![HIRSCHMANN — A BELDEN BRAND logo]
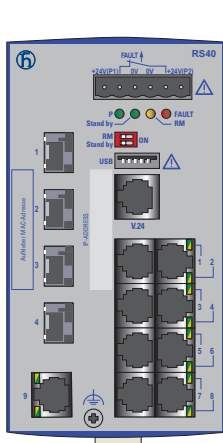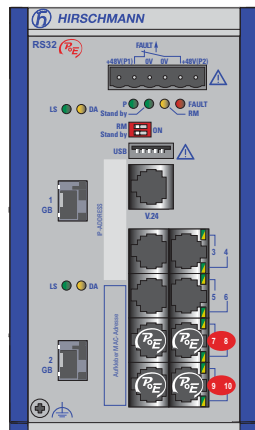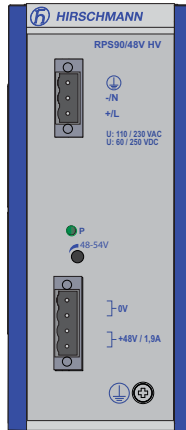
# User Manual

## Installation
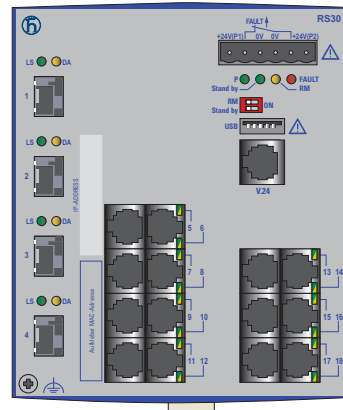## Industrial ETHERNET Rail Switch
## RS20/RS22/RS30/RS32/RS40 Family



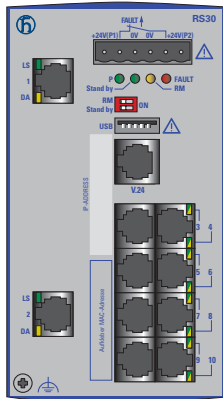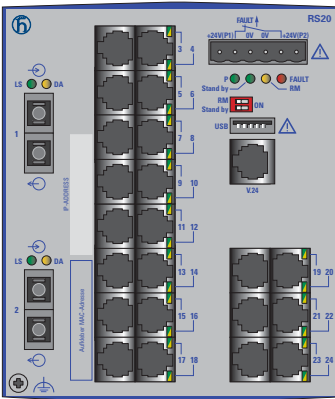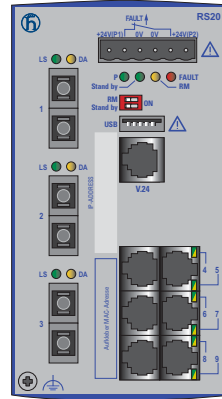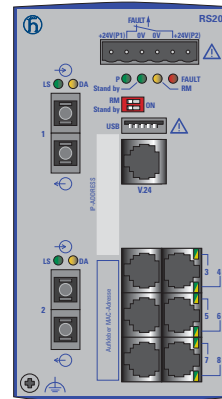RS40-0009...    RS32-0802...    RPS90/48V HV    RS30-1602...

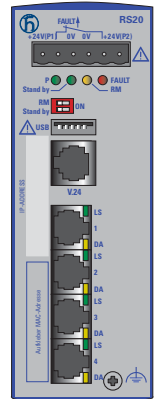RS30-0802...    RS20-2400...    RS20-0900...    RS20-0800...    RS20-0400...

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

# Contents

# Important information

**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.

## ■ Symbol explanation

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

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

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

---

## ⚠ DANGER

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

---

## ⚠ WARNING

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

---

## ⚠ CAUTION

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

| **NOTICE** |
| --- |
| **NOTE** provides information about procedures that do not involve the risk of injury. |

# Safety instructions

| ⚠️ **WARNING** |
| --- |
| **UNCONTROLLED MACHINE ACTIONS** |
| To avoid uncontrolled machine actions caused by data loss, configure all the data transmission devices individually. |
| Before you start any machine which is controlled via data transmission, be sure to complete the configuration of all data transmission devices. |
| **Failure to follow this instruction can result in death, serious injury, or equipment damage.** |

■ **General safety instructions**
You operate this device with electricity. Improper usage of the device entails the risk of physical injury or significant property damage. The proper and safe operation of this device depends on proper handling during transportation, proper storage and installation, and careful operation and maintenance procedures.
☐ Before connecting any cable, read this document, and the safety instructions and warnings.
☐ Operate the device with undamaged components exclusively.
☐ The device is free of any service components. In case of a damaged or malfunctioning device, turn off the supply voltage and return the device to Hirschmann for inspection.

■ **Certified usage**
Use the device solely for the application cases described in the Hirschmann product information, including this manual.
Operate the device solely according to the technical specifications.
See "Technical data" on page 64.

■ **Installation site requirements**
☐ Install the device in a fire enclosure according to IEC 60950-1.
☐ If installed in a living area or office environment, the device must be operated only in switch cabinets with fire protection characteristics according to IEC 60950-1.
Only when using the PoE power supply unit RPS90/48V HV:
☐ Install this device only in a switch cabinet or in an operating site with restricted access, to which maintenance staff have exclusive access.

■ **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.

■ **Device casing**
Only technicians authorized by the manufacturer are permitted to open the casing.
☐ 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.
☐ Keep the ventilation slits free to ensure good air circulation.
  See "General technical data" on page 64.
☐ Mount the device in the vertical position.
☐ At ambient air temperatures > +60 °C (+140 °F):
  The surfaces of the device housing may become hot. Avoid touching the device while it is operating.

■ **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.

■ **National and international safety regulations**
Verify that the electrical installation meets locally or nationally applicable safety regulations.

## ■ Grounding the device

The device is grounded via the separate ground screw on the bottom left of the front side of the device.

☐ Use a wire diameter for the ground conductor that is no smaller than the diameter of the supply voltage connection, however of at least 1.0 mm² (AWG16).

☐ Ground the device before connecting any other cables.

☐ Disconnect the grounding only after disconnecting all other cables.

## ■ Shielding ground

The overall shield of a connected shielded twisted pair cable is connected to the grounding connector on the front panel as a conductor.

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

## ■ Supply voltage

The supply voltage is electrically isolated from the housing.

☐ The devices are designed for operation with Safety Extra-low Voltage (SELV). Connect only SELV circuits with voltage restrictions according to IEC 60950-1 or ES1 according to IEC/EN 62368-1 to the supply voltage connections and to the signal contacts.

☐ Exclusively connect a supply voltage that corresponds to the type plate of your device.

☐ Applies exclusively to RS20-..., RS30-..., RS40-... device variants:
For power supply via DC voltage: **All** following prerequisites are fulfilled:

▶ There are fuses suitable for DC voltage in the positive conductors of the supply lines, or the voltage sources are appropriately current-limited. Regarding the properties of this fuse: See "General technical data" on page 64.

▶ The negative conductors of the voltage inputs are on ground potential.

For power supply via AC voltage: **All** following prerequisites are fulfilled:

▶ There are fuses in the supply lines, or the voltage sources are appropriately current-limited. Regarding the properties of this fuse: See "General technical data" on page 64.

▶ The power sources are electrically isolated from the ground potential.

☐ Applies exclusively to RS22-..., RS32-... device variants:
**All** of the following requirements are complied with:
  ▶ There are fuses suitable for DC voltage in the positive conductors of the supply lines, or the voltage sources are appropriately current-limited. Regarding the properties of this fuse: See "Technical data" on page 64.
  ▶ The power sources are electrically isolated from the ground potential. According to specification IEEE 802.3, the insulation voltage must be 1500 V AC or 2250 V DC.

☐ Observe the maximum values for the contact load of the signal contact.

☐ Relevant for North America:
The device may only be connected to a Class 2 supply voltage that fulfills the requirements of the National Electrical Code, Table 11(b). If the voltage is being supplied redundantly (two different voltage sources), the combined supply voltages must fulfill the requirements of the National Electrical Code, Table 11(b).

☐ Relevant for North America: For use in class 2 circuits.
Use 60/75 °C (140/167 °F) or 75 °C (167 °F) copper (Cu) wire only.

☐ Relevant for North America
for devices certified for hazardous locations:
Power, input and output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods [Article 501-4(b) of the National Electrical Code, NFPA 70] and in accordance with the authority having jurisdiction.

Start connecting the electrical wires only if **all** the above safety requirements are fulfilled.

☐ Enable the supply voltage for the device only when the following requirements are fulfilled:
  ▶ the housing is closed
  ▶ the terminal blocks are wired correctly
  ▶ the terminal blocks for the power supply are connected

☐ 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.

■ **Supply voltage for PoE power supply units (optional)**

☐ Connect the protective conductor with the ground screw before you set up the other connections. When removing the cables, remove the protective conductor last.

☐ Make sure that the cross-section of the protective conductor cable is the same size as or bigger than the cross-section of the voltage supply cables.

☐ Only use connection cables that are permitted for the specified temperature range.

☐ Exclusively connect a supply voltage that corresponds to the type plate of your device.

▶ PoE power supply unit RPS90/48V LV:18 V DC to 60 V DC

▶ PoE power supply unit RPS90/48V HV: 48 V DC to 320 V DC or 90 V AC to 265 V AC

☐ Install a suitable input fuse in the following cases:

▶ The neutral conductor or the negative terminal of the supply voltage is ungrounded.

▶ For the supply voltage, you provide a DC voltage greater than 125 V DC.

☐ With AC power supply, use a cable cross-section of at least 0.75 mm² (for North America AWG 18) for the current conductor at the voltage input.

☐ With DC power supply, use a cable cross-section of at least 1.0 mm² (for North America AWG 16) for the current conductor at the voltage input.

■ **ATEX directive 2014/34/EU – specific regulations for safe operation**

Relevant for RS20/22/30/32/40 devices when operating in explosive gas atmospheres according to ATEX Directive 2014/34/EU, the following applies:

☐ List of standards:
EN IEC 60079-0:2018
EN 60079-7:2015 + A1:2018
EN IEC 60079-15:2019

☐ The equipment is suitable for use in an area with maximum pollution degree 2, as defined in IEC 60664-1.

☐ Make sure that the device has the following label:

⟨Ex⟩ **II 3G Ex ec nC IIC T4 Gc        DEKRA 11ATEX0139 X**
for RS20/22/30/32 types.

⟨Ex⟩ **II 3G Ex ec nC IIC T3 ... T4 Gc   KEMA 09ATEX0067 X**
for RS40-types.

Temperature class and code for RS20 and RS30 types:
**T4: 0 °C ≤ Ta ≤ +60 °C for "S" types**
(position 14 of nomenclature breakdown) or
**T4: −40 °C ≤ Ta ≤ +70 °C for "T" or "E" types**
(position 14 of nomenclature breakdown).

Temperature class and code for RS22 and RS32 types:
**T4: −40 °C ≤ Ta ≤ +50 °C for "T" or "E" types**
(position 14 of nomenclature breakdown) or
**T4: 0 °C ≤ Ta ≤ +50 °C for "S" types**
(position 14 of nomenclature breakdown)

Temperature class and code for RS40 types:
**T3: −40 °C ≤ Ta ≤ +70 °C for "T" or "E" types**
(position 14 of nomenclature breakdown).
**T4: −40 °C ≤ Ta ≤ +60 °C for "T" or "E" types**
(position 14 of nomenclature breakdown).
**T4: 0 °C ≤ Ta ≤ +60 °C for "S" types**
(position 14 of nomenclature breakdown).

☐ The device shall be installed in a suitable enclosure in accordance with EN 60079-0 providing a degree of protection of at least IP54, taking into account the environmental conditions under which the equipment will be used.
☐ When the temperature under rated conditions exceeds 70 °C (158 °F) at the cable or conduit entry point, or 80 °C (176 °F) at the branching point of the conductors, the temperature specification of the selected cable and cable entries shall be in compliance with the actual measured temperature values.
☐ Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 119 V.
☐ Connectors shall be connected or disconnected exclusively in dead-voltage state.

⚠ ☐ Exclusively trigger DIP switches in dead-voltage state.
☐ The USB port must not be connected.

## ■ UK regulation S.I. 2016:1107 (as amended by S.I. 2019:696) - Schedule 3A, Part 6

The following applies to RS20/22/30/32/40 devices if you operate them in areas with explosive gases:

☐ List of standards:
EN IEC 60079-0:2018
EN 60079-7:2015 + A1:2018
EN IEC 60079-15:2019

☐ The device is suitable for use in an area with maximum pollution degree 2 as per IEC 60664-1.

☐ Make sure that the device has the following label:

⟨Ex⟩ **II 3G Ex ec nC IIC T4 Gc       DEKRA 21UKEX0065X**
for RS20/22/30/32 types.

⟨Ex⟩ **II 3G Ex ec nC IIC T3 ... T4 Gc   DEKRA 21UKEX0074X**
for RS40-types.

Temperature class and code for RS20 and RS30 types:
**T4: 0 °C ≤ Ta ≤ +60 °C for "S" types**
(position 14 of nomenclature breakdown) or
**T4: −40 °C ≤ Ta ≤ +70 °C for "T" or "E" types**
(position 14 of nomenclature breakdown).

Temperature class and code for RS22 and RS32 types:
**T4: −40 °C ≤ Ta ≤ +50 °C for "T" or "E" types**
(position 14 of nomenclature breakdown) or
**T4: 0 °C ≤ Ta ≤ +50 °C for "S" types**
(position 14 of nomenclature breakdown)

Temperature class and code for RS40 types:
**T3: −40 °C ≤ Ta ≤ +70 °C for "T" or "E" types**
(position 14 of nomenclature breakdown).
**T4: −40 °C ≤ Ta ≤ +60 °Cfor "T" or "E" types**
(position 14 of nomenclature breakdown).
**T4: 0 °C ≤ Ta ≤ +60 °C for "S" types**
(position 14 of nomenclature breakdown).

☐ The device shall be installed in a suitable enclosure in accordance with EN 60079-0 providing a degree of protection of at least IP54, taking into account the environmental conditions under which the equipment will be used.

□ When the temperature under rated conditions exceeds 70 °C (158 °F) at the cable or conduit entry point, or 80 °C (176 °F) at the branching point of the conductors, the temperature specification of the selected cable and cable entries shall be in compliance with the actual measured temperature values.

□ Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 119 V.

□ Connectors shall be connected or disconnected exclusively in dead-voltage state.

⚠ □ Exclusively trigger DIP switches in dead-voltage state.
□ The USB port must not be connected.

■ **Relevant for use in explosion hazard areas (Hazardous Locations, Class I, Division 2):**
Relevant for North America for devices certified for Hazardous Locations: Power, input and output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods [Article 501-4(b) of the National Electrical Code, NFPA 70] and in accordance with the authority having jurisdiction.

SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D HAZARDOUS LOCATIONS, OR NON-HAZARDOUS LOCATIONS ONLY.
WARNING – EXPLOSION HAZARD – SUBSTITUTION OF ANY COMPONENTS MAY IMPAIR SUITABLE FOR CLASS I, DIVISION 2.
WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS KNOWN TO BE FREE OF IGNITABLE CONCENTRATIONS.

The USB connector is for temporary connection only. Do not use, connect, or disconnect unless area is known to be non-hazardous. Connection or disconnection in an explosive atmosphere could result in an explosion.

Peripheral equipment must be suitabel for the location it is used in.
Use 60/75 °C (140/167 °F) or 75 °C (167 °F) copper (Cu) wire only.

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

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

**CONTROL DRAWING: Hazardous Locations Class I, Division 2, Groups A, B ,C ,D**

HAZARDOUS LOCATION | NON HAZARDOUS LOCATION

Detail: RS20, RS30 or RS40

P1
P2
Power supply:
(Redundant: P1  P2)
Type "D":  9.6Vdc – 60Vdc

Fault contacts. Equipment with nonincendive field wiring parameters:
$V<30V$   $I<90mA$   $L_i<1,0\mu H$   $C_i<2.5nF$

USB Port for Auto Configuration Adapter. For maintenance only – See Installation Instructions

Detail: RS22 or RS32

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P1
P2
Power supply (Redundant: P1  P2)
Type "P": 48Vdc
              (47Vdc min.  … 52Vdc max.)

Fault contacts. Equipment with nonincendive field wiring parameters:
$V<30V$   $I<90mA$   $L_i<1,0\mu H$   $C_i<2.5nF$

USB Port for Auto Configuration Adapter. For maintenance only – See Installation Instructions

**Notes:**

The nonincendive field wiring circuit concept allows interconnection of nonincendive field wiring apparatus and associated nonincendive field wiring apparatus using any of the wiring methods permitted for unclassified locations when certain parametric conditions are met.

$C_a \geq C_i + C_{Cable}$ ; $L_a \geq L_i + L_{Cable}$

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

**Nonincendive Field Wiring Parameters:**

| Entity Parameters<br>... for Class I, Division 2, Groups A,B,C,D => | $V_{max}$<br>[V] | $I_{max}$<br>[mA] | $C_i$<br>[nF] | $L_i$<br>[µH] |
|---|---|---|---|---|
| **Fault contacts** | 30 | 90 | 2.5 | 1.0 |



**WARNING -  EXPLOSION HAZARD – SUBSTITUTION OF ANY COMPONENTS MAY IMPAIR SUITABILITY FOR HAZARDOUS LOCATIONS OR EXPLOSIVE ATMOSPHERES.**

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

**DO NOT OPEN WHEN ENERGIZED.**

**HIRSCHMANN**

| **CONTROL DRAWING for RS20, RS22, RS30, RS32 and RS40 Family** | | |
|---|---|---|
| Size A4 | Document No.: 000157671DNR | Rev. 0 |
| Date: 2011-09-21 | | Sheet 1 of 1 |

## ■ IECEx – Certification Scheme for Explosive Atmospheres

For RS20/22/30/32/40 devices labeled with an IECEx certificate number, the following applies:

☐ List of standards:
IEC 60079-0:2017
IEC 60079-7:2017
IEC 60079-15:2017

☐ The device is suitable for use in an area with maximum pollution degree 2 as per IEC 60664-1.

☐ Make sure that the device has the following label:
**Ex ec nC IIC T4 Gc          IECEx DEK 14.0077X**
for RS20/22/30/32 types.

**Ex ec nC IIC T3 ... T4 Gc      IECEx DEK 14.0076X**
for RS40 types.

Temperature class and code for RS20 and RS30 types:
**T4: 0 °C ≤ Ta ≤ +60 °C for "S" types**
(position 14 of nomenclature breakdown) or
**T4: −40 °C ≤ Ta ≤ +70 °C for "T" or "E" types**
(position 14 of nomenclature breakdown).

Temperature class and code for RS22 and RS32 types:
**T4: −40 °C ≤ Ta ≤ +50 °C for "T" or "E" types**
(position 14 of nomenclature breakdown) or
**T4: 0 °C ≤ Ta ≤ +50 °C for "S" types**
(position 14 of nomenclature breakdown)

Temperature class and code for RS40 types:
**T3: −40 °C ≤ Ta ≤ +70 °C for "T" or "E" types**
(position 14 of nomenclature breakdown).
**T4: −40 °C ≤ Ta ≤ +60 °Cfor "T" or "E" types**
(position 14 of nomenclature breakdown).
**T4: 0 °C ≤ Ta ≤ +60 °C for "S" types**
(position 14 of nomenclature breakdown).

☐ The device shall be installed in a suitable enclosure in accordance with IEC 60079-0 providing a degree of protection of at least IP54, taking into account the environmental conditions under which the equipment will be used.

- ☐ When the temperature under rated conditions exceeds 70 °C (158 °F) at the cable or conduit entry point, or 80 °C (176 °F) at the branching point of the conductors, the temperature specification of the selected cable and cable entries shall be in compliance with the actual measured temperature values.
- ☐ Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 119 V.
- ☐ Connectors shall be connected or disconnected exclusively in dead-voltage state.

⚠️
- ☐ Exclusively trigger DIP switches in dead-voltage state.
- ☐ The USB port must not be connected.

## ■ E marking

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

RPS90/48V LV:
72/245/EWG, 2004/104/EG, 2009/19/EG
Guideline for standardizing the regulations of member states relating to radio interference from motor vehicles. Certified devices are marked with an e1 type approval indicator.

- ☐ For use in connection with a suitable type approved power supply only.

## ■ 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.

2014/34/EU (ATEX)
Directive of the European Parliament and the council on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres.

**Note:** The ATEX Directive applies exclusively to the device variants labeled with an ATEX certificate number.

Applies only to power supply unit RPS90/48V HV:

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 device can be used in industrial environments.
▶ Interference immunity: EN 61000-6-2
▶ Emitted interference: EN 55032


**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.


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

## ■ FCC note

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

RS20/22/30/32/40

**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.

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

# About this Manual

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

# Key

The symbols used in this manual have the following meanings:

| | |
|---|---|
| ▶ | Listing |
| ☐ | Work step |
| ■ | Subheading |

# 1   Description

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
- ▶ Media type
- ▶ Types of connectors
- ▶ Temperature range
- ▶ Certifications
- ▶ Software variant

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

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

The device works without a fan.

The voltage is supplied redundantly.

The following installation options are available:
- ▶ Mounting on the DIN rail
- ▶ mounting them on a wall (only RS22/RS32)

Depending on the device variant, you can choose various media to connect terminal devices and other infrastructure components:
- ▶ Twisted pair cable
- ▶ Multimode F/O
- ▶ Singlemode F/O

The twisted pair ports support:
- ▶ Autocrossing
- ▶ Autonegotiation
- ▶ Autopolarity

There are convenient options for managing the device. Manage your devices via:
- ▶ Web browser
- ▶ Telnet
- ▶ SSH
- ▶ HiDiscovery (software for putting the device into operation)
- ▶ 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
- ▶ V.24 interface (locally on the device)

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

Product configuration data can be provided by:
▶ diagnosis displays
▶ Display of the operating parameters
▶ Label area for IP address

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

## 1.1 Description of the device variants

The devices differ with regard to the range of software functions, the number of interfaces, and the media type for connecting segments.

The table below shows three port categories for each product variant: uplink ports, PoE ports and other ports. The table also shows for each product category the number of ports you can select, and the type of ports. In the column for the port type, the abbreviations F/O (optical fiber) and TP (twisted pair) indicate the media type, while the abbreviations DSC, ST, SFP and RJ45 indicate the socket type.

| Variant | Uplink ports | | Other ports | | PoE ports included | |
| | Amount | Type | Amount | Type | Amount | Type |
|---|---|---|---|---|---|---|
| RS20-... | 2 | Ports 1 and 2 10/100 Mbit/s, media selectable, DSC, ST, RJ45 | 2, 6, 14, 22 | 10/100 Mbit/s, TP, RJ45 | — | — |
| | 3 | Ports 1 to 3 10/100 Mbit/s, media selectable, DSC, ST, RJ45 | 6, 14, 22 | 10/100 Mbit/s, TP, RJ45 | — | — |
| RS22-... | 2 | Ports 1 and 2 10/100 Mbit/s, media selectable, DSC, ST, RJ45 | 6, 14, 22 | 10/100 Mbit/s, TP, RJ45 | 4 | 10/100 Mbit/s, TP, RJ45 |
| | 3 | Ports 1 to 3 10/100 Mbit/s, media selectable, DSC, ST, RJ45 | 6, 14, 22 | 10/100 Mbit/s, TP, RJ45 | 4 | 10/100 Mbit/s, TP, RJ45 |

*Table 1:   Number and type of ports*

| Variant | Uplink ports | | Other ports | | PoE ports included | |
|---|---|---|---|---|---|---|
| | Amount | Type | Amount | Type | Amount | Type |
| RS30-... | 2 | Ports 1 and 2 1000 Mbit/s, media selectable, SFP, RJ45 | 8, 16, 24 | 10/100 Mbit/s, TP, RJ45 | — | — |
| | 4 | Ports 1+2, 3+4 2x100/1000 Mbit/s, 2x 100 Mbit/s, F/O, SFP | 6, 14, 22 | 10/100 Mbit/s, TP, RJ45 | — | — |
| RS32-... | 2 | Ports 1 and 2 1000 Mbit/s, media selectable, SFP, RJ45 | 8, 16, 24 | 10/100 Mbit/s, TP, RJ45 | 4 | 10/100 Mbit/s, TP, RJ45 |
| | 4 | Ports 1+2, 3+4 2x100/1000 Mbit/s, 2x 100 Mbit/s, F/O, SFP | 6, 14, 22 | 10/100 Mbit/s, TP, RJ45 | 4 | 10/100 Mbit/s, TP, RJ45 |
| RS40-... | 4 | Ports 1 to 4 4 combo ports: 100/1000 Mbit/s, F/O, SFP 10/100/1000 Mbit/s, TP, RJ45 | 5 | 10/100/ 1000 Mbit/s, TP, RJ45 | — | — |

*Table 1:    Number and type of ports*

### 1.1.1   Combination options of the device variants RS20/ RS30/RS22/RS32

The product designation of your device is made from combining the desired product characteristics in accordance with the following table. You will find the corresponding short designation in columns 3 and 4.

| Position | Characteristic | Ident. | Ident.2 [a] | Property |
|---|---|---|---|---|
| 1 to 4 | Product | RS20 | | Rail Switch without gigabit ports |
| | | RS30 | | Rail Switch with gigabit ports |
| | | RS22 | | Rail Switch without gigabit ports, with PoE[b)c]) |
| | | RS32 | | Rail Switch with gigabit ports, with PoE[d)e]) |
| 5 | - (hyphen) | - | | |
| 6 to 7 | Number of 10/100 Mbit/s ports | 04 | | 4 × 10/100 Mbit/s Ethernet |
| | | 08 | | 8 × 10/100 Mbit/s Ethernet |
| | | 09 | | 9 × 10/100 Mbit/s Ethernet |
| | | 16 | | 16 × 10/100 Mbit/s Ethernet |
| | | 17 | | 17 × 10/100 Mbit/s Ethernet |
| | | 24 | | 24 × 10/100 Mbit/s Ethernet |
| | | 25 | | 25 × 10/100 Mbit/s Ethernet |

*Table 2:    Combination options of the device variants RS20/RS30/RS22/RS32*

| Position | Characteristic | Ident. | Ident.2 [a] | Property |
|---|---|---|---|---|
| 8 and 9 | Number of 1000 Mbit/s ports | 00 | | 0 × 1000 Mbit/s Ethernet |
| | | 02 | | 2 × 1000 Mbit/s Ethernet (not for 4-port devices)[f] |
| 10 and 11 [a] | Uplink port(s) 1 port (Ident. column) or alternatively 2 ports (Ident. 2 column) | T1 | | Twisted Pair TX (RJ45) |
| | | M2 | MM[g] | Multimode FX, DSC, 100 Mbit/s |
| | | M4 | NN[h] | Multimode FX, ST, 100 Mbit/s |
| | | S2 | VV[i] | Singlemode FX, DSC, 100 Mbit/s |
| | | S4 | UU[j] | Singlemode FX, ST, 100 Mbit/s |
| | | E2 | EE[k][l] | Singlemode+ FX, DSC, 100 Mbit/s |
| | | L2 | LL[m] | Singlemode Longhaul, DSC, 100 Mbit/s |
| | | G2 | GG[n] | Singlemode Longhaul FX DSC 200 km, 100 Mbit/s |
| | | O6 | OO[o][p] | SFP slot 100[q]/1000 Mbit/s |
| | | Z6 | ZZ[r][s] | SFP slot, 100 Mbit/s |
| 12 and 13 [a] | See items 10 and 11 | | | |
| 14 | Temperature range | S | | Standard 0 °C to +60 °C (0 °F to +140 °F)[t] |
| | | T | | Extended -40 °C to +70 °C (0 °F to +158 °F) [u][v] |
| | | E | | Extended -40 °C to +70 °C (-40 °F to +158 °F) Conformal Coating[w][x][y] |
| | Voltage range inclusive maximum tolerances | D[z] | | 9.6 V DC to 60 V DC or 18 V AC to 30 V AC |
| | | P[aa] | | 47 V DC to 52 V DC (PoE) |
| 16 | Approvals | A | | CE, UL 508, ISA 12.12.01 (UL 1604) |
| | | H | | CE, UL 508, ISA 12.12.01 (UL 1604), GL, Railway (along track), Substation |
| | | B[ab] | | CE, UL 508, ISA 12.12.01 (UL 1604), GL, Railway (along track), Substation, Hazardous Location/ATEX/IECEx |
| 17 | Software variant | E | | Enhanced |
| | | P | | Professional |

*Table 2:     Combination options of the device variants RS20/RS30/RS22/RS32*

a.  For device variants with 2 uplink ports you use the "Ident." column for items 10+11 and for items 12+13.
    For device variants with 3 uplink ports you use the "Ident.2" column for items 10+11 and the "Ident." column for items 12+13.
    For device variants with 4 uplink ports you use the "Ident.2" column for items 10+11 and for items 12+13.
b.  Not in combination with "04×100 Mbit/s Ethernet".
c.  The last 4 ports of the device have PoE (Power over Ethernet).
d.  Not in combination with "04×100 Mbit/s Ethernet".
e.  The last 4 ports of the device have PoE (Power over Ethernet).
f.  Not in combination with "04×100 Mbit/s Ethernet".
g.  For RS20-0900..., RS20-1700..., RS20-2500...;
    RS22-0900..., RS22-1700..., RS22-2500...
h.  For RS20-0900..., RS20-1700..., RS20-2500...;
    RS22-0900..., RS22-1700..., RS22-2500...
i.  For RS20-0900..., RS20-1700..., RS20-2500...;
    RS22-0900..., RS22-1700..., RS22-2500...
j.  For RS20-0900..., RS20-1700..., RS20-2500...;
    RS22-0900..., RS22-1700..., RS22-2500...

k.  For RS20-0900..., RS20-1700..., RS20-2500...;
    RS22-0900..., RS22-1700..., RS22-2500...
l.  Devices with ports with product code E2 or EE: only certification "A" available (see product code for item16).
m.  For RS20-0900..., RS20-1700..., RS20-2500...;
    RS22-0900..., RS22-1700..., RS22-2500...
n.  For RS20-0900..., RS20-1700..., RS20-2500...;
    RS22-0900..., RS22-1700..., RS22-2500...
o.  Not in combination with "04×100 Mbit/s Ethernet".
p.  In connection with "2nd uplink port" "ZZ" and "1st uplink port" "OO".
q.  Only for "OO" combination
r.  In combination with "2nd uplink port" "ZZ" and "1st uplink port" "OO".
s.  Not in combination with "04×100 Mbit/s Ethernet".
t.  With a UL-508, ATEX/IECEx, or ISA 12.12.01 certification, the maximum operating temperature for the standard 'S' temperature range for PoE-capable devices (RS22-...,RS32-...) is +50 °C (+122 °F).
u.  The extended "E" temperature range for the PoE capable devices is −40 °C to +60 °C (-40 °F to +140 °F).
    With a UL-508, ATEX/IECEx, or ISA 12.12.01 approval, the maximum operating temperature for the extended "E" temperature range for PoE capable devices (RS22-..., RS32-...) is +50 °C (+122 °F).
v.  Not when using GG or G2 transceivers.
w.  The extended 'T' temperature range for the PoE-capable devices is -40 °C to +60 °C (-40 °F to +140 °F)
    With a UL-508, ATEX/IECEx, or ISA 12.12.01 approval, the maximum operating temperature for the extended 'T' temperature range for PoE-capable devices (RS22-..., RS32-...) is +50 °C (+122 °F)
x.  Not when using GG or G2 transceivers.
y.  In combination with "2nd uplink port" "ZZ" and "1st uplink port" "OO".
z.  Not for PoE-capable devices (RS22-..., RS32-...).
aa. For PoE capable devices (RS22-..., RS32-...).
ab. Without railway approval EN 50155 (Train).

## ■ Examples for product name

| RS20- | | |
|---|---|---|
| | RS20- | Rail Switch without gigabit ports |
| 09 | 09 | 9 × 100 Mbit/s Ethernet ports |
| 00 | 00 | 0 × 1000 Mbit/s Ethernet ports |
| MM | MM | Port 1 + 2 = 2 × Multimode FX, DSC, 100 Mbit/s |
| M2 | M2 | Port 3 = Multimode FX, DSC, 100 Mbit/s |
| S | S | Temperature range Standard: 0 °C ... +60 °C (+32 °F ... +140 °F) |
| D | D | Voltage range: 9.6 V DC to 60 V DC or 18 V AC to 30 V AC |
| A | A | Approvals: CE, UL 508, ISA 12.12.01 (UL 1604) |
| P | P | Software variant: Professional |

*Table 3:  Example of RS20 with 3 uplink ports: RS20-0900MMM2SDAP*

| RS30- | | |
|---|---|---|
| | RS30- | Rail Switch with gigabit ports |
| 08 | 08 | 8 × 100 Mbit/s Ethernet ports |
| 02 | 02 | 2 × 1000 Mbit/s Ethernet ports |
| O6 | O6 | Port 1 = SFP slot, 1000 Mbit/s |
| T1 | T1 | Port 2 = Twisted Pair TX, RJ45 connector, 1000 Mbit/s |

*Table 4:  Example of RS30 with 2 uplink ports: RS30-0802O6T1TDAE*

| | | | |
|---|---|---|---|
| **T** | T | Temperature range Extended: -40 °C to +70 °C (-40 °F ...+158 °F) | |
| **D** | D | Voltage range: 9.6 V DC to 60 V DC or 18 V AC to 30 V AC | |
| **A** | A | Approvals: CE, UL 508, ISA 12.12.01 (UL 1604) | |
| **E** | E | Software variant: Enhanced | |

*Table 4:    Example of RS30 with 2 uplink ports: RS30-0802O6T1TDAE*

Additional examples of devices with 3 or 4 uplink ports:
▶ RS20-0900**NNM4**TDAE for RS20 with 3 uplink ports (ST)
  **NN**: 2 × Multimode FX, ST, 100 Mbit/s (ports 1 and 2)
  **M4**: 1 × Multimode FX, ST, 100 Mbit/s (port 3)
▶ RS30-2402**OOZZ**TDAP for RS30 with 4 uplink ports (SFP)
  **OO**: 2 × SFP slot, 1000 Mbit/s (ports 1 and 2)
  **ZZ**: 2 × SFP slot, 100 Mbit/s (ports 3 und 4)

Example of device with Power over Ethernet:
▶ RS32-0802**O6T1**SP**AP for RS32 with 2 uplink ports and PoE
  **O6**: 1 × SFP slot, 1000 Mbit/s (port 1)
  **T1**: 1 × Twisted pair TX, RJ45, 1000 Mbit/s (port 2)
  **P**: Voltage range 47 V DC to 52 V DC (PoE)

## 1.1.2    Combination options for the RS40 device variants

The product designation of your device is made from combining the desired product characteristics in accordance with the following table. The corresponding short designation is in column 3.

| Position | Characteristic | Ident. | Property |
|---|---|---|---|
| 1 to 4 | Product | RS40 | Rail Switch with gigabit ports |
| 5 | - (hyphen) | - | |
| 6 to 7 | Number of 10/100 Mbit/s Ports | 00 | 0 × 10/100 Mbit/s Ethernet |
| 8 and 9 | Number of 1000 Mbit/s Ports | 09 | 9 × 1000 Mbit/s Ethernet |
| 10 and 11 | 1. + 2. Uplink port | CC | 2 × Combo port multirate (SFP slot: 100/1000 Mbit/s; alternatively twisted pair RJ45 socket: 10/100/1000 Mbit/s) |
| 12 and 13 | 3. + 4. Uplink port | CC | 2 × Combo Port multirate (SFP-slot: 100/1000 Mbit/s; alternatively twisted pair RJ45 socket: 10/100/1000 Mbit/s) |
| 14 | Temperature range | S | Standard 0 °C to +60 °C (+32 °F to +140 °F) |
| | | T | Extended -40 °C to +70 °C (-40 °F to + 158 °F) |
| | | E | Extended: -40 °C to +70 °C (-40 °F to +158 °F), Conformal Coating |
| 15 | Voltage range | D | 9.6 V DC to 60 V DC or 18 V AC to 30 V AC |

*Table 5:    Combination options for the RS40 device variants*

| Position | Characteristic | Ident. | Property |
|---|---|---|---|
| 16 | Approvals | A | CE, UL 508, ISA 12.12.01 (UL 1604) |
| | | H | CE, UL 508, GL, Railway (along track), Sub Station, ISA 12.12.01 (UL 1604) |
| | | B | CE, UL 508, GL, Railway (along track), Sub Station, ISA 12.12.01 (UL 1604), Hazardous Location/ ATEX/IECEx |
| 17 | Software variant | E | Enhanced |
| | | P | Professional |

*Table 5: Combination options for the RS40 device variants*

## ■ Examples for product name

| | | |
|---|---|---|
| RS40- | RS40- | Rail Switch with gigabit ports |
| 00 | 00 | 0 × 100 Mbit/s Ethernet ports |
| 09 | 09 | 9 × 1000 Mbit/s Ethernet ports |
| CC | CC | Port 1 + 2 = Combo port: SFP slot (100/1000 Mbit/s), alternatively: RJ45 connector (10/100/1000 Mbit/s) |
| CC | CC | Port 3 + 4 = Combo port: SFP slot (100/1000 Mbit/s), alternatively: RJ45 connector (10/100/1000 Mbit/s) |
| E | E | Temperature range: Extended -40 °C to +70 °C (-40 °F to +158 °F) with Conformal Coating |
| D | D | Voltage range: 9.6 V DC to 60 V DC or 18 V AC to 30 V AC |
| A | A | Approvals: CE, UL 508, ISA 12.12.01 (UL 1604) |
| P | P | Software variant: Professional |

*Table 6: Example of RS40 with 4 uplink ports: RS40-0009CCCCEDAP*

## 1.1.3    Number of ports and media for RS20-...



RS20-0400T1T1...D...          RS20-0400M2T1...D...          RS20-0400M2M2...D...
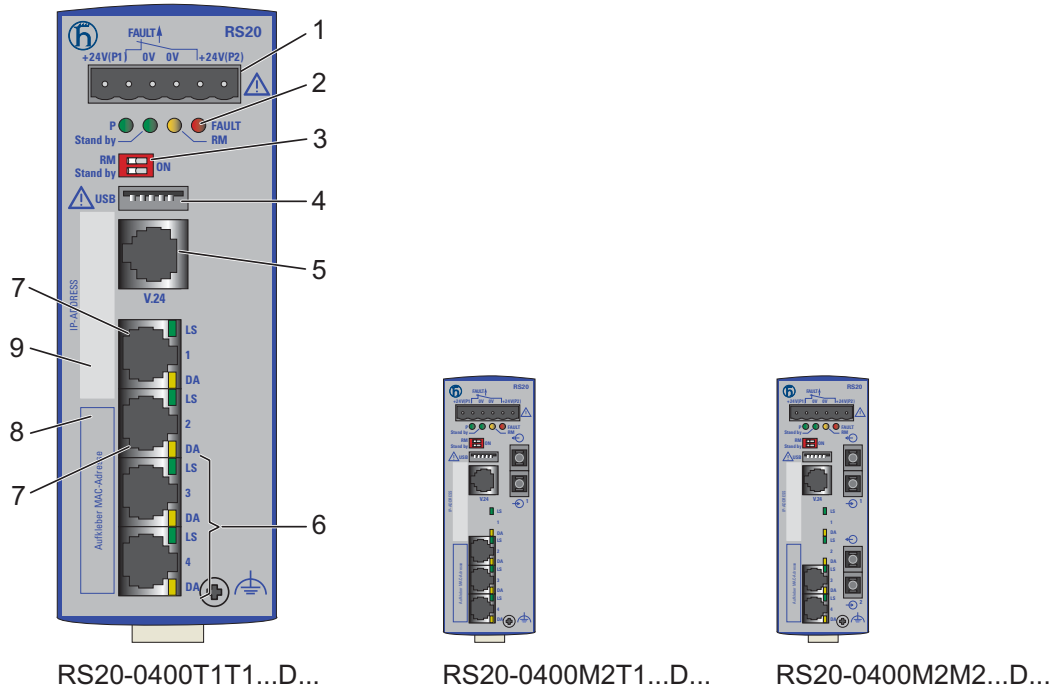
*Figure 1:   Device variants with 4 × 10/100 Mbit/s ports (RS20-0400...)*
*1 – plug-in terminal block, 6-pin*
*2 – LED display elements*
*3 – 2-pin DIP switch*
*4 – USB interface*
*5 – V.24 connection for external management*
*6 – ports in compliance with 10/100BASE-T(X) (RJ45 connections)*
*7 – port 1 + port 2, free choice of connections:*
    *T1: Twisted-pair T(X), RJ45, 10/100 Mbit/s*
*M2: Multimode FX, DSC, 100 Mbit/s*
*M4: Multimode FX, ST, 100 Mbit/s*
*S2: Singlemode FX, DSC, 100 Mbit/s*
*S4: Singlemode FX, ST, 100 Mbit/s*
*L2: Singlemode Longhaul FX, DSC, 100 Mbit/s*
*G2: Singlemode Longhaul+ FX, DSC, 100 Mbit/s, 200 km*
*8 – MAC address field*
*9 – IP address field*

Figure 2: Device variants with 8 × 10/100 Mbit/s ports (RS20-0800...)
    1 to 9 – see figure 1
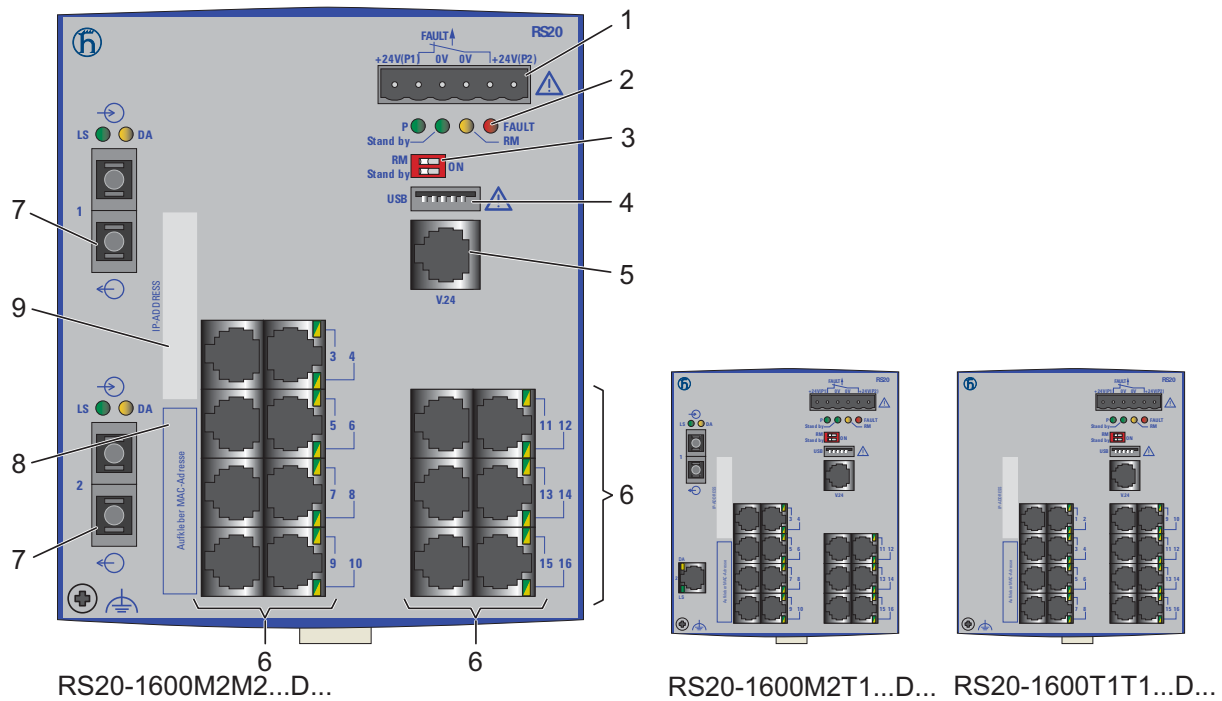


Figure 3: Device variants with 16 × 10/100 Mbit/s ports (RS20-1600...)
    1 to 9 – see figure 1
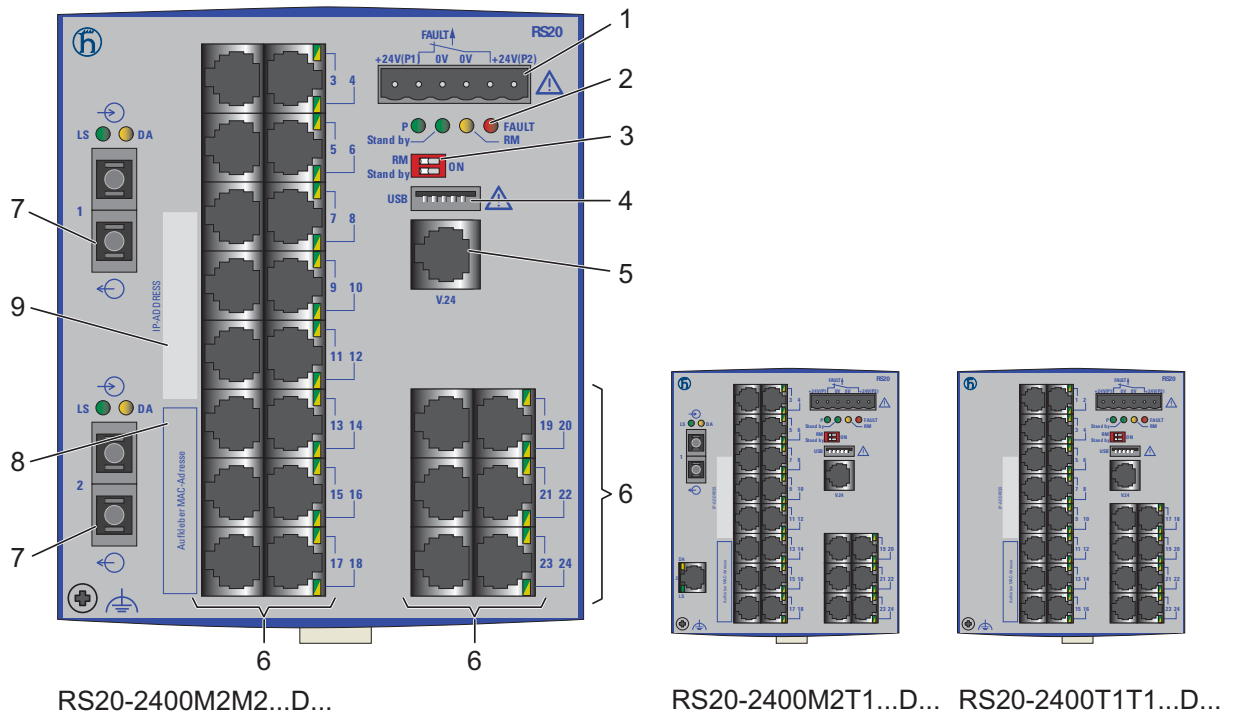
Figure 4:   Device variants with 24 × 10/100 Mbit/s ports (RS20-2400...)
            1 to 9 – see figure 1
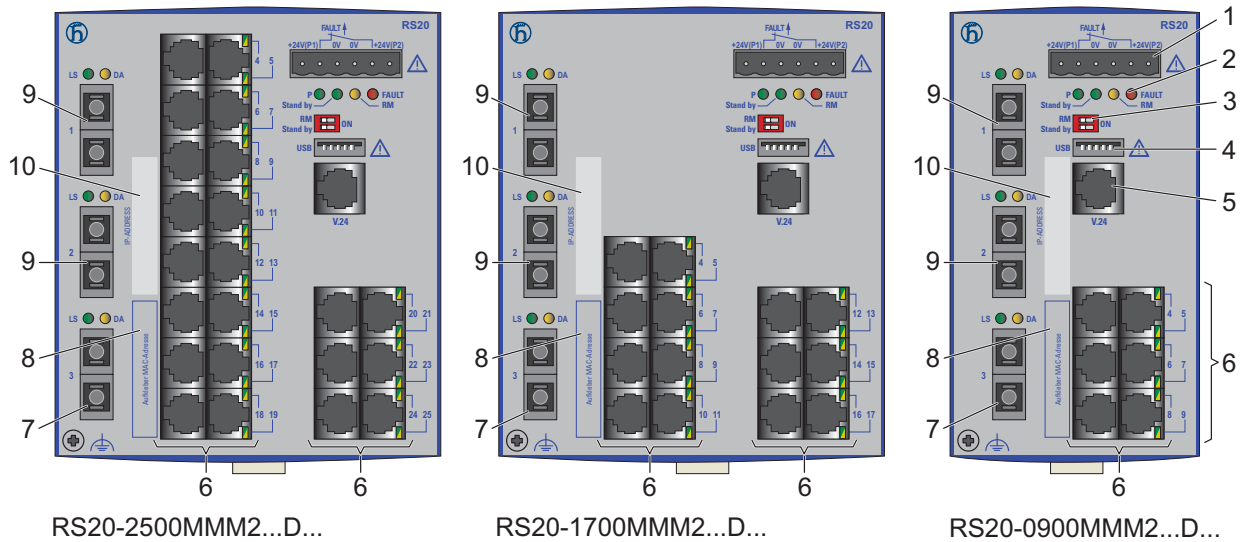


Figure 5:   Device variants with 3 uplink ports (100 Mbit/s)
            1 to 6 – see figure 1
            7 – port 3, free choice of connection:
                T1: Twisted-pair T(X), RJ45, 10/100 Mbit/s
                M2: Multimode FX, DSC, 100 Mbit/s
                M4: Multimode FX, ST, 100 Mbit/s
                S2: Singlemode FX, DSC, 100 Mbit/s
                S4: Singlemode FX, ST, 100 Mbit/s
                L2: Singlemode Longhaul FX, DSC, 100 Mbit/s
                G2: Singlemode Longhaul+ FX, DSC, 100 Mbit/s, 200 km
            8 – MAC address field
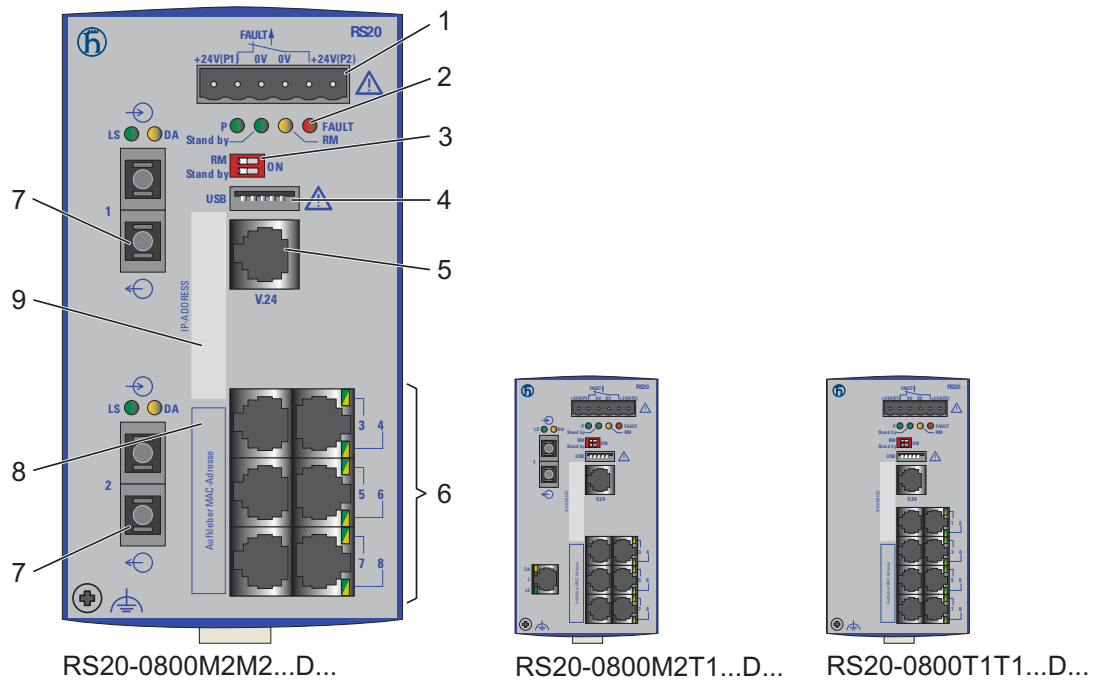
9 – port 1 + port 2, free choice of connections:
   MM: Multimode FX, DSC, 100 Mbit/s
   NN: Multimode FX, ST, 100 Mbit/s
   VV: Singlemode FX, DSC, 100 Mbit/s
   UU: Singlemode FX, ST, 100 Mbit/s
   LL: Singlemode Longhaul FX, DSC, 100 Mbit/s
   GG: Singlemode Longhaul+ FX, DSC, 100 Mbit/s, 200 km
10 – IP address field

## 1.1.4 Number of ports and media for RS30-...



RS30-0802T1T1...D...          RS30-0802O6O6...D...          RS30-0802O6T1...D...
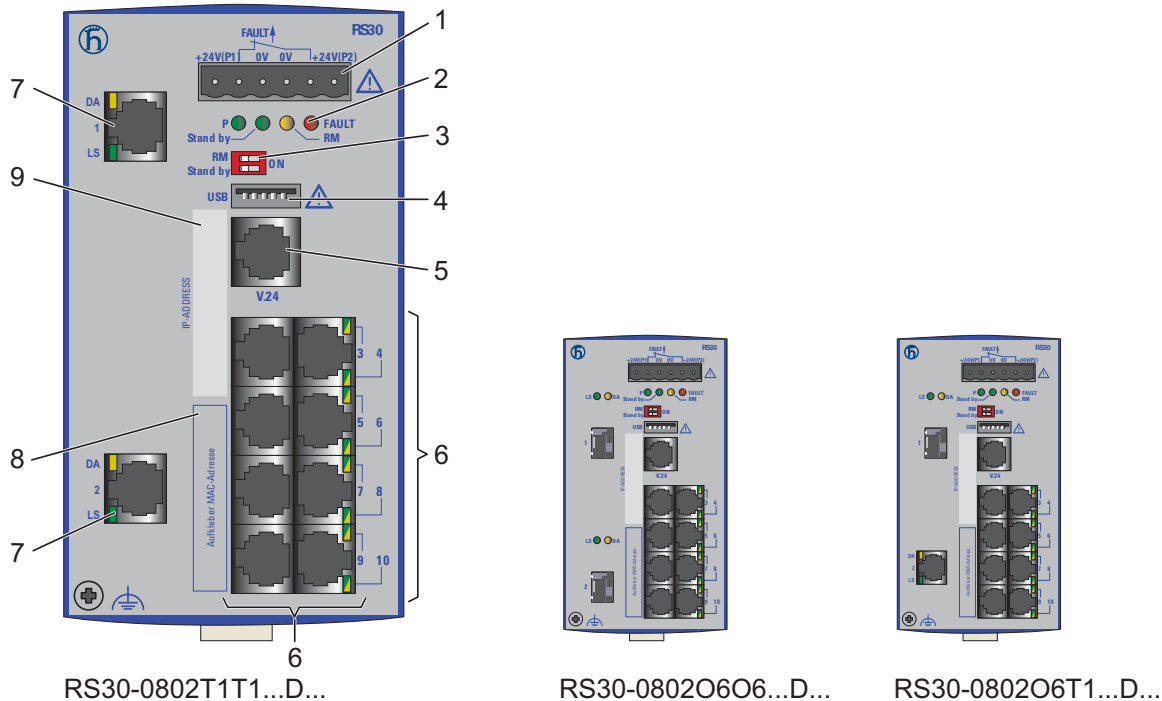
*Figure 6:* *Device variants with 2 × 1000 Mbit/s ports and 8 × 10/100 Mbit/s ports*
*(RS30-0802...)*
  *1 – plug-in terminal block, 6-pin*
  *2 – LED display elements*
  *3 – 2-pin DIP switch*
  *4 – USB interface*
  *5 – V.24 connection for external management*
  *6 – ports in compliance with 10/100BASE-T(X) (RJ45 connections)*
  *7 – port 1 + port 2, free choice of connections:*
     *T1: Twisted-pair T(X), RJ45, 10/100/1000 Mbit/s*
  *O6: SX/LX, SFP slot, 1000 Mbit/s*
  *8 – MAC address field*
  *9 – IP address field*
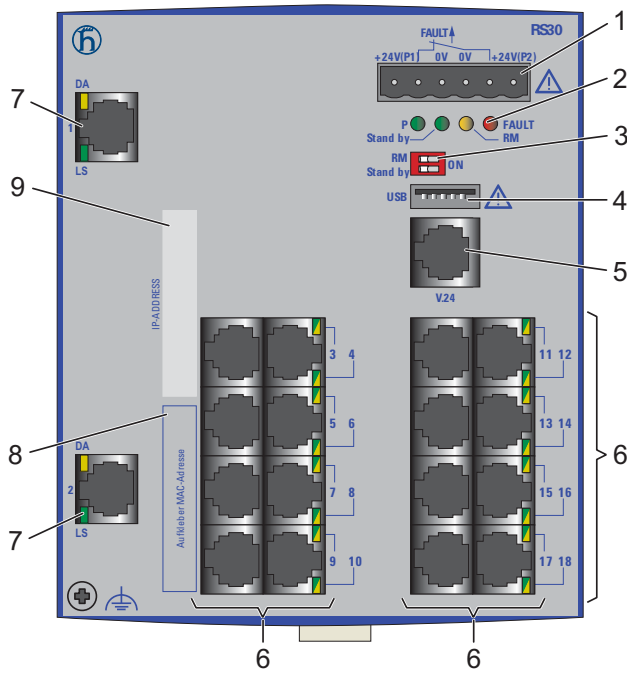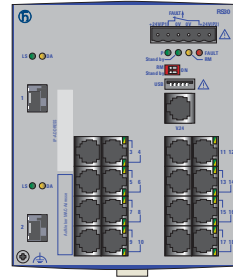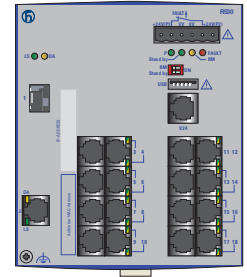
*Figure 7: Device variants with 2 × 1000 Mbit/s ports and 16 × 10/100 Mbit/s ports (RS30-1602...)*
*1 to 9 – see figure 6*
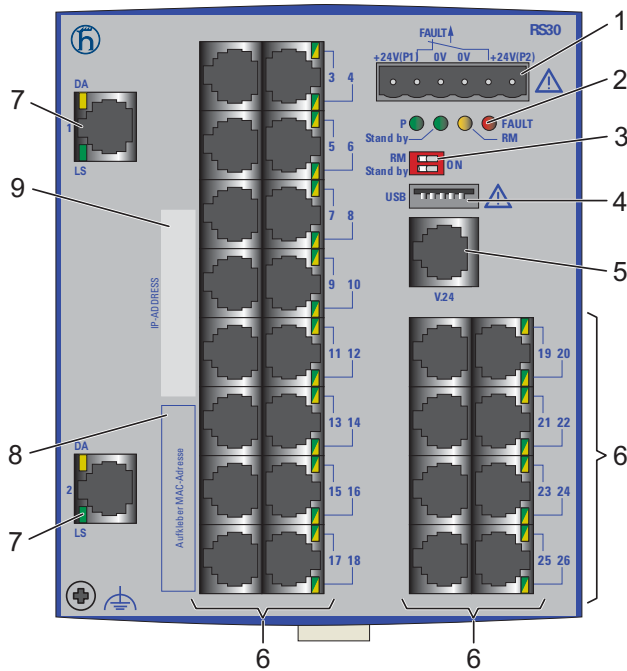


*Figure 8: Device variants with 2 × 1000 Mbit/s ports and 24 × 10/100 Mbit/s ports (RS30-2402...)*
*1 to 9 – see figure 6*

RS30-2402OOZZ...D...  RS30-1602OOZZ...D...  RS30-0802OOZZ...D...
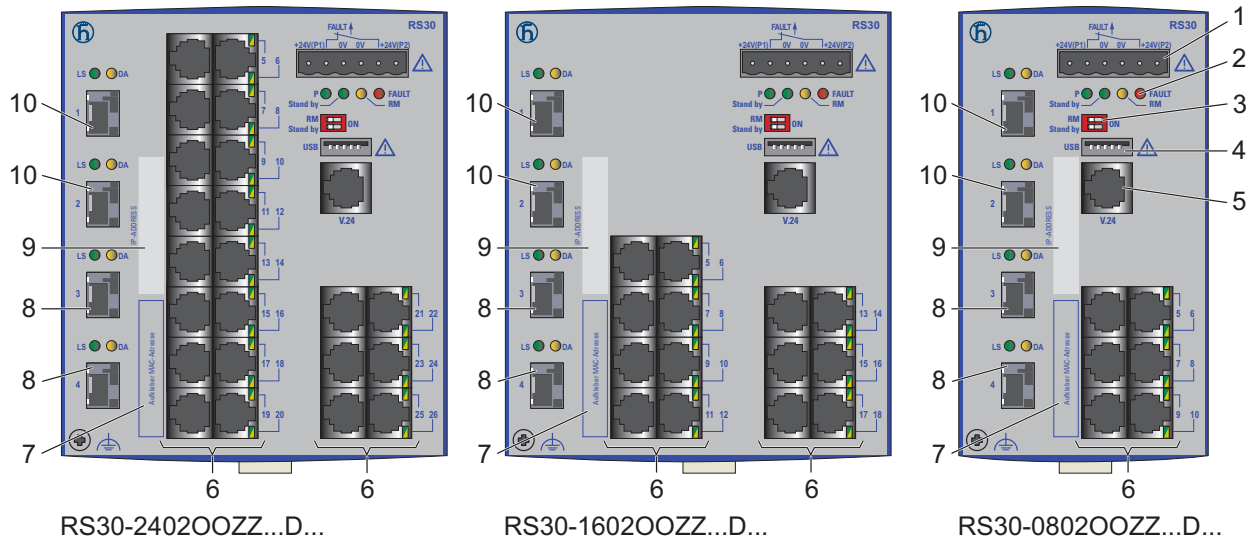
*Figure 9:*  *Device variants with 4 uplink ports*
*1 to 6 – see figure 6*
*7 – MAC address field*
*8 – port 3 + port 4:*
   *ZZ: FX, SFP slot, 100 Mbit/s*
*9 – IP address field*
*10 – port 1 + port 2:*
   *OO: FX/SX/LX, SFP slot, 100/1000 Mbit/s*

## 1.1.5    Number of ports and media for RS40-...



RS40-0009CCCCED...
RS40-0009CCCCTD...                     RS40-0009CCCCSD...
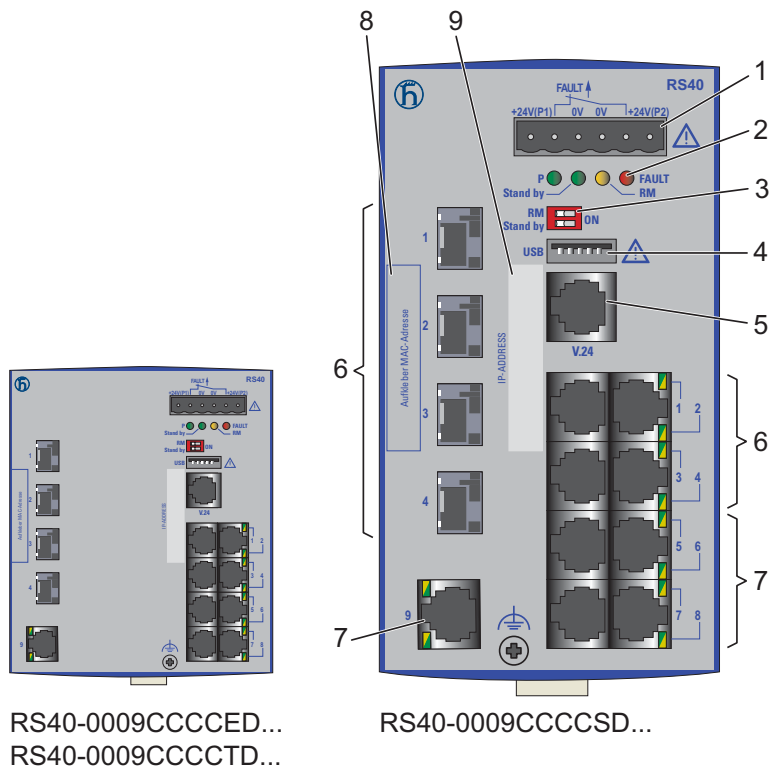
*Figure 10: Device variants with 9 × 1000 Mbit/s ports (RS40-0009...)*
*1 to 5 and 8 to 9 – see figure 6*
*6 – port 1 to port 4: combo ports (CC):*
*FX/SX/LX, SFP slot, 100 or 1000 Mbit/s*
*Alternatively: T(X), RJ45 connections, 10/100/1000 Mbit/s*
*7 – ports in compliance with 10/100/1000BASE-T(X) (RJ45 connections)*

## 1.2 Device variants with PoE (optional)

### 1.2.1 Number of ports and media for devices with PoE
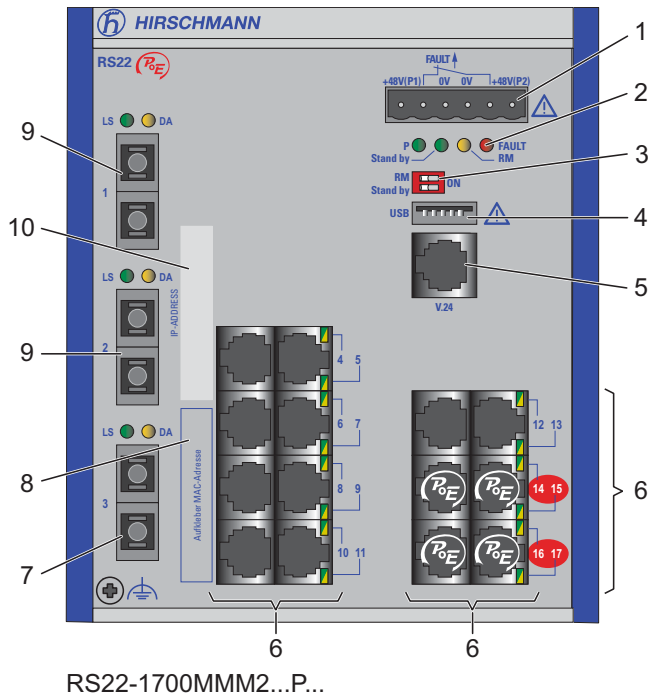


RS22-1700MMM2...P...

*Figure 11: RS22 device variants with PoE (example: RS22-1700MMM2...P...)*
        *1 to 5 and 7 to 9 – see figure 5*
        *6 – ports in compliance with 10/100BASE-T(X) (RJ45 connections; the*
        *PoE-capable ports 14 to 17 are indicated accordingly)*
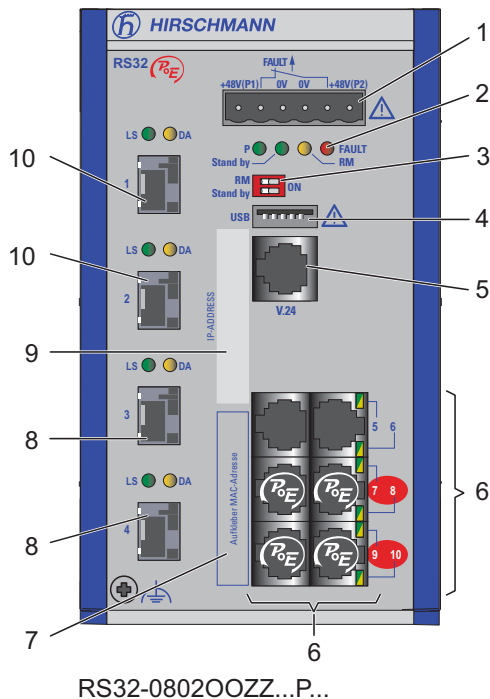
*Figure 12: RS32 device variants with 4 uplink ports (example: RS32-0802OOZZ...P...)*
*1 to 5 and 7 to 9 – see figure 9*
*6 – ports in compliance with 10/100BASE-T(X) (RJ45 connections; the PoE-capable ports 7 to 10 are indicated accordingly)*

Device variants RS22-... and RS32-... support Power over Ethernet (PoE) in accordance with IEEE 802.3af.

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.

The RS22-... and RS32-... devices provide four 10BASE-T/100BASE-TX ports (RJ45 sockets) for connecting network segments or PoE terminal devices (PD, Powered Device) for all IEEE802.3af classes up to a maximum power output of 15.4 W.

The four PoE-capable ports are the four bottom ports on the right side of the device (see figures in section "Number of ports and media for devices with PoE" on page 36. The PoE ports are indicated in red on the device).

The voltage is supplied through the wire pairs transmitting the signal (phantom voltage). The individual ports are not electrically insulated from each other.
The following conditions are met in accordance with IEEE 802.3af:
▶ Endpoint PSE
▶ Alternative A

### 1.2.2 PoE power units

The following PoE power units are available for supplying the devices with PoE voltage:

▶ **RPS90/48V LV**: Low-voltage PoE power unit
  - ▶ Input voltage range: 24 V DC to 48 V DC
  - ▶ Power output at up to +60 °C: 90 W
    Power output at +60 °C to +70 °C: 60 W

▶ **RPS90/48V HV**: High-voltage PoE power unit
  - ▶ Input voltage range:
    60 V DC to 250 V DC or 110 V AC to 230 V AC
    You can choose between a DC or AC voltage connection.
  - ▶ Power output at up to +60 °C: 90 W
    Power output at +60 °C to +70 °C: 60 W

The output voltage can be set in the range from 48 V DC to 54 V DC.
The default setting for the output voltage is 48 V DC.
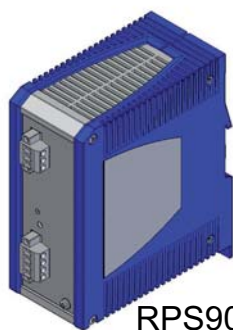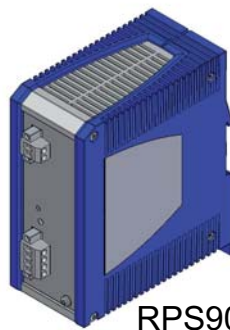
RPS90/48V HV          RPS90/48V LV

## 1.3 Ethernet ports

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

### 1.3.1 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

▶ 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.
The pin assignment corresponds to MDI-X.
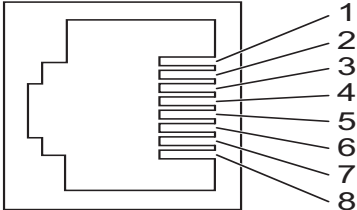
| | Pin | Function |
|---|---|---|
| 1 | 1 | BI_DB+ |
| 2 | 2 | BI_DB- |
| 3 | 3 | BI_DA+ |
| 4 | 4 | BI_DD+ |
| 5 | 5 | BI_DD- |
| 6 | 6 | BI_DA- |
| 7 | 7 | BI_DC+ |
| 8 | 8 | BI_DC- |

*Table 7:    Pin assignments of the 10/100/1000 Mbit/s twisted pair port in 1000 Mbit/s mode, RJ45 socket, MDI-X mode*

## 1.3.2    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.
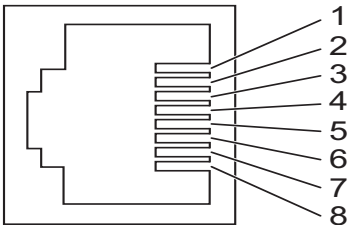
| | Pin | Function | |
|---|---|---|---|
| 1 | 1 | RD+ | Receive path |
| 2 | 2 | RD- | Receive path |
| 3 | 3 | TD+ | Transmission path |
| 4 | 6 | TD- | Transmission path |
| 5, 6, 7, 8 | 4, 5, 7, 8 | – | |

*Table 8:    Pin assignment 10/100 Mbit/s twisted pair port, RJ45 socket, MDI-X mode*

### 1.3.3 10/100 Mbit/s twisted-pair connection PoE (RS22-.../RS32-...)

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.

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, at the last four ports of the device)

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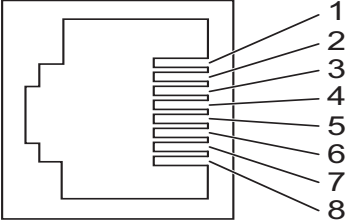
| | Pin | Function | | PoE voltage |
|---|---|---|---|---|
| | 1 | RD+ | Receive path | Minus terminal |
| | 2 | RD- | Receive path | Minus terminal |
| | 3 | TD+ | Transmission path | Plus terminal |
| | 6 | TD- | Transmission path | Plus terminal |
| | 4, 5, 7, 8 — | | | |

*Table 9: Pin assignment 10/100-Mbit/s PoE port, RJ45 socket, MDI-X mode, phantom supply*

### 1.3.4 1000 Mbit/s F/O port

This port is an SFP slot.

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

This port supports:

This port supports:

▶ Autonegotiation

For device variants with the designation RS30-...02OOZZ... and RS32-...02OOZZ... (4 uplink ports with SFP slot), you have the option of using either Gigabit Ethernet SFP transceivers or Fast Ethernet SFP transceivers at the two top ports, and Fast Ethernet SFP transceivers at the two bottom ports.

For the device variants RS40-..., you have the option of using either Gigabit Ethernet SFP transceivers or Fast Ethernet SFP transceivers at the combo ports.
See "Accessories" on page 77.
Verify that you connect LH ports only with LH ports, SX ports only with SX ports, and LX ports only with LX ports.

## 1.3.5    100 Mbit/s F/O port
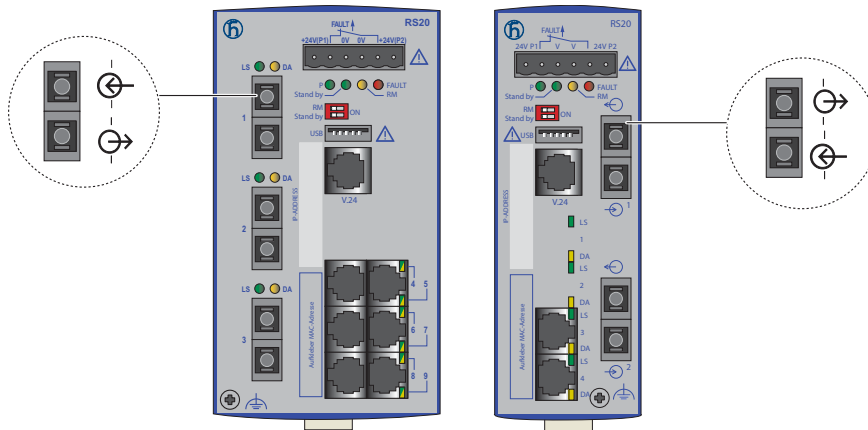


*Figure 13: Sending and receiving directions for device variants with DSC or DST ports*

In device variants RS20 and RS22, these ports are DSC sockets or ST sockets.
In device variants RS30, RS32 and RS40, these ports are SFP slots.
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.

## 1.3.6    Gigabit combo port

You have the option of alternatively connecting a twisted pair cable via a RJ45 socket or an optical fiber via a SFP transceiver to a combo port.
You obtain appropriate SFP transceivers as an accessory.
See "Accessories" on page 77.

By inserting a SFP transceiver, you deactivate automatically the corresponding twisted pair interface.

| Media type | Connection options | | |
|---|---|---|---|
| Twisted pair cable | | Technical standard | IEEE 802.3 10BASE-T/100BASE-TX/ 1000BASE-T |
| | | Connection type | RJ45 |
| Fiber optic cable | either | Technical standard | IEEE 802.3 100BASE-FX |
| | | Connection type | Fast Ethernet SFP transceiver |
| | or | Technical standard | IEEE 802.3 1000BASE-SX/LX |
| | | Connection type | 1 Gigabit Ethernet SFP transceiver |

*Table 10:  Combo ports: Connection options*

■ **10/100/1000 Mbit/s twisted pair port**

■ **100/1000 Mbit/s F/O port**
This port is an SFP slot.
The 100/1000 Mbit/s F/O port allows you to connect network components according to the IEEE 802.3 100BASE-FX/1000BASE-SX/1000BASE-LX standard.
This port supports:
▶ 1000 Mbit/s full duplex
▶ 100 Mbit/s half-duplex mode, 100 Mbit/s full duplex mode
Delivery state:
▶ 100 Mbit/s full duplex when using a Fast Ethernet SFP transceiver
▶ 1000 Mbit/s full duplex when using a Gigabit Ethernet SFP transceiver

# 1.4     Display elements

After the supply voltage is set up, the software starts and initializes itself. Afterwards, the device performs a self-test. During this process, various LEDs light up. The process takes around 60 seconds.

■ **Device state**
These LEDs provide information about conditions which affect the operation of the whole device.



*Figure 14: Device status LEDs*

| P - Power (green/yellow LED) | |
|---|---|
| Glowing green | Both supply voltages are on |
| Glowing yellow | There is only one supply voltage (P1 or P2) on |

| **P - Power (green/yellow LED)** | |
|---|---|
| Not glowing | Supply voltages P1 and P2 are too low |

| **FAULT - detected error, signal contact (red LED) [a]** | |
|---|---|
| Glowing red | The signal contact is open, i. e. it is reporting a detected error. |
| Not glowing | The signal contact is closed, i. e. it is not reporting a detected error. |

a. If the manual adjustment is active for the "FAULT" signal contact, the detected error is displayed independently of the signal contact position.

| **RM - Redundancy Manager (green/yellow LED)** | |
|---|---|
| Glowing green | RM function active, redundant port disabled |
| Glowing yellow | RM function active, redundant port enabled |
| Not glowing | RM function not active |
| Flashing green | Incorrect configuration of the HIPER-Ring (e.g. the ring is not connected to the ring port). |

| **Stand-by** | |
|---|---|
| Glowing green | Stand-by mode enabled |
| Not glowing | Stand-by mode not enabled |

| **RM and Stand-by - display saving processes of the AutoConfiguration Adapter (ACA)** | |
|---|---|
| Flashing alternately: | Error during saving process. |
| LEDs flash synchronously, 2 times a second | Loading configuration from the ACA. |
| LEDs flash synchronously, 1 times a second | Saving the configuration in the ACA. |

■ **Port status**

The green and yellow LEDs at the individual port display port-related information. During the boot phase, these LEDs are used to display the status of the boot procedure.
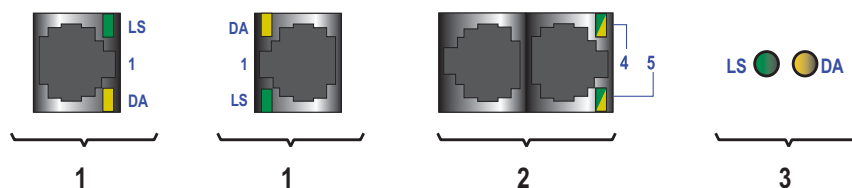


*Figure 15: Port status LEDs*
> *1 – Port status LEDs for isolated or single-row RJ45 sockets: one green and one yellow LED per port.*
> *2 – Port status LEDs for double-row RJ45 sockets: one LED per port, glowing/flashing either green or yellow.*
> *3 – Port status LEDs for DSC, ST, SFP*

**LS - link status (green LED)**

| | |
|---|---|
| Not glowing | No valid connection |
| Glowing green | Valid connection |
| Flashing green (1 time a period) | Port is switched to stand-by. |
| Flashing green (3 times a period) | Port is switched off |

**DA - data (yellow LED)**

| | |
|---|---|
| Not glowing | No data reception at corresponding port |
| Flashing yellow | Data reception at corresponding port |

# 1.5 Management interfaces

## 1.5.1 USB interface

The USB socket is an interface for the local connection of an AutoConfiguration Adapters ACA22-USB (EEC). It is used for saving/loading the configuration data and diagnostic information, and for loading the software.
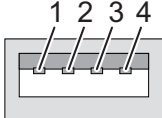
| Figure | Pin | Function |
|---|---|---|
| | 1 | VCC (VBus) |
| 1 2 3 4 | 2 | - Data |
| | 3 | + Data |
| | 4 | Ground (GND) |

*Table 11: Pin assignment of the USB interface*

## 1.5.2 V.24 interface (external management)

The V.24 interface is an RJ11 socket.
At the V.24 connection, a serial interface is provided for the local connection of an external management station (VT100 terminal or PC with corresponding terminal emulation) or an AutoConfiguration Adapter ACA 11. This enables you to set up a connection to the Command Line Interface (CLI) and to the system monitor.

**VT100 terminal settings**

| | |
|---|---|
| Speed | 9600 Baud |
| Data | 8 bit |
| Stopbit | 1 bit |
| Handshake | off |
| Parity | none |

The interface casing is electrically connected to the front panel.

The V.24 interface is not electrically insulated from the supply voltage.
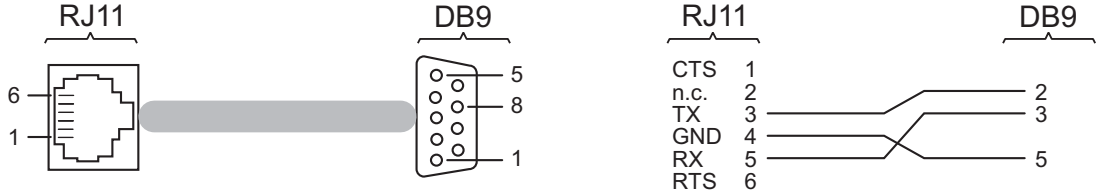


*Figure 16: Pin assignment of the V.24 interface and the DB9 plug*

**Note:** The Terminal cable is available as an accessory.

# 2 Installation

The devices have been developed for practical application in a harsh industrial environment.
On delivery, the device is ready for operation.

Perform the following steps to install and configure the device:
- ► Checking the package contents
- ► Installing and grounding the device
- ► Installing an SFP transceiver (optional)
- ► Adjust DIP switch settings
- ► Connecting the terminal block
- ► Connecting the ferrite
- ► Mounting the terminal block
- ► Operating the device
- ► Connecting data cables
- ► Filling out the inscription label

## 2.1    Checking the package contents

Perform the following work steps:
☐  Check whether the package includes all items named in the section
.
☐  Check the individual parts for transport damage.

## 2.2    Installing and grounding the device

| ⚠ **WARNING** |
|---|
| **FIRE HAZARD**<br><br>Install the device in a fire enclosure according to IEC 60950-1.<br><br>**Failure to follow this instruction can result in death, serious injury, or equipment damage.** |

Only when using the PoE power supply unit RPS90/48V HV:

| ⚠ **WARNING** |
|---|
| **ELECTRIC SHOCK**<br><br>Install this device only in a switch cabinet or in an operating site with restricted access, to which maintenance staff have exclusive access.<br><br>**Failure to follow this instruction can result in death, serious injury, or equipment damage.** |

### 2.2.1    Installing the device onto the DIN rail

Verify that the device maintains the minimum clearance to meet the climatic conditions during operation:
▶  Top and bottom device side: 10 cm (3.94 in)
▶  Left and right device side: 2 cm (0.79 in)
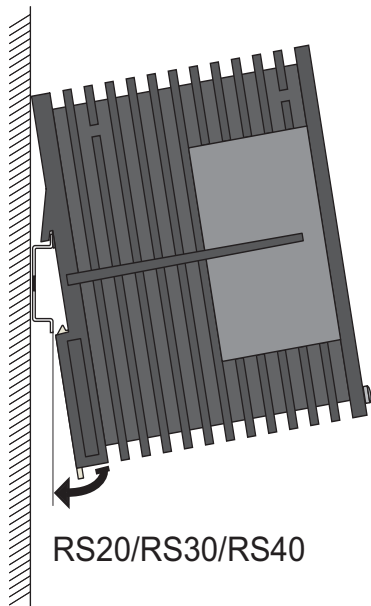
RS20/RS30/RS40
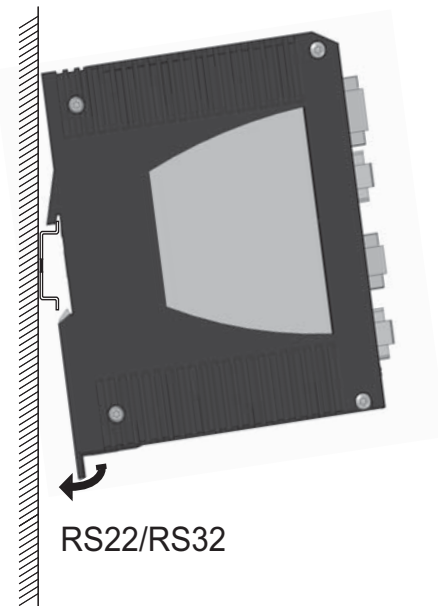
RS22/RS32

To mount the device onto a horizontally mounted 35 mm DIN rail according to DIN EN 60715, proceed as follows:
☐ Slide the upper snap-in guide of the device into the DIN rail.
☐ Pull the rail lock slide down using a screwdriver, and press the lower part of the device against the DIN rail.
☐ Snap in the device by releasing the rail lock slide.

**Note:** The overall shield of a connected shielded twisted pair cable is connected to the grounding connector on the front panel as a conductor.

### 2.2.2    DIN rail mounting on ships (RS30-0802...)

When you are mounting your RS30-0802... Open Rail device on a DIN rail on ships and in similar applications, the Open Rail Mounting Kit available as an accessory can be used to avoid excessive resonance.

☐ You must use the Open Rail Mounting Kit with the order number 942 007-001 when mounting your RS30-0802... device on ships. If you have very little space on your DIN rail, you can alternatively use Open Rail Mounting Kit 942 007-101 (for mounting DIN rail on DIN rail).

☐ Mount one mounting kit on each side of your RS30-0802... device, but at least one mounting kit on one side of the RS30-0802... device. If possible, position one side of the RS30-0802... device on a wall, or in a similarly stable way. If you are positioning multiple RS30-0802... devices side by side, mount the row of devices in the way described for a single device.

☐ Mount a standard DIN rail stopper on both sides beside the mounting kit.

For more information on mounting the RS30-0802... on a DIN rail on ships, see the "Open Rail Mounting Kit Mounting Note" supplied with the Open Rail Mounting Kit.
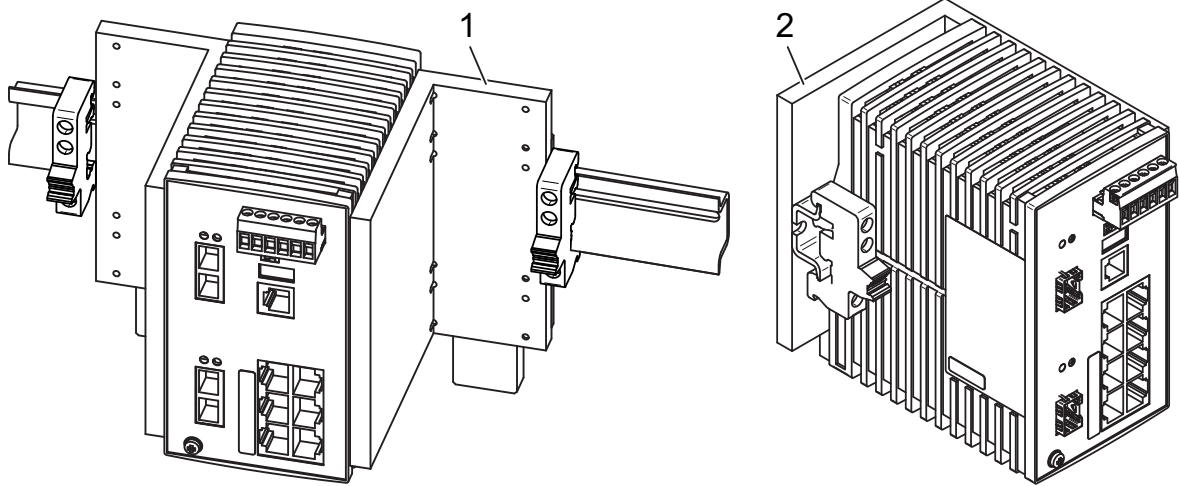
*Figure 17: Mounting the RS30-0802... on ships with the Open Rail Mounting Kit*
*1 - Open Rail Mounting Kit 942 007-001*
*2 - Open Rail Mounting Kit 942 007-101*

### 2.2.3 Mounting on a vertical flat surface

Applies to the device variants RS22 and RS32:
You have the option of attaching the device to a vertical flat surface. This
requires a wall mounting plate, which you purchase as a separate accessory.
See "Accessories" on page 77.
Verify that the device maintains the minimum clearance to meet the climatic
conditions during operation:
▶ Top and bottom device side: 10 cm (3.94 in)
▶ Left and right device side: 2 cm (0.79 in)

☐ Mount the device on the wall plate as shown in the illustration. Insert the upper snap-in guide of the device into the rail and press it down against the rail until it snaps into place.

☐ Fasten the wall plate (see on page 77 "Accessories") on a level wall surface using 4 screws.

## 2.2.4 Grounding the device

Use a wire diameter for the ground conductor that is no smaller than the diameter of the supply voltage connection, however of at least 1.0 mm² (AWG16).

With the RS20/RS30/RS40, the front panel of the device is grounded via the separate ground screw.

With the RS22/RS32, the front panel and the metal housing of the device is grounded via the separate ground screw.

## 2.3 Installing an SFP transceiver (optional)

**Prerequisites:**
Exclusively use Hirschmann SFP transceivers.
See "Accessories" on page 77.
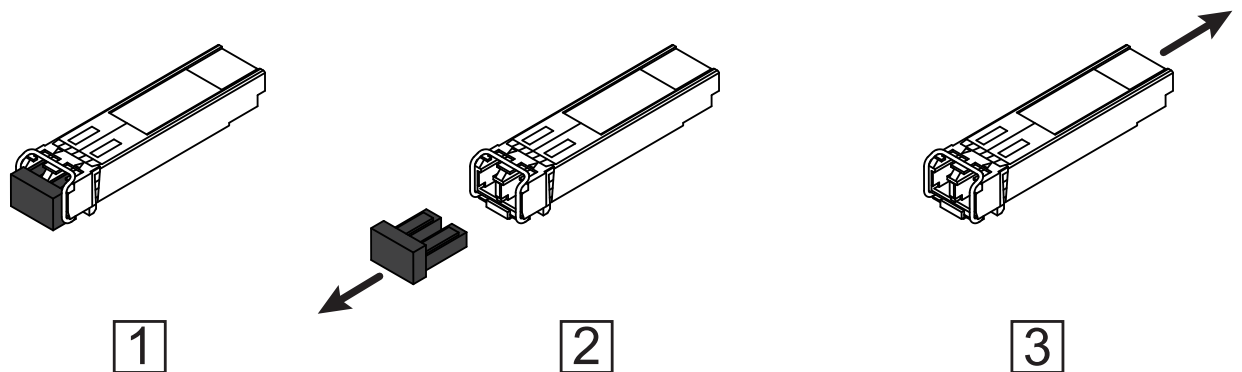


*Figure 18: Installing SFP transceivers: Installation sequence*

**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).

## 2.4 Adjust DIP switch settings

The 2-pin DIP switch on the front panel of the device gives you the following options:



*Figure 19: 2-pin DIP switch*

| Switch RM Position | Switch Stand-by Position | Ring redundancy | Coupling switch | Redundancy manager | Coupling manager | Ring port | Control port | Coupling port | Software configuration |
|---|---|---|---|---|---|---|---|---|---|
| OFF | OFF | on | on | off | off | 1 + 2 | | | |
| ON | OFF | on | on | on | off | 1 + 2 | | | |
| OFF | ON | on | on | off | on | 1 + 2 | 3 | 4 | |

| Switch RM Position | Switch Stand-by Position | Ring redundancy | Coupling switch | Redundancy manager | Coupling manager | Ring port | Control port | Coupling port | Software configuration |
|---|---|---|---|---|---|---|---|---|---|
| ON | ON | | | | | | | | SW configuration has priority over DIP switch configuration |

Delivery state: both DIP switches "ON".

☐ Before starting operation of the device, check whether the default settings of the DIP switch correspond to your requirements.

## 2.5    Connecting the terminal block

⚠ **WARNING**

**ELECTRIC SHOCK**

Exclusively connect a supply voltage that corresponds to the type plate of your device.
Never insert sharp objects (small screwdrivers, wires, etc.) into the connection terminals for electric conductors, and do not touch the terminals.
Observe the maximum values for the contact load of the signal contact.

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

⚠ **WARNING**

**FIRE HAZARD**

When supplying with direct current (DC), exclusively ground the negative conductors of the voltage inputs.

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

For more information on the supply with DC voltage power, refer to chapter "Supply voltage" on page 9.

### 2.5.1 RS20/RS30/RS40: supply voltage and signal contact

The supply voltage and the signal contact are connected via a 6-pin terminal block with snap lock.

■ **Supply voltage for RS20/RS30/RS40**

The supply voltage can be connected redundantly. Both inputs are uncoupled. There is no distributed load. With redundant supply, the power supply unit with the higher output voltage supplies the device on its own. The supply voltage is electrically isolated from the housing.
See "Insulation voltage" in section "Technical data" on page 64.

You can choose between DC or AC voltage when connecting the supply voltage. You use the +24V and 0V pins to connect the AC voltage (see figure 20).
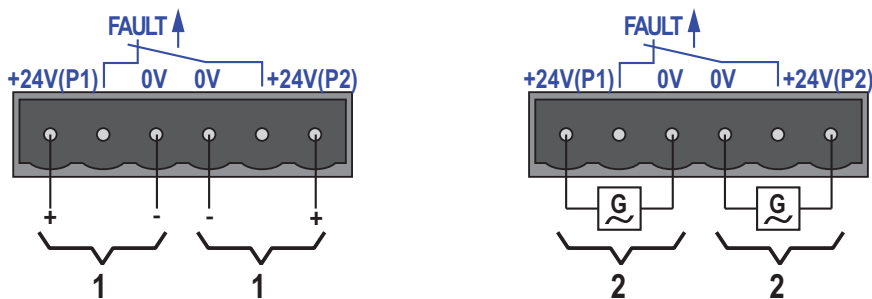


*Figure 20: Connecting the supply voltage to the 6-pin terminal block*
*1 – DC voltage, voltage range: 9.6 V DC to 60 V DC*
*2 – AC voltage, voltage range: 18 V AC to 30 V AC*

With a non-redundant supply of the supply voltage, the device reports the loss of a supply voltage. You can prevent this message by changing the configuration in the Management.

■ **Signal contact for RS20/RS30/RS40**

▶ The signal contact ("FAULT", pin assignment of terminal block see figure 20) 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 also use the switch Web page to switch the signal contact manually and thus control external devices.

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

▶ The detected inoperability of at least one of the two voltage supplies (voltage supply 1 or 2 is below the threshold value).
▶ The device is not operational.

▶ The failure of the connection on at least one port.
The report of the link status can be masked by the Management for each port. In the delivery state is deactivated.
▶ Loss of the ring redundancy reserve.
▶ A detected error during the self-test.
▶ Incorrect configuration of the HIPER-Ring or ring coupling.

The following condition is also reported in RM mode:
▶ Ring redundancy reserve is available. On delivery, there is no ring redundancy monitoring.

☐ Pull the terminal block off the device and connect the power supply and signal lines.

## 2.5.2 RS22/RS32: supply voltage and signal contact

The PoE voltage and the signal contact are connected via a 6-pin terminal block with snap lock.
The RS22/RS32 devices are supplied with PoE voltage (48 V DC safety low voltage) via an external power supply unit.
The RS22/RS32 devices fulfill the technical data and the certifications when using the RPS90/48V LV and RPS90/48V HV power units from Hirschmann. Only use these power units, to ensure that the specifications are fulfilled.

☐ 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 (insulation resistance 48 V, output to "rest of the world" 2.250 V DC for 1 min)
▶ Output power < 100 W
▶ Current limitation < 5 A
▶ The power supply unit and the devices with PoE ports form a "limited power source" according to IEC 60950-1.
▶ The external PoE power supply unit must be able to provide the power for the connected PDs (Power Devices) and for the Switch.

### ■ RPS90/48V LV: connecting the input voltage
With the RPS90/48V LV low-voltage PoE power unit, you connect a DC supply voltage of 24 V DC to 48 V DC at the input connection.
The supply voltage is connected via pin 1 and pin 2.

| Figure | Pin | Assignment | Supply voltage range |
|---|---|---|---|
| - ⊙—1 <br> + ⊙—2 | 1 | Minus terminal of the supply voltage | Low voltage input voltage: |
| | 2 | Plus terminal of the supply voltage | 24 V DC to 48 V DC |

*Table 12: Connecting the low-voltage supply voltage at PoE power unit RPS90/48V LV*

☐ First connect the protective conductor to the protective conductor terminal.

☐ Connect the DC voltage to the 2-pin terminal block.

☐ Use a supply cable with a maximum length of 2 m (6.56 ft) to the power unit.

## ■ RPS90/48V HV: connecting the input voltage

With the RPS90/48V HV high-voltage PoE power unit, you connect either a DC or AC supply voltage at the input connection:

▶ 60 V DC to 250 V DC
▶ 110 V AC to 230 V AC

The supply voltage is connected via pin 2 and pin 3, and the protective conductor is connected via pin 1.

| Figure | Pin | Assignment | Supply voltage range |
|---|---|---|---|
| ⊕ ○─1<br>-/N ○─2 G<br>+/L ○─3 | 1 | Protective conductor | High voltage input voltage: 110 V AC to 230 V AC |
| | 2 | Minus terminal of the supply voltage | |
| | 3 | Plus terminal of the supply voltage | |

*Table 13: Connecting the high-voltage supply voltage at PoE power unit RPS90/ 48V HV (AC voltage)*

| Figure | Pin | Assignment | Supply voltage range |
|---|---|---|---|
| ⊕ ○──1<br>-/N ○─ 2<br>+/L ○──3 | 1 | Protective conductor | High voltage input voltage: 60 V DC to 250 V DC |
| | 2 | Minus terminal of the supply voltage | |
| | 3 | Plus terminal of the supply voltage | |
| | ⊏⊐ | = external fuse for supply voltages > 125 V DC | |

*Table 14: Connecting the high-voltage supply voltage at PoE power unit RPS90/ 48V HV (DC voltage)*

☐ First connect the protective conductor to the protective conductor terminal.

☐ Connect the supply voltage via the 3-pin terminal block. Pay attention to the +/L and -/N connections.

☐ If the neutral conductor or the minus terminal of the supply voltage is not grounded, install a suitable fuse in the input line.

☐ For supply voltages > 125 V DC:
Install a suitable external fuse in the supply voltage input line of the plus terminal.

☐ Use a supply cable with a maximum length of 2 m (6.56 ft) to the power unit.

## ■ RS22/RS32 supply voltage

The RPS90/48V LV and RPS90/48V HV PoE power supply units provide an output voltage of typically 48 V DC for supplying the RS22-.../RS32-... devices with PoE voltage.
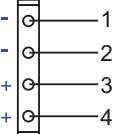
| Figure | Pin | Assignment | Supply voltage range |
|---|---|---|---|
|  | 1+2 | Minus terminal of the output voltage | Output voltage (PoE voltage) range: 48 V DC to 54 V DC (Default: 48 V DC) |
| | 3+4 | Plus terminal of the output voltage | |

*Table 15: Output voltage of RPS90/48V LV and RPS90/48V HV PoE power units*

☐ Connect the PoE voltage to the 6-pin terminal block for the device included in the delivery.
Make sure the following requirements are met:
▶ Supply line length < 0.5 m.
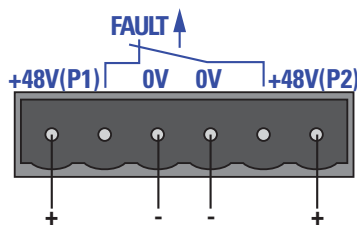


*Figure 21: Connecting the PoE voltage at the 6-pin terminal block of the RS22/RS32 devices*

## ■ RS22/RS32 signal contact

▶ The signal contact ("FAULT", pin assignment of terminal block see figure 21) 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 also use the switch Web page to switch the signal contact manually and thus control external devices.

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

▶ The detected inoperability of at least one of the two voltage supplies (voltage supply 1 or 2 is below the threshold value).
▶ The device is not operational.
▶ The failure of the connection on at least one port.
The report of the link status can be masked by the Management for each port. In the delivery state is deactivated.
▶ Loss of the ring redundancy reserve.

- ▶ A detected error during the self-test.
- ▶ Incorrect configuration of the HIPER-Ring or ring coupling.

The following condition is also reported in RM mode:
- ▶ Ring redundancy reserve is available. On delivery, there is no ring redundancy monitoring.

☐ Pull the terminal block off the device and connect the power supply and signal lines.

## 2.6    Mounting the terminal block

☐ Mount the terminal block for the voltage supply and signal contact on the front of the device using the snap lock. Verify that the snap lock latches in place.

## 2.7    Connecting the ferrite

**Note:** For PoE devices with 16 or more ports
(RS22-16..., RS22-17..., RS22-24... and RS22-25...):

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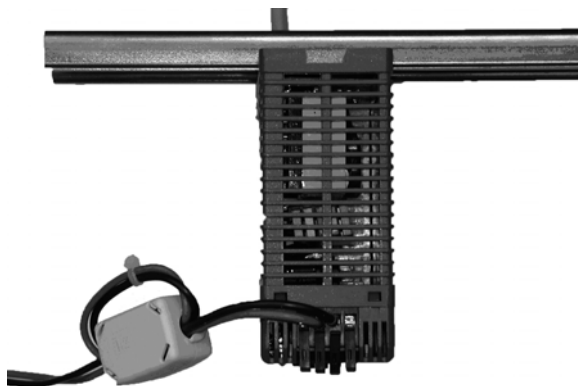


☐ Insert both cables of the 48 V output through the ferrite twice.
☐ Lock the ferrite.
☐ Position the ferrite as close as possible to the voltage input (max. distance 50 cm (19.7 in)).

To open the ferrite use the key supplied.

## 2.8 Operating the device

☐ By connecting the supply voltage via the terminal block, you start the operation of the device.

## 2.9 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. Exclusively use shielded data cables to meet EMC requirements according to EN 50121-4 and marine applications.

☐ Connect the data cables according to your requirements.
See "Ethernet ports" on page 38.

## 2.10 Filling out the inscription label

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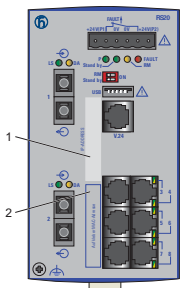


*Figure 22: Label area for IP address of device*
*1 – IP address of device (label area)*
*2 – MAC address of device (label)*

# 3 Making basic settings

| ⚠ **WARNING** |
| --- |
| **UNINTENTIONAL OPERATION IN DEVICE** |
| Install and maintain a process that assigns a unique IP address to every device in the network. |
| **Failure to follow this instruction can result in death, serious injury, or equipment damage.** |

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

▶ Configuration via V.24 connection
▶ Configuration using the HiDiscovery protocol
▶ Configuration via BOOTP
▶ Configuration via DHCP
▶ Configuration via DHCP (Option 82)
▶ Configuration using AutoConfiguration Adapter

## 3.1 Applies to devices with a software version before HiOS 7.1/8.1

### 3.1.1 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)
▶ V.24 data rate: 9600 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
▶ Redundancy Manager disabled (DIP switch RM and Stand-by: ON)
▶ Stand-by coupling disabled (DIP switch RM and stand-by: ON), Port 4 = control port, Port 3 = coupling port for redundant ring coupling
▶ Rapid Spanning Tree enabled

# 4 Monitoring the ambient air temperature

Operate the device below the specified maximum ambient air temperature exclusively.
See "Technical data" on page 64.

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.

# 5   Maintenance and service

▶ When designing this device, Hirschmann largely avoided using high-wear parts. The parts subject to wear and tear are dimensioned to last longer than the lifetime of the product when it is operated normally. Operate this device according to the specifications.

▶ Relays are subject to natural wear. This wear depends on the frequency of the switching operations. Check the resistance of the closed relay contacts and the switching function depending on the frequency of the switching operations.

▶ Hirschmann is continually working on improving and developing their software. Check regularly whether there is an updated version of the software that provides you with additional benefits. You find information and software downloads on the Hirschmann product pages on the Internet (http://www.hirschmann.com).

▶ Depending on the degree of pollution in the operating environment, check at regular intervals that the ventilation slots in the device are not obstructed.

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

# 6 Disassembly

## 6.1 Removing the device

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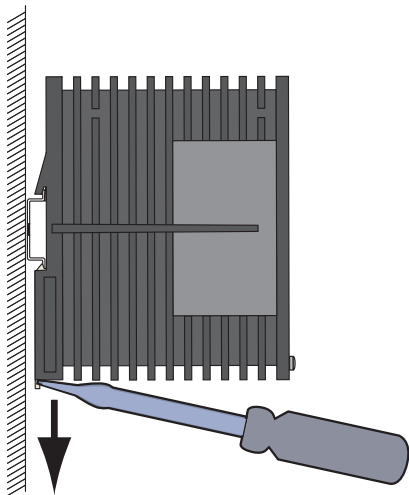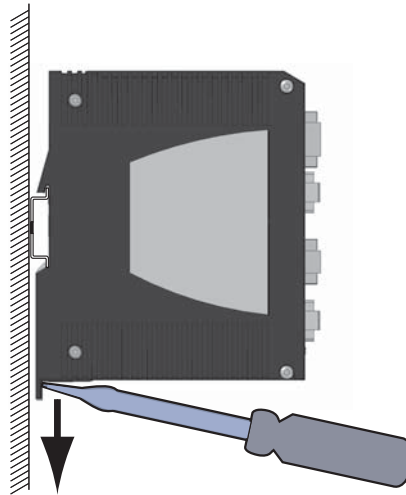


RS20/RS30/RS40                    RS22/RS32

Perform the following work steps:
- ☐ Disconnect the data cables.
- ☐ Disable the supply voltage.
- ☐ Disconnect the terminal blocks.
- ☐ Disconnect the grounding.
- ☐ Insert a screwdriver horizontally below the casing into the locking gate.
- ☐ Without tilting the screwdriver, pull the locking gate down and tilt the device upwards.

## 6.2 Removing an SFP transceiver (optional)
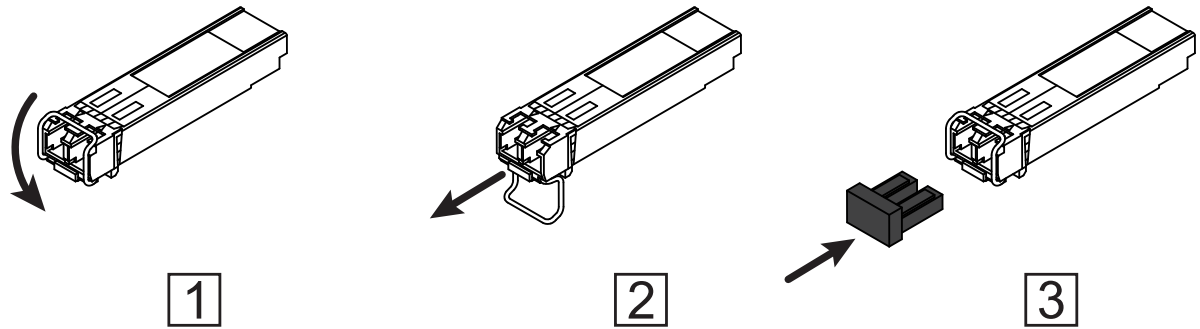


*Figure 23: De-installing SFP transceivers: De-installation sequence*

**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).

# 7 Technical data

## ■ General technical data

| Dimensions W × H × D | | |
|---|---|---|
| | RS20-0400... | 47 mm × 131 mm × 111 mm (1.85 in × 5.16 in × 4.37 in) |
| | RS20-08..., RS20-09..., RS30-0802 | 74 mm × 131 mm × 111 mm (2.91 in × 5.16 in × 4.37 in) |
| | RS20-16..., RS20-17..., RS30-1602 | 110 mm × 131 mm × 111 mm (4.33 in × 5.16 in × 4.37 in) |
| | RS20-24..., RS20-25..., RS30-2402 | 110 mm × 131 mm × 111 mm (4.33 in × 5.16 in × 4.37 in) |
| | RS40-0009CCCCS... | 74 mm × 131 mm × 111 mm (2.91 in × 5.16 in × 4.37 in) |
| | RS40-0009CCCCE..., RS40-0009CCCCT... | 110 mm × 131 mm × 111 mm (4.33 in × 5.16 in × 4.37 in) |
| | RS22-08..., RS22-09..., RS32-0802 | 90 mm × 137 mm × 115 mm (3.54 in × 5.39 in × 4.53 in) |
| | RS22-16..., RS22-17..., RS32-1602 | 4.72 in × 5.39 in × 4.53 in (120 mm × 137 mm × 115 mm) |
| | RS22-24..., RS22-25..., RS32-2402 | 4.72 in × 5.39 in × 4.53 in (120 mm × 137 mm × 115 mm) |
| | PoE power supply unit RPS 90/ 48V LV | 60 mm × 137 mm × 115 mm (2.36 in × 5.39 in × 4.53 in) |
| | PoE power supply unit RPS 90/ 48V HV | 60 mm × 137 mm × 115 mm (2.36 in × 5.39 in × 4.53 in) |
| Weight | RS20-0400... | 400 g (14.11 oz) |
| | RS20-08..., RS20-09..., RS30-0802 | 410 g (14.46 oz) |
| | RS20-16..., RS20-17..., RS30-1602 | 600 g (21.16 oz) |
| | RS20-24..., RS20-25..., RS30-2402 | 650 g (22.93 oz) |
| | RS40-0009CCCCS... | 530 g (18.70 oz) |
| | RS40-0009CCCCE..., RS40-0009CCCCT... | 600 g (21.16 oz) |
| | RS22-08..., RS22-09..., RS32-0802 | 820 g (28.92 oz) |
| | RS22-16..., RS22-17..., RS32-1602 | 1150 g (40.56 oz) |
| | RS22-24..., RS22-25..., RS32-2402 | 1200 g (42.33 oz) |
| | PoE power supply unit RPS 90/ 48V LV | 770 g (27.16 oz) |
| | PoE power supply unit RPS 90/ 48V HV | 740 g (26.10 oz) |

| Power supply RS20-..., RS30-..., RS40-... | Rated voltage AC: | 24 V AC |
| | Voltage range AC incl. maximum tolerances: | 18 V AC ... 30 V AC |
| | Rated voltage range DC: | 12 V DC ... 24 V DC |
| | Voltage range DC incl. maximum tolerances: | 9.6 V DC ... 60 V DC |
| | Power loss buffer | >10 ms |
| | Back-up fuse | Nominal rating: 3.5 A<br>Characteristic: slow blow |
| | Peak inrush current | <14 A |
| Power supply RS22-..., RS32-... | Rated voltage DC: | 48 V DC |
| | Voltage range DC incl. maximum tolerances: | 47 V DC ... 52 V DC |
| | Power loss buffer | >10 ms |
| | Back-up fuse | Nominal rating: 3.5 A<br>Characteristic: slow blow |
| | Peak inrush current | <14 A |
| PoE power unit RPS90/48V HV | Rated voltage AC: | 110 V AC ... 230 V AC, 50 Hz ... 60 Hz |
| | Voltage range AC incl. maximum tolerances: | 90 V AC ... 265 V AC, 47 Hz ... 63 Hz |
| | Power consumption at 110 V AC<br>Power consumption at 230 V AC | 1.00 A<br>0.50 A |
| | Rated voltage DC: | 60 V DC ... 250 V DC |
| | Voltage range DC incl. maximum tolerances: | 48 V DC ... 320 V DC |
| | Power consumption at 60 V DC<br>Power consumption at 250 V DC | 1.70 A<br>0.39 A |
| | Output voltage | 48 V DC ... 54 V DC (variable, default value: 48 V DC) |
| | Power output | At up to +60 °C (+140 °F): 90 W<br>At +60 °C to +70 °C<br>(+140 °F to +158 °F): 60 W |
| | Power loss buffer | >10 ms |
| | Back-up fuse | Nominal rating: 6.3 A<br>Characteristic: slow blow |
| | Peak inrush current | <15 A |

| PoE power unit RPS90/48V LV | Rated voltage DC: | 24 V DC ... 48 V DC |
|---|---|---|
| | Voltage range DC incl. maximum tolerances: | 18 V DC ... 60 V DC |
| | Power consumption at 24 V DC<br>Power consumption at 48 V DC | 4.20 A<br>2.10 A |
| | Output voltage | 48 V DC ... 54 V DC (variable, default value: 48 V DC) |
| | Power output | At up to +60 °C (+140 °F): 90 W<br>At +60 °C to +70 °C<br>(+140 °F to +158 °F): 60 W |
| | Power loss buffer | >10 ms |
| | Back-up fuse | Nominal rating: 10 A<br>Characteristic: slow blow |
| | Peak inrush current | <15 A |
| | Overload current protection on the device | Non-replaceable fuse |
| | Insulation voltage between supply voltage connections and housing | 800 V DC<br>Protective elements limit the insulation voltage to 90 V DC (1 mA) |
| Signal contact "FAULT" | Switching current | max. 1 A SELV according to IEC 60950-1 or ES1 according to IEC/EN 62368-1 |
| | 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 |
| Environment | Storage temperature (ambient air) | Standard: -40 °C ...+70 °C<br>(-40 °F ... +158 °F)<br>Extended: -40 °C ... +85 °C<br>(-40 °F ... +185 °F) |
| | Humidity | 10 % ... 95 %<br>(non-condensing) |
| | Air pressure | min. 795 hPa (+2000 m ASL; +6562 ft ASL), higher altitudes upon request |
| | Minimum clearance around the device | Top and bottom device side: 10 cm (3.94 in)<br>Left and right device side: 2 cm (0.79 in) |

| | | |
|---|---|---|
| Operating temperature[a] | RS20/RS30/RS40 | Standard: 0 °C ... +60 °C (+32 °F ... +140 °F)<br>Extended: -40 °C ... +70 °C (-40 °F ... +158 °F) |
| | RS22-..., RS32-... | Standard: 0 °C ... +60 °C (+32 °F ... +140 °F)[b)]<br>Extended: -40 °C ...+60 °C (-40 °F to +140 °F)[c)] |
| | RS40-...B... (ATEX/IECEx) Standard (S) | Temperature code T4:<br>0 °C ... +60 °C (+32 °F ... +140 °F) |
| | RS40-...B... (ATEX/IECEx) Extended (E and T) | Temperature code T3:<br>-40 °C ... +70 °C (-40 °F ... +158 °F)<br>Temperature code T4:<br>-40 °C ... +60 °C (-40 °F ... +140 °F) |
| | RPS90/48V HV | -40 °C ... +70 °C (-40 °F ... +158 °F)<br>Cold start at temperatures > -30 °C (-22 °F) |
| | RPS90/48V LV | -40 °C ... +70 °C (-40 °F ... +158 °F)<br>Cold start at temperatures > -30 °C (-22 °F) at an input voltage ≥ 21.6 V DC |
| Maximum inner temperature of device (guideline) | RS20-..., RS30-... | Devices with operating temperature characteristic value S (Standard): +83 °C (+181.4 °F) |
| | | Devices with operating temperature characteristic value E and T (extended): +93 °C (+199.4 °F) |
| | RS22-..., RS32-... | Devices with operating temperature characteristic value S (Standard): +94 °C (+201 °F) |
| | | Devices with operating temperature characteristic value E and T (extended): – |
| | RS40-... | Devices with operating temperature characteristic value S (Standard): +90 °C (+194 °F) |
| | | Devices with operating temperature characteristic value E and T (extended): +98 °C (+208 °F) |
| Pollution degree | | 2 |
| Protection classes | Laser protection | Class 1 in compliance with IEC 60825-1 |
| | Degree of protection | IP20 |

a. Exclusively use SFP transceiver with the extension "EEC" at temperatures > 60 °C (> 140 °F) and < 0 °C (< 32 °F).
b. With a UL-508, ATEX/IECEx, or ISA 12.12.01 approval, the maximum operating temperature for the standard 'S' temperature range for PoE-capable devices (RS22-..., RS32-...) is +50 °C (+122 °F).
c. With a UL-508, ATEX/IECEx, or ISA 12.12.01 approval, the maximum operating temperature for the extended 'E' and 'T' temperature range for PoE-capable devices (RS22-..., RS32-...) is +50 °C (+122 °F).

## ■ Dimension drawings
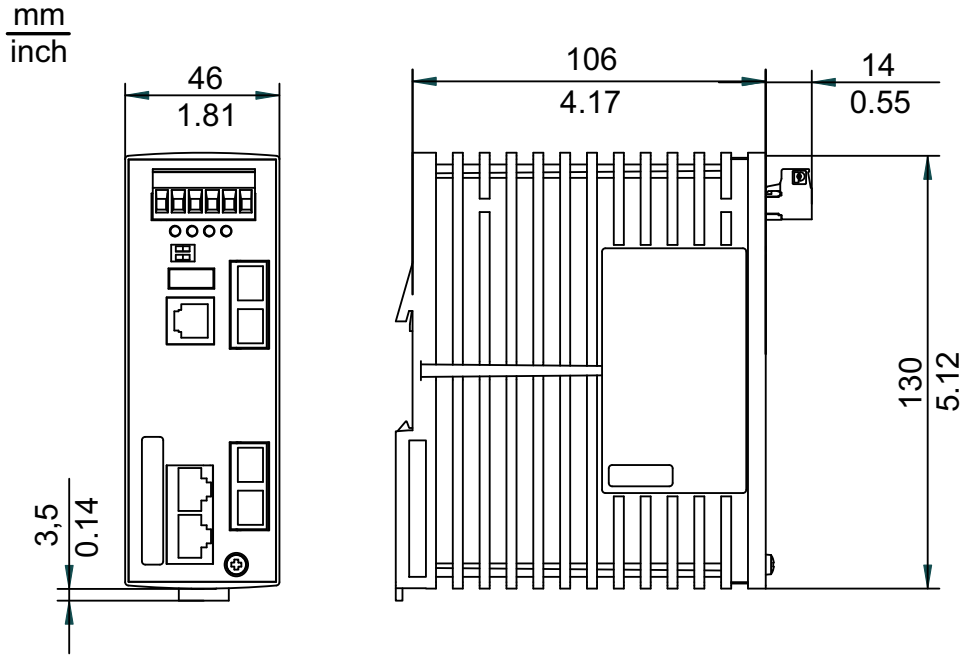


Figure 24: Dimensions of device variants RS20-04...
with operating temperature characteristic value S, T and E
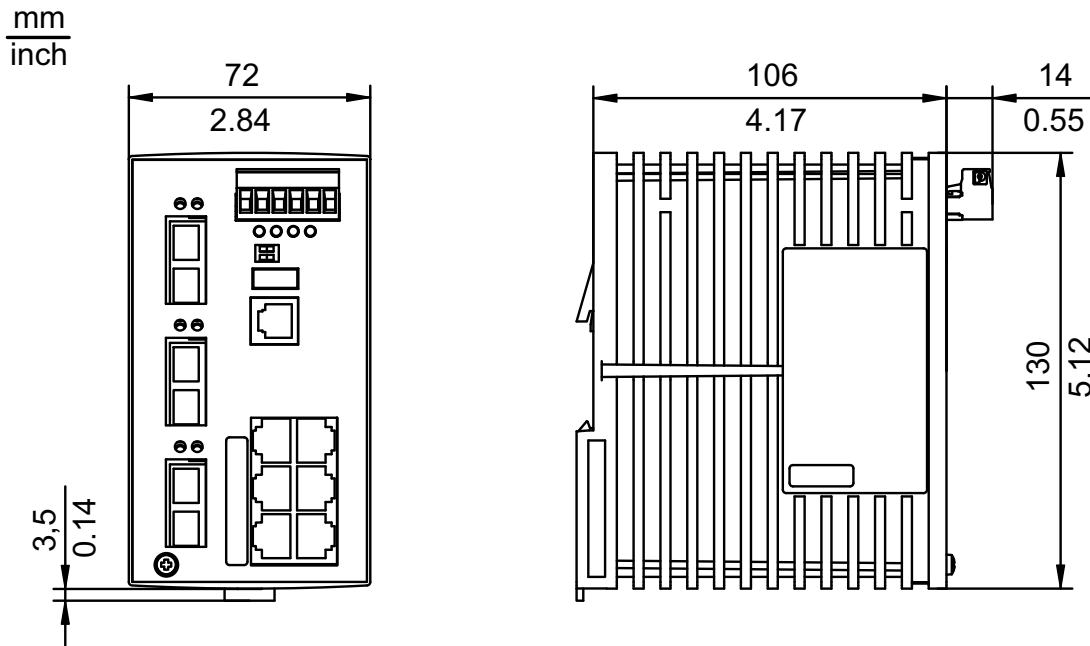


Figure 25: Dimensions of device variants
- RS20-08... and RS20-09... with operating temperature
characteristic value S, T and E
- RS30-08... with operating temperature characteristic value S, T and E
- RS40-09... with operating temperature characteristic value S

mm / inch
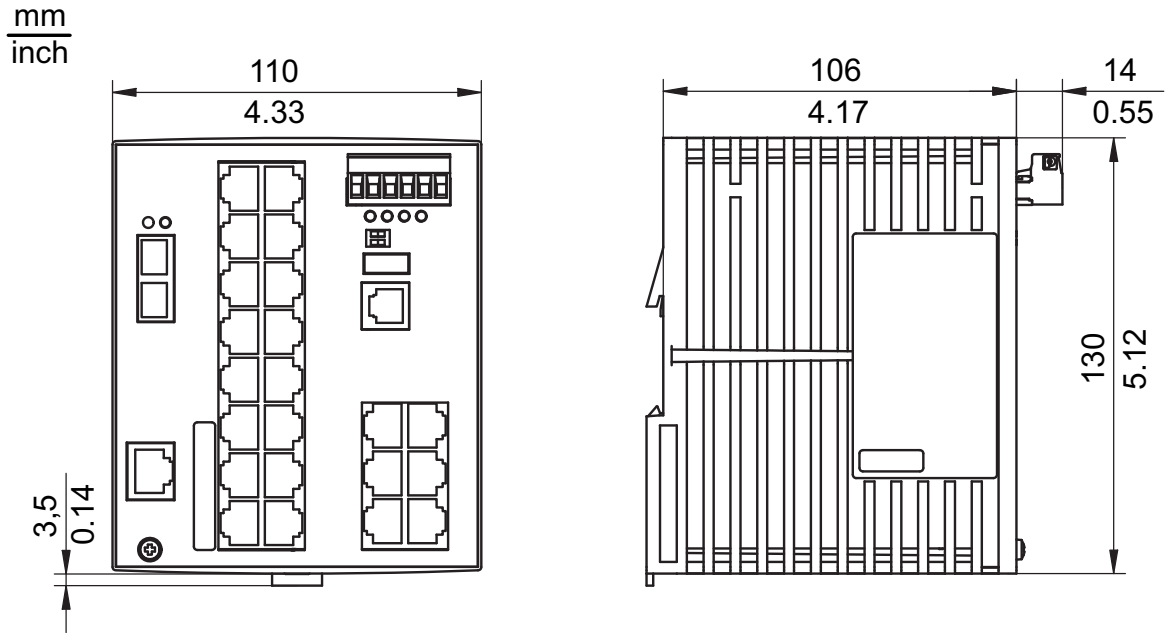


*Figure 26: Dimensions of device variants*
*- RS20-16... , RS20-17... and RS20-24... with operating temperature characteristic value S, T and E*
*- RS30-16... and RS30-24... with operating temperature characteristic value S, T and E*
*- RS40-09... with operating temperature characteristic value T and E*
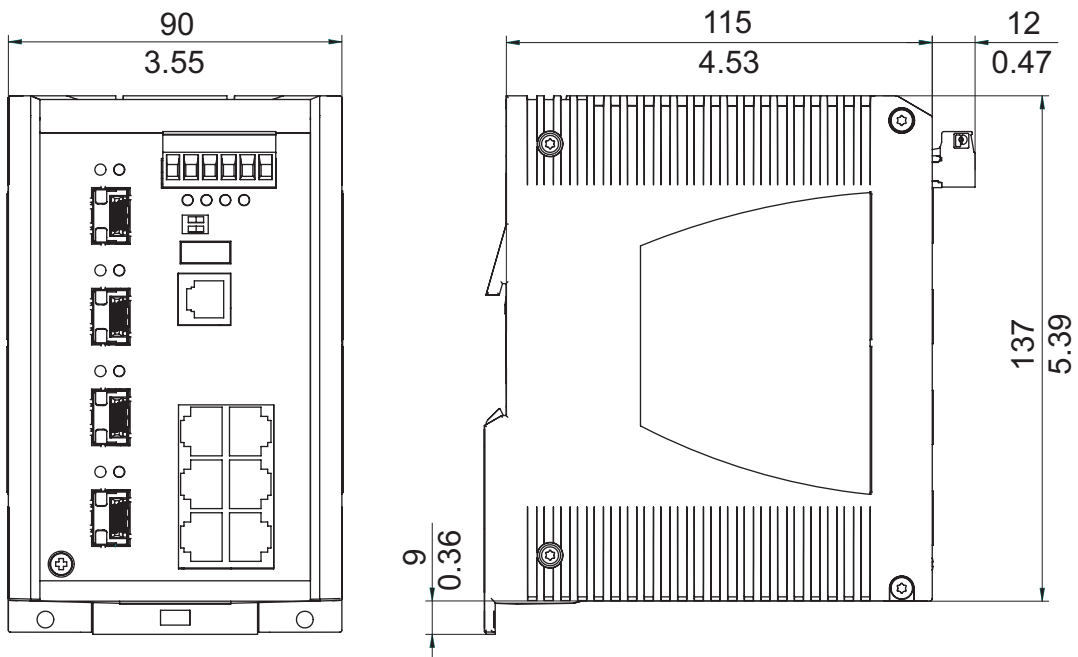


*Figure 27: Dimensions of device variants RS22.../RS32... with 8 to 10 ports with operating temperature characteristic value S, T and E*
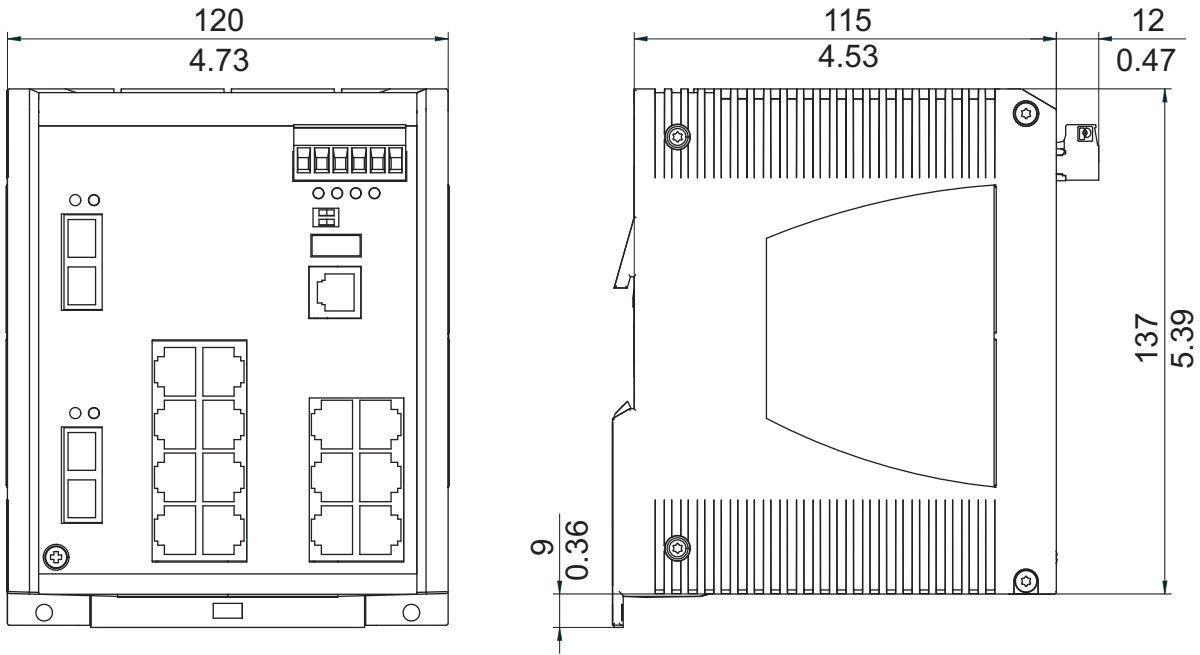
*Figure 28: Dimensions of device variants RS22.../RS32... with 16 to 26 ports with operating temperature characteristic value S, T and E*
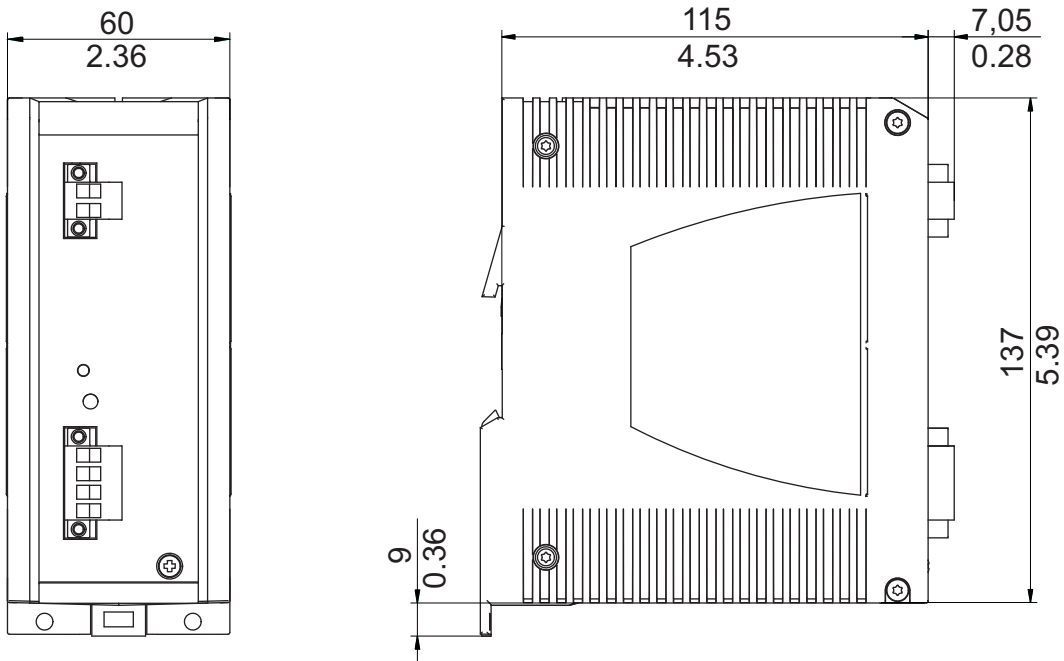


*Figure 29: Dimensions of RPS90/48V LV and RPS90/48V HV PoE power units*

## ■ EMC and immunity

| EMC compliance – IEC/EN 61000-6-2:2005 EMI TYPE tests, test acc. to: | | A [a) | B [a) | H [a) |
|---|---|---|---|---|
| IEC/EN 61000-4-2 | Electrostatic discharge | | | |
| | Contact discharge | 4 kV | 8 kV | 8 kV |
| | Air discharge | 8 kV | 15 kV | 15 kV |
| IEC/EN 61000-4-3 | Electromagnetic field | | | |
| | 80 MHz ... 3000 MHz | max. 10 V/m | max. 20 V/m | max. 20 V/m |
| IEC/EN 61000-4-4 | Fast transients (burst) | | | |
| | Power line | 2 kV | 4 kV | 4 kV |
| | Data line | 1 kV | 4 kV | 4 kV |
| IEC/EN 61000-4-5 | Voltage surges | | | |
| | Power line, line / line | 0.5 kV | 1 kV | 1 kV |
| | Power line, line / ground | 1 kV | 2 kV | 2 kV |
| | Data line | 1 kV | 4 kV | 4 kV |
| IEC/EN 61000-4-6 | Conducted disturbances | | | |
| | 10 kHz - 150 kHz | 3 V | 3 V | 3 V |
| | 150 kHz ... 80 MHz | 10 V | 10 V | 10 V |
| EN 61000-4-9 | Pulse magnetic fields | — | 300 A/m | 300 A/m |

| EMC interference emission | | A [a) | B [a) | H [a) |
|---|---|---|---|---|
| EN 55032 | Class A | Yes | Yes | Yes |
| FCC 47 CFR Part 15 | Class A | Yes | Yes | Yes |
| DNVGL-CG-0339 | Class B (All locations including bridge and open deck) | — | Yes | Yes |

| Stability | | A [a | B [a) | H [a) |
|---|---|---|---|---|
| Vibration | IEC 60068-2-6 Test FC test level according to IEC 61131-2 | Yes | Yes | Yes |
| | Germanischer Lloyd Guidelines for the Performance of Type Tests Part 1 | — | Yes | Yes |
| | IEC 60870-2-2 table 3 normal installation according to EN 61850-3 | — | Yes | Yes |
| Shock | IEC 60068-2-27 Test Ea test level according to IEC 61131-2 | Yes | Yes | Yes |
| | IEC 60870-2-2 table 3 normal installation according to EN 61850-3 | — | Yes | Yes |

a. Product code A: Approval = CE, UL
Product code B: Approval = CE, UL, GL, railway (along track), Sub Station, ATEX/IECEx
Produktcode H: Zulassung = CE, UL, GL, Bahn (along track), Sub Station
(See "Combination options of the device variants RS20/RS30/RS22/RS32" on page 24.
See "Combination options for the RS40 device variants" on page 27.)

## ■ Network range

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

| Product code M-SFP-... | Wave length | Fiber | System attenuation | Example for F/O cable length[a] | Fiber attenuation | BLP[b]/ Dispersion |
|---|---|---|---|---|---|---|
| -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 |
| -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 |
| -MX/LC EEC MM | 1310 nm | 50/125 µm | 0 dB ... 12 dB | 0 km ... 1.5 km (0 mi ... 0.93 mi) | 1.0 dB/km | 800 MHz×km |
| -MX/LC EEC MM | 1310 nm | 62.5/125 µm | 0 dB ... 12 dB | 0 km ... 0.55 km (0 mi ... 0.34 mi) | 1.0 dB/km | 500 MHz×km |
| -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 |
| -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 |
| -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) |
| -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) |
| -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) |
| -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) |
| -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 (typicall y) | 19 ps/(nm×km) |

*Table 16: F/O port 1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver)*

a. Including 3 dB system reserve when compliance with the fiber data is observed.
b. Using the bandwidth-length product is inappropriate for expansion calculations.
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.

| Product code M-SFP-BIDI... | | Wave length TX | Wave length RX | Fiber | System attenuation | Example for F/O cable length[a] | Fiber attenuation | Dispersion |
|---|---|---|---|---|---|---|---|---|
| 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) |
| 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) |
| 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) |
| 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 17:  F/O port (bidirectional Gigabit Ethernet SFP transceiver)*

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

| Product code M-FAST-SFP-... | | Wave length | Fiber | System attenuation | Example for F/O cable length[a] | Fiber attenuation | BLP/ Dispersion |
|---|---|---|---|---|---|---|---|
| -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 |
| -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 |
| -SM/LC... | SM | 1310 nm | 9/125 µm | | 0 km ... 25 km (0 mi ... 15.53 mi) | 0.4 dB/km | 3.5 ps/ (nm×km) |
| -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) |

*Table 18:  Fiber port 100BASE-FX (SFP fiber optic Fast Ethernet Transceiver)*

| Product code M-FAST-SFP-... | | Wave length | Fiber | System attenuation | Example for F/O cable length[a] | Fiber attenuation | BLP/Dispersion |
|---|---|---|---|---|---|---|---|
| -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) |
| -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[b] | 18 ps/(nm×km) |

*Table 18: Fiber port 100BASE-FX (SFP fiber optic Fast Ethernet Transceiver)*

a. Including 3 dB system reserve when compliance with the fiber data is observed.
b. With ultra-low-loss optical fiber.

| Product code | Mode[a] | Wave length | Fiber | System attenuation | Example for F/O cable length[b] | Fiber attenuation | BLP/Dispersion |
|---|---|---|---|---|---|---|---|
| -M2, -MM | MM | 1300 nm | 50/125 µm | 0 dB ... 8 dB | 0 km ... 5 km (0 mi ... 3.11 mi) | 1.0 dB/km | 800 MHz×km |
| -M2, -MM | MM | 1300 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 |
| -M4, -NN | SM | 1300 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 |
| -S2, -VV | SM | 1300 nm | 9/125 µm | 0 dB ... 16 dB | 0 km ... 30 km (0 mi ... 18.64 mi) | 0.4 dB/km | 3.5 ps/(nm×km) |
| -S4, -UU | SM | 1300 nm | 9/125 µm | 0 dB ... 16 dB | 0 km ... 30 km (0 mi ... 18.64 mi) | 0.4 dB/km | 3.5 ps/(nm×km) |
| -E2, EE | SM+ | 1300 nm | 9/125 µm | 7 dB ... 29 dB | 25 km ... 65 km (12.43 mi ... 40.39 mi) | 0.4 dB/km | 3.5 ps/(nm×km) |
| -L2, -LL | LH | 1550 nm | 9/125 µm | 3 dB ... 29 dB | 14 km ... 104 km (8.70 mi ... 64.62 mi) | 0.25 dB/km | 19 ps/(nm×km) |
| -G2, -GG | LH+ | 1550 nm | 9/125 µm | 14 dB ... 47 dB | 67 km ... 176 km (41.63 mi ... 109.36 mi) | 0.25 dB/km | 19 ps/(nm×km) |

*Table 19: F/O port 100BASE-FX (DSC/DST fiber optic Fast Ethernet Transceiver)*

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

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

*Table 20: Network range: 10/100/1000 Mbit/s twisted pair port*

## ■ Power consumption/power output

| Device name | Device model | | Maximum power consumption | Power output |
|---|---|---|---|---|
| **2 uplink ports:** | | | | |
| RS20-0400... | | 2xTX port | 5.3 W | 18.1 Btu (IT)/h |
| RS20-0400... | | 1xFX port, 1xTX port | 6.5 W | 22.2 Btu (IT)/h |
| RS20-0400... | | 2xFX port | 7.7 W | 26.3 Btu (IT)/h |
| RS20-0800... | RS22-0800... | 2xTX port | 5.3 W | 18.1 Btu (IT)/h |
| RS20-0800... | RS22-0800... | 1xFX port, 1xTX port | 6.5 W | 22.2 Btu (IT)/h |
| RS20-0800... | RS22-0800... | 2xFX port | 7.7 W | 26.3 Btu (IT)/h |
| RS20-1600... | RS22-1600... | 2xTX port | 9.4 W | 32.1 Btu (IT)/h |
| RS20-1600... | RS22-1600... | 1xFX port, 1xTX port | 10.6 W | 36.2 Btu (IT)/h |
| RS20-1600... | RS22-1600... | 2xFX port | 11.8 W | 40.3 Btu (IT)/h |
| RS20-2400-... | RS22-2400-... | 2xTX port | 12.1 W | 41.3 Btu (IT)/h |
| RS20-2400-... | RS22-2400-... | 1xFX port, 1xTX port | 13.3 W | 45.4 Btu (IT)/h |
| RS20-2400-... | RS22-2400-... | 2xFX port | 14.5 W | 52.9 Btu (IT)/h |
| RS30-0802-... | RS32-0802-... | 2xTX port | 8.9 W | 30.4 Btu (IT)/h |
| RS30-0802-... | RS32-0802-... | 1xFX port, 1xTX port | 8.6 W | 29.4 Btu (IT)/h |
| RS30-0802-... | RS32-0802-... | 2xFX port | 8.3 W | 28.4 Btu (IT)/h |
| RS30-1602-... | RS32-1602-... | 2xTX port | 13.0 W | 44.4 Btu (IT)/h |
| RS30-1602-... | RS32-1602-... | 1xFX port, 1xTX port | 12.7 W | 43.4 Btu (IT)/h |
| RS30-1602-... | RS32-1602-... | 2xFX port | 12.4 W | 42.4 Btu (IT)/h |
| RS30-2402-... | RS32-2402-... | 2xTX port | 15.7 W | 53.6 Btu (IT)/h |
| RS30-2402-... | RS32-2402-... | 1xFX port, 1xTX port | 15.4 W | 52.6 Btu (IT)/h |
| RS30-2402-... | RS32-2402-... | 2xFX port | 15.1 W | 51.6 Btu (IT)/h |
| **3 uplink ports:** | | | | |
| RS20-0900-... | RS22-0900-... | 3xFX port | 9.6 W | 32.8 Btu (IT)/h |
| RS20-1700-... | RS22-1700-... | 3xFX port | 13.7 W | 46.7 Btu (IT)/h |
| RS20-2500-... | RS22-2500-... | 3xFX port | 16.4 W | 56.0 Btu (IT)/h |
| **4 uplink ports:** | | | | |
| RS30-0802-... | RS32-0802-... | 4xFX port | 12.7 W | 43.3 Btu (IT)/h |
| RS30-1602-... | RS32-1602-... | 4xFX port | 16.8 W | 57.3 Btu (IT)/h |
| RS30-2402-... | RS32-2402-... | 4xFX port | 19.5 W | 66.5 Btu (IT)/h |
| RS40-... | | 4xFX port | 20.0 W | 68.2 Btu (IT)/h |

*Table 21: Power consumption/power output RS20/RS30/RS40 and RS22/RS32 without PDs (powered devices)*

| Device name | Device model | Maximum power consumption | Power output |
|---|---|---|---|
| **2 uplink ports:** | | | |
| RS22-0800... | 2xTX port | 70.9 W | 31.8 Btu (IT)/h |
| RS22-0800... | 1xFX port, 1xTX port | 72.1 W | 35.9 Btu (IT)/h |

*Table 22: Power consumption/power output RS22/RS32 with 4 x Class0 PD (powered device)*

| Device name | Device model | Maximum power consumption | Power output |
|---|---|---|---|
| RS22-0800... | 2xFX port | 73.3 W | 40.0 Btu (IT)/h |
| RS22-1600... | 2xTX port | 75.0 W | 45.8 Btu (IT)/h |
| RS22-1600... | 1xFX port, 1xTX port | 76.2 W | 49.9 Btu (IT)/h |
| RS22-1600... | 2xFX port | 77.4 W | 54.0 Btu (IT)/h |
| RS22-2400-... | 2xTX port | 77.7 W | 55.0 Btu (IT)/h |
| RS22-2400-... | 1xFX port, 1xTX port | 78.9 W | 59.1 Btu (IT)/h |
| RS22-2400-... | 2xFX port | 80.1 W | 66.6 Btu (IT)/h |
| RS32-0802-... | 2xTX port | 74.5 W | 44.1 Btu (IT)/h |
| RS32-0802-... | 1xFX port, 1xTX port | 74.2 W | 43.1 Btu (IT)/h |
| RS32-0802-... | 2xFX port | 73.9 W | 42.1 Btu (IT)/h |
| RS32-1602-... | 2xTX port | 78.6 W | 58.1 Btu (IT)/h |
| RS32-1602-... | 1xFX port, 1xTX port | 78.3 W | 57.1 Btu (IT)/h |
| RS32-1602-... | 2xFX port | 78.0 W | 56.1 Btu (IT)/h |
| RS32-2402-... | 2xTX port | 81.3 W | 67.3 Btu (IT)/h |
| RS32-2402-... | 1xFX port, 1xTX port | 81.0 W | 66.3 Btu (IT)/h |
| RS32-2402-... | 2xFX port | 80.7 W | 65.3 Btu (IT)/h |
| **3 uplink ports:** | | | |
| RS22-0900-... | 3xFX port | 75.2 W | 46.5 Btu (IT)/h |
| RS22-1700-... | 3xFX port | 79.3 W | 60.4 Btu (IT)/h |
| RS22-2500-... | 3xFX port | 82.0 W | 69.7 Btu (IT)/h |
| **4 uplink ports:** | | | |
| RS32-0802-... | 4xFX port | 78.3 W | 57.0 Btu (IT)/h |
| RS32-1602-... | 4xFX port | 82.4 W | 71.0 Btu (IT)/h |
| RS32-2402-... | 4xFX port | 85.1 W | 80.2 Btu (IT)/h |

*Table 22:   Power consumption/power output RS22/RS32 with 4 x Class0 PD (powered device)*

## ■ Scope of delivery

| Device | Scope of delivery |
|---|---|
| RS20-..., RS30-..., RS40-..., RS22-... or RS32-... | Device |
| | Terminal block for supply voltage and signal contact |
| | Safety and general information sheet |
| RS22-16..., RS22-17..., RS22-24..., RS22-25... | Additionally: ferrite with key |

## ■ Order numbers/product description

The order numbers correspond to the product codes of the devices.
See "Combination options of the device variants RS20/RS30/RS22/RS32" on page 24.
See "Combination options for the RS40 device variants" on page 27.

### ■ 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.

| Gigabit Ethernet SFP transceiver | Certification type[a] | Temperature range | Order number |
|---|---|---|---|
| M-SFP-TX/RJ45 | Standard level | 0 °C ...+60 °C (+32 °F ...+140 °F) | 943 977-001 |
| M-SFP-TX/RJ45 EEC | Standard level | 0 °C ...+70 °C (+32 °F ...+158 °F) | 942 161-001 |

The following operating conditions apply to twisted pair transceivers:
▶ Usable with:
  - Classic Switch software, as of software version 04.1.00.
▶ Longer RSTP switching times and link loss detection times compared to twisted pair ports provided by the device directly.
▶ Not applicable for combo and Fast Ethernet ports.
▶ Exclusively supports the autonegotiation mode including autocrossing.

| | | | |
|---|---|---|---|
| M-SFP-SX/LC | Standard level | 0 °C ...+60 °C (+32 °F ...+140 °F) | 943 014-001 |
| M-SFP-SX/LC EEC | Standard level | 0 °C ...+70 °C (+32 °F ...+158 °F) | 943 896-001 |
| M-SFP-MX/LC EEC | Standard level | 0 °C ...+70 °C (+32 °F ...+158 °F) | 942 108-001 |
| M-SFP-LX/LC | Standard level | 0 °C ...+60 °C (+32 °F ...+140 °F) | 943 015-001 |
| M-SFP-LX/LC EEC | Standard level | 0 °C ...+70 °C (+32 °F ...+158 °F) | 943 897-001 |
| M-SFP-LX+/LC | Standard level | 0 °C ...+60 °C (+32 °F ...+140 °F) | 942 023-001 |
| M-SFP-LX+/ LC EEC | Standard level | 0 °C ...+70 °C (+32 °F ...+158 °F) | 942 024-001 |
| M-SFP-LH/LC | Standard level | 0 °C ...+60 °C (+32 °F ...+140 °F) | 943 042-001 |
| M-SFP-LH/LC EEC | Standard level | 0 °C ...+70 °C (+32 °F ...+158 °F) | 943 898-001 |
| M-SFP-LH+/LC | Standard level | 0 °C ...+60 °C (+32 °F ...+140 °F) | 943 049-001 |
| M-SFP-LH+/LC EEC | Standard level | 0 °C ...+70 °C (+32 °F ...+158 °F) | 942 119-001 |
| SFP-GIG-LX/LC | Entry level | 0 °C ...+60 °C (+32 °F ...+140 °F) | 942 196-001 |
| SFP-GIG-LX/LC EEC | Entry level | 0 °C ...+70 °C (+32 °F ...+158 °F) | 942 196-002 |

*Table 23:  Accessory: Gigabit Ethernet SFP transceiver*

a. Use Entry level SFP transceivers for industrial applications that exclusively require the following approvals: CE, FCC or UL 61010-2-201.
Use Standard level SFP transceivers for industrial applications that exclusively require following approvals: CE, FCC, UL 61010-2-201, DNV, Lloyd's Register, Bureau Veritas, UL121201 (Hazardous Locations), IEC61850-3, EN 50121-4, ATEX or IECEx.

| Bidirectional Gigabit Ethernet SFP transceiver | Certification type[a] | Temperature range | Order number |
|---|---|---|---|
| M-SFP-BIDI Type A LX/LC EEC | Standard level | 0 °C ...+70 °C (+32 °F ...+158 °F) | 943 974-001 |
| M-SFP-BIDI Type B LX/LC EEC | Standard level | 0 °C ...+70 °C (+32 °F ...+158 °F) | 943 974-002 |
| M-SFP-BIDI Type A LH/LC EEC | Standard level | 0 °C ...+70 °C (+32 °F ...+158 °F) | 943 975-001 |
| M-SFP-BIDI Type B LH/LC EEC | Standard level | 0 °C ...+70 °C (+32 °F ...+158 °F) | 943 975-002 |
| M-SFP-BIDI Bundle LX/LC EEC (Type A + B) | Standard level | 0 °C ...+70 °C (+32 °F ...+158 °F) | 943 974-101 |
| M-SFP-BIDI Bundle LH/LC EEC (Type A + B) | Standard level | 0 °C ...+70 °C (+32 °F ...+158 °F) | 943 975-101 |

*Table 24: Accessory: Bidirectional Gigabit Ethernet SFP transceiver*

a. Use Standard level SFP transceivers for industrial applications that require following approvals: CE, FCC, UL 61010-2-201, DNV, Lloyd's Register, Bureau Veritas, UL121201 (Hazardous Locations), IEC61850-3, EN 50121-4, ATEX or IECEx.

| Fast Ethernet SFP transceiver | Certification type[a] | Temperature range | Order number |
|---|---|---|---|
| M-FAST SFP-TX/RJ45 | Standard level | 0 °C ...+60 °C (+32 °F ...+140 °F) | 942 098-001 |
| M-FAST SFP-TX/RJ45 EEC | Standard level | 0 °C ...+70 °C (+32 °F ...+158 °F) | 942 098-002 |

The following operating conditions apply to twisted pair transceivers:
▶ Usable with:
  Classic Switch software, as of software version 08.0.00.
▶ 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 | Standard level | 0 °C ...+60 °C (+32 °F ...+140 °F) | 943 865-001 |
| M-FAST SFP-MM/LC EEC | Standard level | 0 °C ... +70 °C (+32 °F ... +158 °F) | 943 945-001 |
| M-FAST SFP-SM/LC | Standard level | 0 °C ...+60 °C (+32 °F ...+140 °F) | 943 866-001 |
| M-FAST SFP-SM/LC EEC | Standard level | 0 °C ... +70 °C (+32 °F ... +158 °F) | 943 946-001 |
| M-FAST SFP-SM+/LC | Standard level | 0 °C ...+60 °C (+32 °F ...+140 °F) | 943 867-001 |
| M-FAST SFP-SM+/LC EEC | Standard level | 0 °C ...+70 °C (+32 °F ... +158 °F) | 943 947-001 |
| M-FAST SFP-LH/LC | Standard level | 0 °C ...+60 °C (+32 °F ...+140 °F) | 943 868-001 |
| M-FAST SFP-LH/LC EEC | Standard level | 0 °C ...+70 °C (+32 °F ...+158 °F) | 943 948-001 |

*Table 25: Accessory: Fast Ethernet SFP transceiver*

| Fast Ethernet SFP transceiver | Certification type[a] | Temperature range | Order number |
|---|---|---|---|
| SFP-FAST-MM/LC | Entry level | 0 °C ...+60 °C (+32 °F ...+140 °F) | 942 194-001 |
| SFP-FAST-MM/LC EEC | Entry level | 0 °C ...+70 °C (+32 °F ...+158 °F) | 942 194-002 |
| SFP-FAST-SM/LC | Entry level | 0 °C ...+60 °C (+32 °F ...+140 °F) | 942 195-001 |
| SFP-FAST-SM/LC EEC | Entry level | 0 °C ...+70 °C (+32 °F ...+158 °F) | 942 195-002 |

*Table 25:   Accessory: Fast Ethernet SFP transceiver*

a.  Use Entry level SFP transceivers for industrial applications that require the following approvals: CE, FCC or UL 61010-2-201.
     Use Standard level SFP transceivers for industrial applications that require following approvals: CE, FCC, UL 61010-2-201, DNV, Lloyd's Register, Bureau Veritas, UL121201 (Hazardous Locations), IEC61850-3, EN 50121-4, ATEX or IECEx.

| Special accessories for the device variants RS22/RS32 | Order number |
|---|---|
| Wall mounting plate in DIN rail design, width 120 mm (4.72 in) | 943 971-001 |
| Wall mounting plate for DIN rail mounting, width 90 mm (3.54 in) | 943 971-002 |
| RPS 90/48V HV (high-voltage) PoE power unit | 943 979-001 |
| RPS 90/48V HV (high-voltage) PoE with Conformal Coating | 943 979-101 |
| RPS 90/48V LV (low-voltage) PoE power unit | 943 980-001 |
| RPS 90/48V LV (low-voltage) PoE with Conformal Coating | 943 980-101 |

| Other accessories | Order number |
|---|---|
| AutoConfiguration Adapter ACA22-USB (EEC) | 942 124-001 |
| Terminal cable | 943 301-001 |
| 6-pin terminal block (50 pcs.) | 943 845-006 |
| Rail Power Supply RPS 30 | 943 662-003 |
| Rail Power Supply RPS 80 EEC | 943 662-080 |
| Rail Power Supply RPS 120 EEC (CC) | 943 662-121 |
| Industrial HiVision Network Management Software | 943 156-xxx |

## ■ Underlying technical standards

| Name | |
|---|---|
| CAN/CSA C22.2 No. 213 | Non-incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations. |
| EN 50121-4 | Railway applications - EMC - emitted interference and interference immunity for signal and telecommunication systems |
| EN 55032 | Electromagnetic compatibility of multimedia equipment – Emission Requirements |
| EN 60079-0 | Explosive atmospheres – Part 0: Equipment – General requirements |
| EN 60079-7 | Explosive atmospheres – Part 7: Equipment protection by increased safety "e" |
| IEC/EN 60079-15 | Explosive atmospheres – Part 15: Equipment protection by type of protection "n" |
| IEC/EN 62368-1 | Equipment for audio/video, information and communication technology - Part 1: safety requirements |
| EN 61000-6-2 | Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments |
| EN 61131-2 | Programmable controllers – Part 2: Equipment requirements and tests |
| FCC 47 CFR Part 15 | Code of Federal Regulations |
| DNVGL-CG-0339 | Environmental test specification for electrical, electronic and programmable equipment and systems. |
| IEC 60950-1 | Information technology equipment – Safety – Part 1: General requirements |
| IEC/EN 61850-3 | Communication networks and systems for power utility automation - Part 3: General requirements. |
| IEEE 802.1D | Switching, GARP, GMRP, Spanning Tree |
| IEEE 802.1D | Media access control (MAC) bridges (includes IEEE 802.1p Priority and Dynamic Multicast Filtering, GARP, GMRP) |
| IEEE 802.1Q | Virtual LANs (VLANs, MRP, Spanning Tree) |
| IEEE 802.1Q | Virtual Bridged Local Area Networks (VLAN Tagging, GVRP) |
| IEEE 802.1w | Rapid Reconfiguration |
| IEEE 802.3 | Ethernet |
| IEEE 1613 | IEEE Standard Environmental and Testing Requirements for Communication Networking Devices in Electric Power Substations |
| UL 508 / CSA C22.2 No.142 | Safety for Industrial Control Equipment |

*Table 26:  List of the technical standards*

The device has an approval based on a specific standard exclusively if the approval indicator appears on the device casing.
If your device has a shipping approval according to Germanischer Lloyd, 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 under www.hirschmann.com in the product information.
The device generally fulfills the technical standards named in their current versions.

# A   Further support

**Technical questions**

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

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

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

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

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