.
[See “Technical data” on page 65.](#)
- 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.hirschmann.com>).
- 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.
- Depending on the pollution degree in the operating environment, check at regular intervals that the ventilation slots in the device are not obstructed.

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

11 Disassembly

Perform the following work steps:

- Removing an SFP transceiver (optional)
- Removing a media module
- Removing the device

11.1 Removing an SFP transceiver (optional)

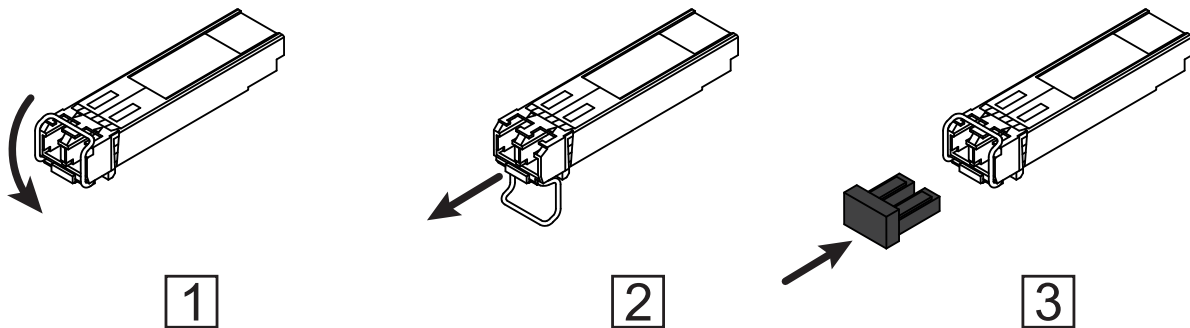


Figure 28: De-installing SFP transceivers: De-installation sequence

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).

11.2 Removing a media module

WARNING

FIRE HAZARD

Disconnect the PoE voltage supply before removing the M1-8TP-RJ45 PoE media module.

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

- To remove the media module, first remove the two screws at the corners of the media module.
- Pull the media module out of the slot.
- Fasten the protective cover to the slot using the two screws.

11.3 Removing the device

WARNING

ELECTRIC SHOCK

Disconnect the grounding only after disconnecting all other cables.

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

Perform the following work steps:

- Disconnect the data cables.
- Disable the supply voltage.
- Disconnect the supply voltage.
- Remove terminal blocks and power supply cables from the device.
- Disconnect the grounding.

Note: When using devices with redundant power supply, remove both non-heating device couplings to disconnect the device from the power supply. When using PoE modules, also disconnect or remove the PoE voltage.

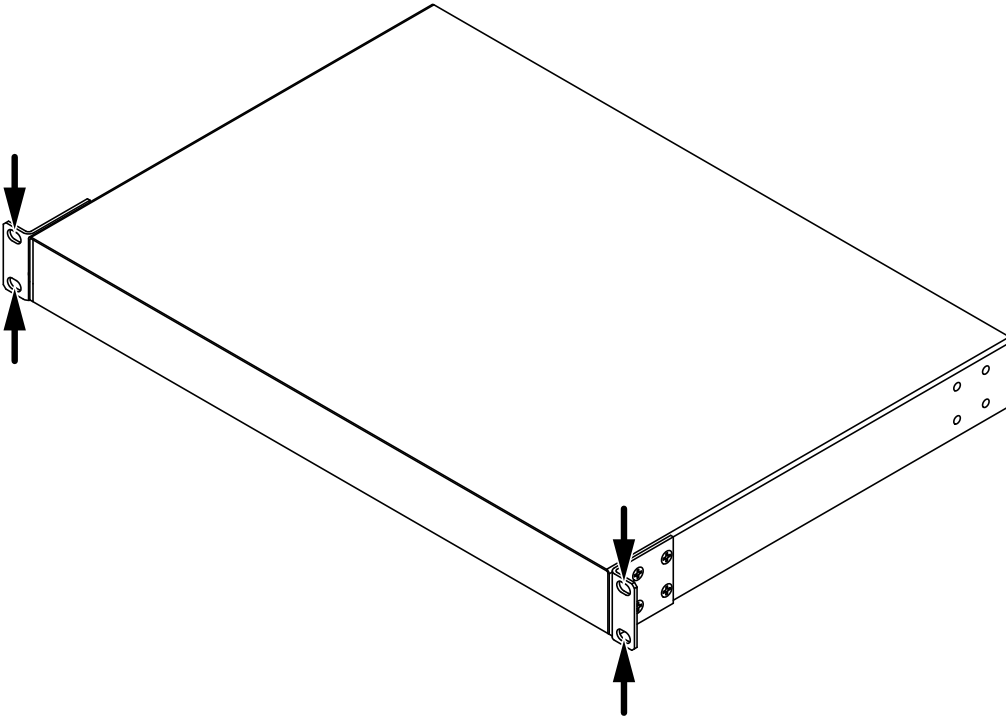


Figure 29: Removing the device: Mounting brackets with oblong holes

- To detach the device from a switch cabinet or a plain surface, remove the screws from the mounting brackets on the device.

12 Technical data

12.1 General technical data

12.1.1 Basic device

Dimensions	See "Dimension drawings" on page 70.	
Weight	GRS103-6TX/4C-1HV-2S ^a	3.6 kg (7.94 lb)
	GRS103-6TX/4C-1HV-2A ^a	3.6 kg (7.94 lb)
	GRS103-6TX/4C-2HV-2S ^a	3.85 kg (8.49 lb)
	GRS103-6TX/4C-2HV-2A ^a	3.85 kg (8.49 lb)
	GRS103-22TX/4C-1HV-2S	3.85 kg (8.49 lb)
	GRS103-22TX/4C-1HV-2A	3.85 kg (8.49 lb)
	GRS103-22TX/4C-2HV-2S	4.1 kg (9.05 lb)
	GRS103-22TX/4C-2HV-2A	4.1 kg (9.05 lb)
Pollution degree	2	
Protection classes	Laser protection	Class 1 in compliance with IEC 60825-1
	Degree of protection	IP20

Table 14: General technical data

a. Basic device without media modules.

12.1.2 Media modules

Dimensions	See "Dimension drawings" on page 70.	
Weight	M1-8TP-RJ45	210 g (0.46 lb)
	M1-8MM-SC	210 g (0.46 lb)
	M1-8SM-SC	180 g (0.4 lb)
	M1-8SFP	130 g (0.29 lb)
	M1-8TP-RJ45 PoE	260 g (0.57 lb)
Installing the media modules	Tightening torque	0.34 Nm (3 lb-in)
Mounting of the cover panel	Tightening torque	0.34 Nm (3 lb-in)
Max. PoE power	Per media module:	124 W
Pollution degree		2
Protection classes	Laser protection	Class 1 in compliance with IEC 60825-1

12.2 Supply voltage

12.2.1 Basic device

Rated voltage	100 V AC ... 240 V AC, 50 Hz ...60 Hz	
Voltage range including maximum tolerances	90 V AC ... 264 V AC, 50 Hz ... 60 Hz	
Connection type	Built-in non-heating-appliance connection (built-in C14 plug according to IEC 60320-1)	
	min. conductor diameter	0.75 mm ² (AWG18)
	max. conductor diameter	2.5 mm ² (AWG12)
Power loss buffer	115 V AC: >15 ms 230 V AC: >78 ms	
Back-up fuse for each voltage input Supply voltage 110 V AC	Nominal rating:	20 A
	Characteristic:	slow blow
Back-up fuse for each voltage input Supply voltage 230 V AC	Nominal rating:	16 A
	Characteristic:	B
Overload current protection on the device	Non-replaceable fuse	
Peak inrush current	<18 A at 115 V AC	
	<35 A at 230 V AC	

Table 15: Basic device: Supply voltage

12.2.2 Media modules

■ M1-8TP-RJ45 PoE

Rated voltage range	Type 1 PD, SELV/ES1	48 V DC
Voltage range including maximum tolerances	45 V DC ... 57 V DC	

Connection type	3-pin terminal block	
	Tightening torque	0.34 Nm (3 lb-in)
	min. conductor diameter	1 mm ² (AWG16)
	max. conductor diameter	1.3 mm ² (AWG16)
Rated power	2.5 A	
Rated voltage range	Type 2 PD, SELV/ES1	54 V DC
Voltage range including maximum tolerances	51 V DC ... 57 V DC	
Overload current protection on the device	Non-replaceable fuse	

12.3 Power consumption/power output

Device/module	Max. power consumption	Max. power output
Basic devices		
GRS103-6TX/4C-1HV-2S ^a	7.2 W	24.6 Btu (IT)/h
GRS103-6TX/4C-1HV-2A ^a	7.2 W	24.6 Btu (IT)/h
GRS103-6TX/4C-2HV-2S ^a	7.3 W	26.9 Btu (IT)/h
GRS103-6TX/4C-2HV-2A ^a	7.3 W	26.9 Btu (IT)/h
GRS103-22TX/4C-1HV-2S	11.3 W	38.5 Btu (IT)/h
GRS103-22TX/4C-1HV-2A	11.3 W	38.5 Btu (IT)/h
GRS103-22TX/4C-2HV-2S	11.5 W	39.3 Btu (IT)/h
GRS103-22TX/4C-2HV-2A	11.5 W	39.3 Btu (IT)/h
Media modules		
M1-8TP-RJ45	2 W	7 Btu (IT)/h
M1-8TP-RJ45 PoE - internal supply voltage	2.2 W	7.6 Btu (IT)/h
M1-8TP-RJ45 PoE - external PoE voltage: No PD	1.2 W	4.1 Btu (IT)/h
M1-8TP-RJ45 PoE - external PoE voltage: 8 × Class-0-PD	2 W + PDs	6.9 Btu (IT)/h
M1-8MM-SC	10 W	34 Btu (IT)/h
M1-8SM-SC	10 W	34 Btu (IT)/h
M1-8SFP (incl. SFPs)	11 W	37 Btu (IT)/h

Table 16: Power, temperature and order numbers

a. Basic device without media modules.

12.4 Signal contact

Nominal value	Switching current	max. 1 A
	Switching voltage	max. 60 V DC or max. 30 V AC SELV according to IEC 60950-1 or ES1 according to IEC/EN 62368-1
Connection type	2-pin terminal block with screw lock	
	Tightening torque	0.34 Nm (3 lb-in)
	min. conductor diameter	0.08 mm ² (AWG28)
	max. conductor diameter	1.3 mm ² (AWG16)

Table 17: Signal contact

12.5 Climatic conditions during operation

12.5.1 Basic device

Climatic conditions during operation	
Ambient air temperature ^a	-10 °C ... +60 °C (+14 °F ... +140 °F)
Maximum internal air temperature ^b	+75 °C (+167 °F)
Humidity	10 % ... 95 % (non-condensing)
Air pressure	min. 700 hPa (+3000 m ASL; +9842 ft ASL) max. 1060 hPa (-400 m ASL; -1312 ft ASL)

Table 18: Climatic conditions during operation

- a. Temperature of the ambient air at a distance of 5 cm (2 in) from the device
b. Temperature measured by the temperature sensor within the device.

12.5.2 Media modules

Climatic conditions during operation		
Ambient air temperature ^a	M1-8TP-RJ45 PoE	0 °C ... +50 °C (+32 °F ... +122 °F)
	M1-8TP-RJ45	0 °C ... +60 °C (+32 °F ... +140 °F)
	M1-8MM-SC	
	M1-8SM-SC	
	M1-8SFP ^b	
Humidity	10 % ... 95 % (non-condensing)	
Air pressure	min. 700 hPa (+3000 m ASL; +9842 ft ASL) max. 1060 hPa (-400 m ASL; -1312 ft ASL)	

Table 19: Climatic conditions during operation

- a. Temperature of the ambient air at a distance of 5 cm (2 in) from the device
b. Max. Ta: +60 °C (+140 °F) applies when using suitable SFP transceivers with EEC extension. When using SFP transceivers without EEC extension, the maximum ambient air temperature is reduced to +50 °C (+122 °F).

12.6 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	10 % ... 95 % (non-condensing)	
Air pressure	min. 540 hPa (+4000 m ASL; +13123 ft ASL)	
	max. 1060 hPa (-400 m ASL; -1312 ft ASL)	

Table 20: Climatic conditions during storage

12.7 Dimension drawings

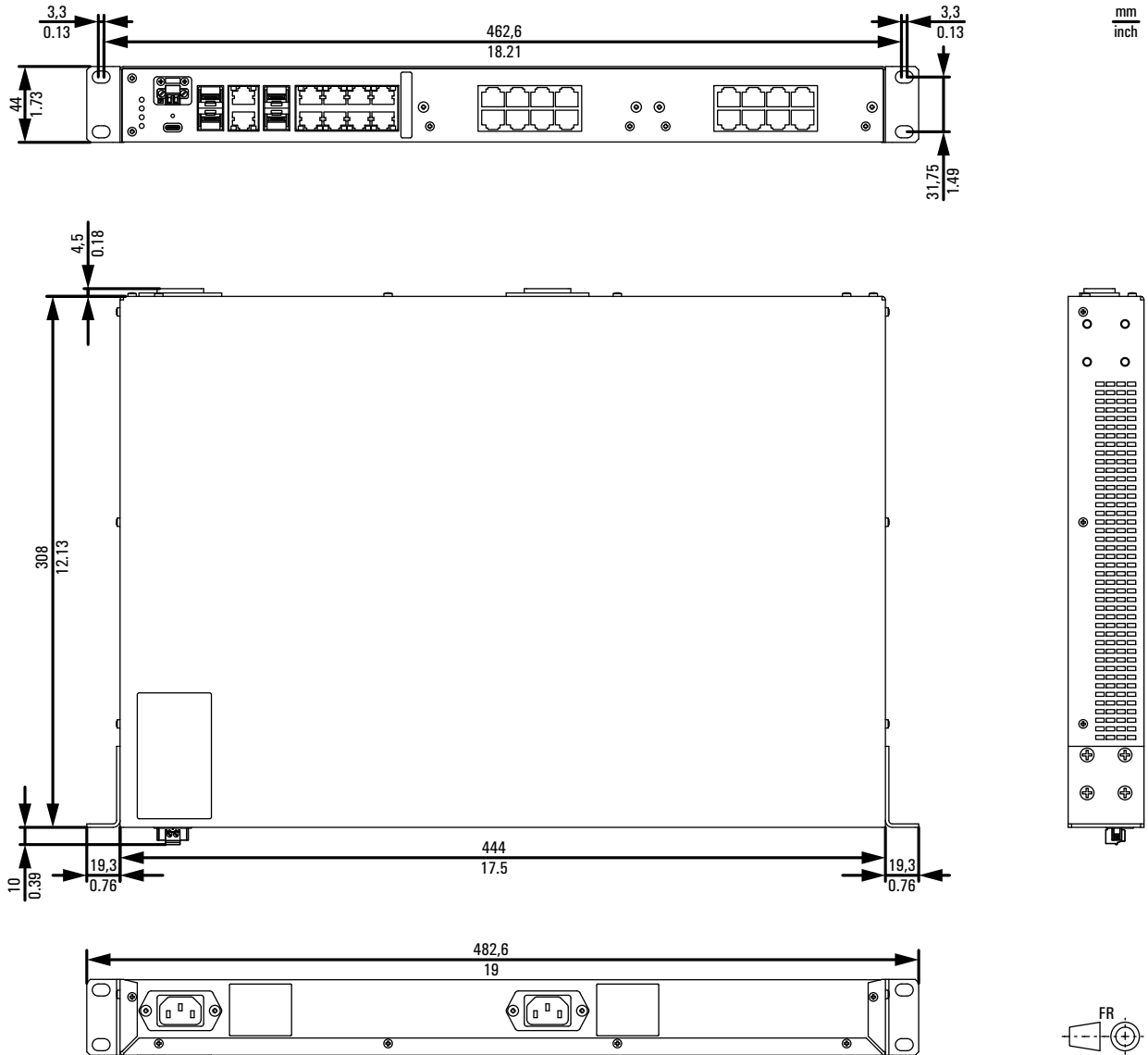


Figure 30: Dimension drawings

12.8 EMC

EMC interference emission		Standard applications
EN 55032	Class A	Fulfilled
FCC 47 CFR Part 15	Class A	Fulfilled
EN 61000-6-4		Fulfilled

12.9 Immunity

Immunity		Standard applications
IEC 60068-2-6, test Fc	Vibration	5 Hz ... 8.4 Hz with 3.5 mm (0.14 in) amplitude 8.4 Hz ... 200 Hz with 1 g
IEC 60068-2-27, test Ea	Shock	15 g at 11 ms

EMC interference immunity		Standard applications ^a
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 ... 2700 MHz	max. 10 V/m
EN 61000-4-3	2.7 GHz ... 6.0 GHz	max. 10 V/m, 80 % AM
Fast transients (burst)		
EN 61000-4-4	Supply voltage connection	±4 kV
EN 61000-4-4	Data line	±2 kV
Voltage surges - AC supply connection		

Table 21: EMC and immunity: EMC interference immunity

EMC interference immunity		Standard applications^a
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	10 kHz ... 150 kHz	3 V
EN 61000-4-6	150 kHz ... 80 MHz	10 V

Table 21: EMC and immunity: EMC interference immunity

a. According to EN 61000-6-2.

12.10 Network range

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

12.10.1 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)

Table 22: Network range: 10/100/1000 Mbit/s twisted pair port

12.10.2 Fast Ethernet SFP transceiver

Product code	Mode ^a	Wave length	Fiber	System attenuation	Example for F/O line length ^b	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 ^c	18 ps/(nm×km)
SFP-FAST-MM/LC ^d	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

Table 23: F/O port 100BASE-FX (SFP Fiber Optic Fast Ethernet Transceiver)

Product code	Mode ^a	Wave length	Fiber	System attenuation	Example for F/O line length ^b	Fiber attenuation	BLP/Dispersion
SFP-FAST-MM/LC EEC ^d	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 ^d	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 ^d	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)

Table 23: F/O port 100BASE-FX (SFP Fiber Optic Fast Ethernet Transceiver)

- a. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul
b. Including 3 dB system reserve when compliance with the fiber data is observed.
c. With ultra-low-loss optical fiber.
d. You will find further information on certifications on the Internet on the Hirschmann product pages (www.hirschmann.com).

12.10.3 Bidirectional Fast Ethernet SFP transceiver

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

Table 24: F/O port (bidirectional Fast Ethernet SFP transceiver)

- a. MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul

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

12.10.4 Gigabit Ethernet SFP transceiver

Product code	Mode ^a	Wave length	Fiber	System attenuation	Example for F/O line length ^b	Fiber attenuation	BLP/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 ... 50 km (0 mi ... 31.06 mi)	1.0 dB/km	500 MHz×km
M-SFP-LX/LC...	MM	1310 nm ^c	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 ^d	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) ^e	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)
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 EEC	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)

Table 25: F/O port 1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver)

Product code	Mode ^a	Wave length	Fiber	System attenuation	Example for F/O line length ^b	Fiber attenuation	BLP/Dispersion
M-SFP-LH+/LC EEC	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 ^f	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 ^g	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
SFP-GIG-LX/LC...	SM	1310 nm	9/125 μm	0 dB ... 10.5 dB	0 km ... 20 km (0 mi ... 12.43 mi) ^h	0.4 dB/km	3.5 ps/(nm×km)

Table 25: F/O port 1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver)

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

12.10.5 Bidirectional Gigabit Ethernet SFP transceiver

Product code	Mode ^a	Wave length TX	Wave length RX	Fiber	System attenuation	Example for F/O line length ^b	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)
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)

Table 26: F/O port (bidirectional Gigabit Ethernet SFP transceiver)

Product code	Mode ^a	Wave length TX	Wave length RX	Fiber	System attenuation	Example for F/O line length ^b	Fiber attenuation	BLP/Dispersion
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)
SFP-GIG-BA LH/ LC EEC	LH	1490 nm	1550 nm	9/125 μm	4 dB ... 24 dB	19 km ... 80 km (11.80 mi ... 49.71 mi)	0.25 dB/km	19 ps/(nm×km)
SFP-GIG-BB LH/ LC EEC	LH	1550 nm	1490 nm	9/125 μm	4 dB ... 24 dB	19 km ... 80 km (11.80 mi ... 49.71 mi)	0.25 dB/km	19 ps/(nm×km)

Table 26: F/O port (bidirectional Gigabit Ethernet SFP transceiver)

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

13 Scope of delivery

13.1 Basic device

Amount	Article
1 ×	GRS103 device
1 ×	Safety and general information sheet
1 ×	2-pin terminal block for signal contact
2 ×	Cover panel for media module slot

13.2 Media modules

Amount	Article
1 ×	Media module
1 ×	Safety and general information sheet
1 ×	3-pin terminal block for the PoE supply voltage (exclusively with media module M1-8TP-RJ45 PoE)

14 Order numbers

GRS103 devices	Order number
GRS103-6TX/4C-1HV-2S	942 298-001
GRS103-6TX/4C-1HV-2A	942 298-002
GRS103-6TX/4C-2HV-2S	942 298-003
GRS103-6TX/4C-2HV-2A	942 298-004
GRS103-22TX/4C-1HV-2S	942 298-005
GRS103-22TX/4C-1HV-2A	942 298-006
GRS103-22TX/4C-2HV-2S	942 298-007
GRS103-22TX/4C-2HV-2A	942 298-008

M1 modules	Order number
M1-8TP-RJ45	943 970-001
M1-8MM-SC	943 970-101
M1-8SM-SC	943 970-201
M1-8SFP	943 970-301
M1-8TP-RJ45-PoE	942 028-001

15 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.

General accessories	Order number
Network management software Industrial HiVision	943 156-xxx
Bracket for fastening the casing (2 pcs.)	943 943-001
Bracket, long (+50 mm/1.97 in), for fastening the casing (2 pcs.)	943 943-101
Non-heating-appliance cable (Euro model)	942 271-001
2-pin terminal block (50 pieces)	943 845-010
2-pin terminal block with screw lock (50 pieces)	943 845-009
3-pin High Voltage Interlock terminal block (50 pcs.)	943 845-008
Protection cap for RJ45 socket (50 pieces)	943 936-001
Protection cap for SFP slot (25 pieces)	943 942-001
AutoConfiguration Adapter ACA22-USB-C (EEC)	942-239-001

Fast Ethernet SFP transceiver	Order number
M-FAST SFP-TX/RJ45	942 098-001
M-FAST SFP-TX/RJ45 EEC	942 098-002

The following operating conditions apply to twisted pair transceivers:

- ▶ Usable with:
 - HiOS as of software version 03.0.00
 - for PRP ports on RSP devices, as of software version 02.0.01
 - for PRP ports on EES devices, as of software version 02.0.02
 - Classic switch software as of software version 08.0.00
 - HiSecOS as of software version 01.2.00
- ▶ Longer RSTP switching times and link loss detection times compared to twisted pair ports provided by the device directly.
- ▶ Not applicable for combo ports.
- ▶ Not applicable for ports which support only Gigabit Ethernet.
- ▶ It is currently not possible to set autocrossing manually.

M-FAST SFP-MM/LC	943 865-001
M-FAST SFP-MM/LC EEC	943 945-001
M-FAST SFP-SM/LC	943 866-001
M-FAST SFP-SM / LC EEC	943 946-001
M-FAST SFP-SM+/LC	943 867-001
M-FAST SFP-SM+/ LC EEC	943 947-001
M-FAST SFP-LH/LC	943 868-001
M-FAST SFP-LH/LC EEC	943 948-001
SFP-FAST-MM/LC ^a	942 194-001
SFP-FAST-MM/LC EEC ^a	942 194-002
SFP-FAST-SM/LC ^a	942 195-001
SFP-FAST-SM/LC EEC ^a	942 195-002

Table 27: Accessory: Fast Ethernet SFP transceiver

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

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

Table 28: Accessory: Bidirectional Fast Ethernet SFP transceiver

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

Gigabit Ethernet SFP transceiver	Order number
M-SFP-TX/RJ45	943 977-001
M-SFP-SX/LC	943 014-001
M-SFP-SX/LC EEC	943 896-001
M-SFP-MX/LC EEC	942 108-001
M-SFP-LX/LC	943 015-001
M-SFP-LX/LC EEC	943 897-001
M-SFP-LX+/LC	942 023-001
M-SFP-LX+/ LC EEC	942 024-001
M-SFP-LH/LC	943 042-001
M-SFP-LH/LC EEC	943 898-001
M-SFP-LH+/LC	943 049-001
M-SFP-LH+/LC EEC	942 119-001
SFP-GIG-LX/LC ^a	942 196-001
SFP-GIG-LX/LC EEC ^a	942 196-002

- a. Weitere Informationen zu den Zertifizierungen finden Sie im Internet auf den Hirschmann-Produktseiten (www.hirschmann.com).

Bidirectional Gigabit Ethernet SFP transceiver	Order number
M-SFP-BIDI Type A LX/LC EEC	943 974-001
M-SFP-BIDI Type B LX/LC EEC	943 974-002
M-SFP-BIDI Type A LH/LC EEC	943 975-001
M-SFP-BIDI Type B LH/LC EEC	943 975-002
M-SFP-BIDI Bundle LX/LC EEC (Type A + B)	943 974-101
M-SFP-BIDI Bundle LH/LC EEC (Type A + B)	943 975-101
SFP-GIG-BA LX/LC EEC ^a	942 207-001
SFP-GIG-BB LX/LC EEC ^a	942 207-002
SFP-GIG-BA LX+/LC EEC ^a	942 208-001
SFP-GIG-BB LX+/LC EEC ^a	942 208-002
SFP-GIG-BA LH/LC EEC ^a	942 209-001
SFP-GIG-BB LH/LC EEC ^a	942 209-002

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

16 Underlying technical standards

Name	
EN 55032	Electromagnetic compatibility of multimedia equipment – Emission Requirements
FCC 47 CFR Part 15	Code of Federal Regulations
IEC/EN 62368-1	Equipment for audio/video, information and communication technology - Part 1: safety requirements
IEEE 802.1Q	Virtual LANs (VLANs, MRP, Spanning Tree)
IEEE 802.3	Ethernet
cUL 62368-1	Audio/video, information and communication technology equipment – Part 1: Safety requirements
IEC 60825-1	Laser product safety
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

Table 29: List of the technical standards

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

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

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

A Further support

Technical questions

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

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

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.

Customer Innovation Center

The Customer Innovation Center is ahead of its competitors on three counts with its complete range of innovative services:

- ▶ Consulting incorporates comprehensive technical advice, from system evaluation through network planning to project planning.
- ▶ Training offers you an introduction to the basics, product briefing and user training with certification.
You find the training courses on technology and products currently available at <https://www.belden.com/solutions/customer-innovation-center>.
- ▶ Support ranges from the first installation through the standby service to maintenance concepts.

With the Customer Innovation Center, you decide against making any compromises in any case. Our client-customized package leaves you free to choose the service components you want to use.

Internet:

<https://www.belden.com/solutions/customer-innovation-center>



HIRSCHMANN

A **BELDEN** BRAND