User Manual

Installation
Industrial Security Router
EAGLE20/30
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You can get the latest version of this manual on the Internet at the Hirschmann product site (www.hirschmann.com).

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Germany
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Safety instructions

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNCONTROLLED MACHINE ACTIONS</td>
</tr>
</tbody>
</table>
To avoid uncontrolled machine actions caused by data loss, configure all the data transmission devices individually. Before you start any machine which is controlled via data transmission, be sure to complete the configuration of all data transmission devices.

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

■ 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 the device, turn off the supply voltage and return the device to Hirschmann for inspection.

■ Certified usage
- Use the product only for the application cases described in the Hirschmann product information, including this manual.
- Operate the product only according to the technical specifications. See “Technical data” on page 43.
- Connect to the product only components suitable for the requirements of the specific application case.

■ Installation site requirements
- Install the device in a fire enclosure according to EN 60950-1.
- Only for device variants featuring supply voltage with the characteristic value K9 or KK: Install this device solely in a switch cabinet or in an operating site with restricted access, to which maintenance staff have exclusive access.
**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 43.
- Install the device in the vertical position.
- At ambient temperatures > 140 °F (60 °C): 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 local or nationally applicable safety regulations.

**Grounding the device**

Grounding the device is by means of a separate ground connection on the device.

- 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 ground connector on the front panel as a conductor.

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

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

All of the following requirements are complied with:
- The electrical wires are voltage-free.
- The cables used are permitted for the temperature range of the application case.
- Only for device variants featuring supply voltage with the characteristic value CC: The voltage connected complies with the requirements for a safety extra-low voltage (SELV) as per IEC/EN 60950-1.

Table 1: General requirements for connecting electrical wires

All of the following requirements are complied with:
- The voltage connected complies with the requirements for a safety extra-low voltage (SELV) as per IEC/EN 60950-1.
- The connected voltage is limited by a current limitation device or a fuse. Observe the electrical threshold values for the signal contact. See “General technical data” on page 43.
- The cross-section of the ground conductor is the same size as or bigger than the cross-section of the power supply cables.

Table 2: Requirements for connecting the signal contact

<table>
<thead>
<tr>
<th>Device variant</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>All variants</td>
<td>All of the following requirements are complied with:</td>
</tr>
<tr>
<td></td>
<td>- The supply voltage corresponds to the voltage specified on the type plate of the device.</td>
</tr>
<tr>
<td></td>
<td>- The power supply conforms to overvoltage category I or II.</td>
</tr>
<tr>
<td></td>
<td>- The power supply has an easily accessible disconnecting device (e.g., a switch or a plug). This disconnecting device is clearly identified. So in the case of an emergency, it is clear which disconnecting device belongs to which power supply cable.</td>
</tr>
<tr>
<td></td>
<td>- The cross-section of the ground conductor is the same size as or bigger than the cross-section of the power supply cables.</td>
</tr>
<tr>
<td></td>
<td>- Relevant for North America: The power cords are suitable for ambient air temperatures of at least 167 °F (75 °C). The power cord wires are made of copper.</td>
</tr>
</tbody>
</table>

Table 3: Requirements for connecting the supply voltage
Supply voltage

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

Table 3: Requirements for connecting the supply voltage

<table>
<thead>
<tr>
<th>Device variant</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only for device variants featuring supply voltage with the characteristic value CC:</td>
<td>The wire diameter of the supply voltage at the input is at least 1 mm² (North America AWG16). The following requirements are alternatively complied with:</td>
</tr>
<tr>
<td>Alternative 1</td>
<td>Relevant for North America: The power supply complies with the requirements as per NEC Class 2</td>
</tr>
<tr>
<td>Alternative 2</td>
<td>All of the following requirements are complied with:</td>
</tr>
<tr>
<td></td>
<td>- The power supply complies with the requirements for a safety extra-low voltage (SELV) as per IEC/EN 60950-1.</td>
</tr>
<tr>
<td></td>
<td>- A fuse suitable for DC voltage is located in the plus conductor of the power supply. The minus conductor is on ground potential. Otherwise, a fuse is also located in the minus conductor. Regarding the properties of this fuse: See “General technical data” on page 43.</td>
</tr>
<tr>
<td>Only for device variants featuring supply voltage with the characteristic value K9 or KK:</td>
<td>All of the following requirements are complied with:</td>
</tr>
<tr>
<td></td>
<td>- Disconnect device for equipment supplied from IT supply system, shall disconnect both poles of mains supply.¹</td>
</tr>
<tr>
<td></td>
<td>- Supply with DC voltage: A fuse suitable for DC voltage is located in the plus conductor of the power supply. The minus conductor is on ground potential. Otherwise, a fuse is also located in the minus conductor. Regarding the properties of this fuse: See “General technical data” on page 43.</td>
</tr>
<tr>
<td></td>
<td>- Supply with AC voltage: A fuse is located in the outer conductor of the power supply. The neutral conductor is on ground potential at both voltage inputs. Otherwise, a fuse is also located in the neutral conductor. Regarding the properties of this fuse: See “General technical data” on page 43.</td>
</tr>
<tr>
<td></td>
<td>- The wire diameter of the power supply cable is at least 0.75 mm² (North America: AWG18) on the supply voltage input.</td>
</tr>
</tbody>
</table>

¹ IT supply system according to the technical standard UL 60950-1
Instructions for Use in Hazardous Locations

Note: The following information applies only to models without WAN ports.
See “Device name and product code” on page 16.

SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D HAZARDOUS LOCATIONS, OR NONHAZARDOUS LOCATIONS ONLY.

WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS KNOWN TO BE FREE OF IGNITABLE CONCENTRATIONS.

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

For USB and Relay: Install per Control Drawing 000172287DNR.

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.
USB connection:
Equipment with non-incendive field wiring parameters.
USB entity parameters:

\[
V_{oc} = 5.5 \text{ V} \quad I_{sc} = 1.25 \text{ A} \\
C_s = 10 \text{ µF} \quad L_s = 10 \text{ µH}
\]

For usage with Hirschmann USB devices certified and labelled according Class I Div 2 hazardous location requirements such as ACA21-USB EEC, or succeeding types.

Relay contacts:
Equipment with non-incendive field wiring parameters.
Polarity is not relevant.
The relay terminals are dependent upon the following entity parameters:

\[
V_i = 30 \text{ V} \quad I_i = 90 \text{ mA} \\
C_i = 2 \text{ nF} \quad L_i = 1 \text{ µH}
\]

Power Supply unit type C: 24 V DC – 48 V DC
Power Supply unit type K: 110 V AC – 230 V AC or 60 V DC – 250 V DC
(Refer to the power supply code of the type designation on the device)

Temperature Code: T4
Ambient Temperature rating:
\[
T_a: \ 0^\circ \text{ C} \text{ to } +60^\circ \text{ C for "S" temperature types} \\
T_a: \ -40^\circ \text{ C} \text{ to } +70^\circ \text{ C for "T" or "E" temperature types}
\]
(Refer to the temperature code of the type designation on the device)
For Use in Hazardous Locations Class I Division 2 Groups A, B, C, D:
Only allowed for EAGLE20/30 model No’s. which are individually labelled
“FOR USE IN HAZARDOUS LOCATIONS”

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

The earth conductor must be at least the same wire size (mm² or AWG) as the supply conductors.

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.

Control Drawing for EAGLE20/30 devices according to Class 1 Division 2 Hazardous Locations

Rev.: 2  Doc. No.: 000172287DNR  Page 2 of 2
CE marking
The labeled devices comply with the regulations contained in the following European directive(s):

<table>
<thead>
<tr>
<th>Device variant</th>
<th>Directive</th>
</tr>
</thead>
</table>
| All variants   | 2011/65/EU (RoHS)  
| All variants   | 2014/30/EU (EMC)  
Directive of the European Parliament and the council for standardizing the regulations of member states with regard to electromagnetic compatibility. |
| Only for device variants featuring supply voltage with the characteristic value K9 or KK: | 2014/35/EU  
Directive of the European Parliament and the council for standardizing the regulations of member states with regard to electrical equipment for use within specific 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
Tel.: +49 1805 141538

The product can be used in the industrial sector.
- Interference immunity: EN 61000-6-2
- Emitted interference: EN 55022
- Reliability: EN 60950-1
You find more information on technical standards here:
“Technical data” on page 43

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

Connecting the SHDSL ports DSL1 and DSL2 to the public telecommunications system is illegal. The SHDSL port is used exclusively for direct data connections between SHDSL-enabled devices.

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

**FCC note:**
This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference; (2) this device must accept any interference received, including interference that may cause undesired operation. Appropriate testing has established that this device fulfills the requirements of a class A digital device in line with part 15 of the FCC regulations. These requirements are designed to provide sufficient protection against interference when the device is being used in a business environment. The device creates and uses high frequencies and can also radiate these frequencies. If it is not installed and used in accordance with this operating manual, it can cause radio transmission interference. The use of this device in a residential area can also cause interference, and in this case the user is obliged to cover the costs of removing the interference.

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

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

The Industrial HiVision Network Management software provides you with additional options for smooth configuration and monitoring:

► ActiveX control for SCADA integration
► Auto-topology discovery
► Browser interface
► Client/server structure
► Event handling
► Event log
► Simultaneous configuration of multiple devices
► Graphical user interface with network layout
► SNMP/OPC gateway

Key

The symbols used in this manual have the following meanings:

► Listing

☐ Work step

■ Subheading
1 Description

1.1 General device description

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

- Number of ports
- Transmission speed
- Types of connectors
- Temperature range
- Supply voltage range
- Certifications

The EAGLE20/30 devices are designed for the special requirements of industrial automation. They meet the relevant industry standards, provide very high operational reliability, even under extreme conditions, and also long-term reliability and flexibility.

The devices allow you to set up switched and routed industrial Ethernet networks that conform to the IEEE 802.3 standard. The devices work without a fan.

The device is mounted by latching in place on a DIN rail.

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

- a Web browser
- SSH
- HiDiscovery (Software for putting the device into operation)
- network management software (e.g. Industrial HiVision)
- a V.24 interface (locally on the device)

The devices provide you with a large range of functions, which the manuals for the operating software inform you about. You will find these manuals in the form of PDF files for downloading on the Internet on the Hirschmann product pages (www.hirschmann.com).

The Hirschmann network components help you ensure continuous communication across all levels of the company.
1.2 Device name and product code

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

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

<table>
<thead>
<tr>
<th>Item</th>
<th>Characteristic</th>
<th>Characteristic value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ... 7</td>
<td>Device</td>
<td>EAGLE20</td>
<td>Router without gigabit ports</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EAGLE30</td>
<td>Router with gigabit ports</td>
</tr>
<tr>
<td>8</td>
<td>(hyphen)</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>9 ... 10</td>
<td>Number: Fast Ethernet ports</td>
<td>04</td>
<td>4 ×</td>
</tr>
<tr>
<td>11 ... 12</td>
<td>Number: Gigabit Ethernet ports</td>
<td>00 02</td>
<td>0 × 2 ×</td>
</tr>
<tr>
<td>13 ... 15</td>
<td>Configuration of the uplink ports</td>
<td>2O6 999</td>
<td>2 × SFP slot Not present</td>
</tr>
<tr>
<td>16 ... 17</td>
<td>Configuration of the other ports</td>
<td>TT</td>
<td>All the other ports are RJ45 sockets for twisted pairs</td>
</tr>
<tr>
<td>18</td>
<td>Cellular phone interface</td>
<td>9</td>
<td>Not present</td>
</tr>
<tr>
<td>19 ... 20</td>
<td>WAN port</td>
<td>99</td>
<td>Not present</td>
</tr>
<tr>
<td></td>
<td>H2</td>
<td>2 ×</td>
<td>SHDSL port</td>
</tr>
<tr>
<td>21</td>
<td>Temperature range</td>
<td>S</td>
<td>Standard 0 °C ... +60 °C (+32 °F ... +140 °F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T</td>
<td>Extended −40 °F ... +158 °F (−40 °C ... +70 °C)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E</td>
<td>Extended with conformal coating −40 °F ... +158 °F (−40 °C ... +70 °C)</td>
</tr>
</tbody>
</table>

Table 4: Device name and product code
### Supply voltage

<table>
<thead>
<tr>
<th>Item</th>
<th>Product characteristic</th>
<th>Characteristic value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 ... 23</td>
<td>Supply voltage</td>
<td>CC</td>
<td>2 × Voltage input</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rated voltage range DC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>24 V ... 48 V</td>
</tr>
<tr>
<td></td>
<td>K9</td>
<td>1 × Voltage input</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rated voltage range AC</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>110 V ... 230 V, 50 Hz ... 60 Hz</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rated voltage range DC</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>60 V ... 250 V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>KK</td>
<td>2 × Voltage input</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rated voltage range AC</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>110 V ... 230 V, 50 Hz ... 60 Hz</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rated voltage range DC</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>60 V ... 250 V</td>
<td></td>
</tr>
</tbody>
</table>

### Certifications

**Note:** You will find detailed information on the certificates and declarations applying to your device in a separate overview. See table 5 on page 18.

---

Table 4: Device name and product code
<table>
<thead>
<tr>
<th>Application case</th>
<th>Certificates and declarations</th>
<th>Characteristic value&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P9</td>
<td>T9</td>
</tr>
<tr>
<td>Standard applications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>UL 508</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>EN 60950-1</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>EN 61131-2</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>FCC</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>UL 60950-1</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Oil and gas applications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISA 12.12.01 – Class I, Div. 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substation applications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IEC 61850-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IEEE 1613</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navy applications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ABS</td>
<td>(x)</td>
<td>(x)</td>
</tr>
<tr>
<td>BV</td>
<td>(x)</td>
<td>(x)</td>
</tr>
<tr>
<td>DNV</td>
<td>(x)</td>
<td>(x)</td>
</tr>
<tr>
<td>GL</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>KR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LR</td>
<td>(x)</td>
<td>(x)</td>
</tr>
<tr>
<td>Railway applications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN 50121-4</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Table 5: Assignment: application cases, certificates and declarations, characteristic values

a.  
X = Certificate or declaration present  
(X) = Certificate or declaration in preparation  
(x) = Certificate or declaration available upon request
# 1.3 Device views

## 1.3.1 Front view

<table>
<thead>
<tr>
<th>Number</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LED display elements for device status</td>
</tr>
<tr>
<td>2</td>
<td>V.24 interface</td>
</tr>
<tr>
<td>3</td>
<td>USB port</td>
</tr>
<tr>
<td>4</td>
<td>2 × SFP slot (optional)</td>
</tr>
<tr>
<td>5</td>
<td>4 × Fast Ethernet ports</td>
</tr>
<tr>
<td>6</td>
<td>2 × SHDSL port (optional)</td>
</tr>
<tr>
<td>7</td>
<td>LED display elements for the status of the SHDSL ports</td>
</tr>
<tr>
<td>8</td>
<td>Grounding screw</td>
</tr>
<tr>
<td>9</td>
<td>Supply voltage connection</td>
</tr>
<tr>
<td>10</td>
<td>Connection for the signal contact</td>
</tr>
<tr>
<td>11</td>
<td>Connection for digital input</td>
</tr>
<tr>
<td>12</td>
<td>LED display element for digital input</td>
</tr>
<tr>
<td>13</td>
<td>Save/Load/Reset button</td>
</tr>
<tr>
<td></td>
<td>The support of the function is dependent on the software release. Software support for the function is unimplemented at the time of printing this manual.</td>
</tr>
<tr>
<td>14</td>
<td>LED display elements for additional status information</td>
</tr>
<tr>
<td>15</td>
<td>LED display elements</td>
</tr>
<tr>
<td></td>
<td>The support of the function is dependent on the software release. Software support for the function is unimplemented at the time of printing this manual.</td>
</tr>
</tbody>
</table>

EAGLE30-0402206TT9H2SCC...

- 2 voltage inputs for redundant power supply
- 2-pin terminal block
- 1 voltage input
- 3-pin terminal block
- 2 voltage inputs for redundant power supply
- 3-pin terminal block
1.3.2 Rear view

1.4 Power supply

1.4.1 Supply voltage with the characteristic value K9
For the power supply of the device, a 3-pin terminal block is available.
For further information see “Supply voltage with the characteristic value K9” on page 34.

1.4.2 Supply voltage with the characteristic value KK
For the redundant power supply of the device, two 3-pin terminal blocks are available.
For further information see “Supply voltage with the characteristic value KK” on page 20.

1.4.3 Supply voltage with the characteristic value CC
For the redundant power supply of the device, two 2-pin terminal blocks are available.
For further information see “Supply voltage with the characteristic value CC” on page 20.
1.5 **Ethernet ports**

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

You find information on pin assignments for making patch cables here: See “Pin assignments” on page 22.

### 1.5.1 10/100 Mbit/s twisted pair port

This port is an RJ45 socket.

The 10/100 Mbit/s twisted pair port offers you the ability 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 socket housing is electrically connected with the front panel.

### 1.5.2 100/1000 Mbit/s F/O port (optional)

This port is an SFP slot.

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

This port supports:
- Full duplex mode
1.5.3 100/1000 Mbit/s twisted pair port (optional)

Note: The following information applies only to device variants with HiSecOS, software versions 01.2.00 and higher.

You set up this connection using the following SFP transceivers, which you insert into the SFP slot of the 100/1000 Mbit/s F/O port:
- M-FAST SFP-TX/RJ45
- M-FAST SFP-TX/RJ45 EEC
- M-SFP-TX/RJ45

The 100/1000-Mbit/s twisted pair port offers you the possibility to connect network components according to the IEEE 802.3 100BASE-FX/1000BASE-SX/1000BASE-LX standard.

This port supports:
- Autonegotiation
- Full duplex mode

1.5.4 Pin assignments

<table>
<thead>
<tr>
<th>RJ45</th>
<th>Pin</th>
<th>10/100 Mbit/s</th>
<th>1000 Mbit/s</th>
<th>PoE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10/100 Mbit/s</td>
<td>1000 Mbit/s</td>
<td>PoE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TX+</td>
<td>BI_DA+</td>
<td>Positive V_PSE^a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TX−</td>
<td>BI_DA−</td>
<td>Positive V_PSE^a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RX+</td>
<td>BI_DB+</td>
<td>Negative V_PSE^a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RX−</td>
<td>BI_DB−</td>
<td>Negative V_PSE^a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>BI_DC+</td>
<td>Positive V_PSE^b</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>BI_DC−</td>
<td>Positive V_PSE^b</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RX+</td>
<td>BI_DB+</td>
<td>Negative V_PSE^a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RX−</td>
<td>BI_DB−</td>
<td>Negative V_PSE^a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>BI_DD+</td>
<td>Negative V_PSE^b</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>BI_DD−</td>
<td>Negative V_PSE^b</td>
</tr>
</tbody>
</table>

MDI-X mode

<table>
<thead>
<tr>
<th>RJ45</th>
<th>Pin</th>
<th>10/100 Mbit/s</th>
<th>1000 Mbit/s</th>
<th>PoE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>RX+</td>
<td>BI_DB+</td>
<td>Negative V_PSE^a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RX−</td>
<td>BI_DB−</td>
<td>Negative V_PSE^a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TX+</td>
<td>BI_DA+</td>
<td>Positive V_PSE^a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>BI_DD+</td>
<td>Positive V_PSE^b</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>BI_DD−</td>
<td>Positive V_PSE^b</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TX−</td>
<td>BI_DA−</td>
<td>Positive V_PSE^a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>BI_DC+</td>
<td>Negative V_PSE^b</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>BI_DC−</td>
<td>Negative V_PSE^b</td>
</tr>
</tbody>
</table>

^a. Phantom supply
^b. Spare pair supply
1.6  WAN port (optional)

Note: The following information applies only to models with WAN ports. See “Device name and product code” on page 16.

- **SHDSL port**
  This port is an RJ45 socket. The WAN port offers you the ability to connect network components according to the IEEE 802.3ah standard.

  This port supports:
  - Aggregation of 2 links within the same port
  - SHDSL (Single Pair High Bit Rate Digital Subscriber Line)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tip Pair 1</td>
</tr>
<tr>
<td>2</td>
<td>Ring</td>
</tr>
<tr>
<td>3</td>
<td>Tip Pair 0</td>
</tr>
<tr>
<td>4</td>
<td>Ring</td>
</tr>
<tr>
<td>5</td>
<td>—</td>
</tr>
<tr>
<td>6,7,8</td>
<td>—</td>
</tr>
</tbody>
</table>

*Table 6: Pin assignment of SHDSL port, RJ-45 socket*
1.7 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.

1.7.1 Device state

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

<table>
<thead>
<tr>
<th>LED</th>
<th>Display</th>
<th>Color</th>
<th>Activity</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>Supply voltage</td>
<td>—</td>
<td>None</td>
<td>Supply voltage is too low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yellow</td>
<td>Lights up</td>
<td>Device variants with redundant power supply: Supply voltage 1 or 2 is on</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Software update is running. Maintain the power supply.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green</td>
<td>Lights up</td>
<td>Device variants with redundant power supply: Supply voltages 1 and 2 are on</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Device variants with single power supply: Supply voltage is on</td>
</tr>
<tr>
<td>Status</td>
<td>Device Status</td>
<td>—</td>
<td>None</td>
<td>Device starts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green</td>
<td>Lights up</td>
<td>Device is ready for operation. Characteristics can be configured</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Red</td>
<td>Lights up</td>
<td>The device reports a detected error. See “Reference Manual GUI Graphical User Interface”, Chapter “Device Status”.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Flashes 1 time a period The boot parameters used when the device has been started differ from the boot parameters saved. Start the device again.</td>
</tr>
<tr>
<td>RM</td>
<td>Ring Manager</td>
<td>—</td>
<td>None</td>
<td>The support of the function is dependent on the software release.</td>
</tr>
<tr>
<td>ACA</td>
<td>Storage medium</td>
<td>ACA31</td>
<td>None</td>
<td>No ACA connected</td>
</tr>
<tr>
<td>ACA</td>
<td></td>
<td>ACA22</td>
<td></td>
<td>ACA storage medium connected</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Flashes 3 times a period Device writes to/reads from the storage medium</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yellow</td>
<td>Lights up</td>
<td>ACA storage medium inoperative Check the file system format See “SD card interface” on page 27. Deactivate the write protection on the ACA31 by pushing the lock towards the contacts.</td>
</tr>
</tbody>
</table>
1.7.2 Digital input (optional)

**Note:** Only for supply voltage with the following characteristic values:
- CC
- K9

<table>
<thead>
<tr>
<th>LED</th>
<th>Display</th>
<th>Color</th>
<th>Activity</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN</td>
<td>The support of the function is dependent on the software release. Software support for the function is unimplemented at the time of printing this manual.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.7.3 Port state

### Ethernet ports

These LEDs display port-related information. During the boot phase, they indicate the status of the boot process. The LEDs are directly located on the ports.

<table>
<thead>
<tr>
<th>Display</th>
<th>Color</th>
<th>Activity</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link status</td>
<td>None</td>
<td>Device detects an invalid or missing link</td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td>Lights up</td>
<td>Device detects a valid link</td>
<td></td>
</tr>
<tr>
<td>Flashes 1 time a period</td>
<td>Port is switched to stand-by</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flashes 3 times a period</td>
<td>Port is switched off</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow</td>
<td>flashing</td>
<td>Device is transmitting and/or receiving data</td>
<td></td>
</tr>
</tbody>
</table>

### WAN port (optional)

The LEDs are directly located on the ports.

<table>
<thead>
<tr>
<th>LED</th>
<th>Display</th>
<th>Color</th>
<th>Activity</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS</td>
<td>Link status</td>
<td>None</td>
<td>Device detects an invalid or missing link</td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td>Lights up</td>
<td>Device detects a valid link</td>
<td></td>
<td></td>
</tr>
<tr>
<td>lights up 2 times a period</td>
<td>The device is establishing a link</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DA</td>
<td>data</td>
<td>Yellow</td>
<td>flashing</td>
<td>Device is transmitting and/or receiving data</td>
</tr>
</tbody>
</table>
1.7.4 Additional status information (optional)

**Note:** Only for supply voltage with the following characteristic values:
- CC
- K9

<table>
<thead>
<tr>
<th>LED</th>
<th>Display</th>
<th>Color</th>
<th>Activity</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>VPN</td>
<td>VPN connections</td>
<td>Green</td>
<td>Lights up</td>
<td>The LED lights up green when one or more VPN connections are active and are in the up state.</td>
</tr>
<tr>
<td>RD</td>
<td>VRRP instances</td>
<td>—</td>
<td>None</td>
<td>No VRRP instances are active. Possible reasons: 1) VRRP is globally disabled. 2) The configured VRRP instances have not met the preconditions for operation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green</td>
<td>Lights up</td>
<td>At least 1 VRRP instance is in Master mode.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yellow</td>
<td>Lights up</td>
<td>No VRRP instances are in Master mode, but at least one VRRP instance is in Backup mode.</td>
</tr>
</tbody>
</table>

**Note:** The following information applies only to device variants with SHDSL ports.
See “Device name and product code” on page 16.

<table>
<thead>
<tr>
<th>LED</th>
<th>Display</th>
<th>Color</th>
<th>Activity</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>Operational Mode</td>
<td>Green</td>
<td>Lights up</td>
<td>The port is in the Central Office mode.</td>
</tr>
<tr>
<td>AL</td>
<td></td>
<td>—</td>
<td>None</td>
<td>The port is in Remote Office mode.</td>
</tr>
</tbody>
</table>

The support of the function is dependent on the software release. Software support for the function is unimplemented at the time of printing this manual.
1.8  Management interfaces

1.8.1  V.24 interface (external management)

Note: For information about the position on the device see “Front view” on page 19.

A serial interface is provided on the RJ11 socket (V.24 interface) for the local connection of an external management station (VT100 terminal or PC with corresponding terminal emulation). This enables you to set up a connection to the Command Line Interface CLI and to the System Monitor.

<table>
<thead>
<tr>
<th>VT 100 terminal settings</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>9600 Baud</td>
</tr>
<tr>
<td>Data</td>
<td>8 bit</td>
</tr>
<tr>
<td>Stopbit</td>
<td>1 bit</td>
</tr>
<tr>
<td>Handshake</td>
<td>off</td>
</tr>
<tr>
<td>Parity</td>
<td>none</td>
</tr>
</tbody>
</table>

The socket housing is electrically connected to the front panel of the device. The V.24 interface is electrically insulated from the supply voltage.

Figure 1: Pin assignment of the V.24 interface and the DE9 connector

The terminal cable is available as an accessory. See “Accessories” on page 53.

1.8.2  SD card interface

Note: For information about the position on the device see “Rear view” on page 20.

The SD card interface allows you to connect the AutoConfiguration Adapter ACA31 storage medium. This is used for saving/loading the configuration data and diagnostic information, and for loading the software. The ACA31 supports the FAT16 file system format exclusively.
1.8.3  **USB interface**

**Note:** For information about the position on the device see “Front view” on page 19.

The USB socket has an interface for the local connection of an AutoConfiguration Adapter ACA22. It is used for saving/loading the configuration data and diagnostic information, and for loading the software.

The USB interface has the following properties:
- Supports the USB master mode
- Supports USB 2.0 (data rate max. 480 MBit/s)
- Connector type A
- Supplies current of max. 500 mA
- Voltage not potential-separated
- Supported file system: FAT32

<table>
<thead>
<tr>
<th>Figure</th>
<th>Pin</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Pin assignment of the USB interface" /></td>
<td>1</td>
<td>VCC (VBus)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>− Data</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>+ Data</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Ground (GND)</td>
</tr>
</tbody>
</table>

*Table 7: Pin assignment of the USB interface*
1.9  **Input/output interfaces**

1.9.1  **Signal contact**

![Signal contact](image)

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

In the state on delivery, the signal contact indicates the device status. It can be configured using the device management.

1.9.2  **Digital input (optional)**

**Note:** Only for supply voltage with the following characteristic values:

- CC
- K9

The support of the function is dependent on the software release. Software support for the function is unimplemented at the time of printing this manual.

![Input](image)

*Figure 3:  Input: 2-pin terminal block with screw locking*
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 the SD card (optional)
- Installing and grounding the device
- Installing an SFP transceiver (optional)
- Connecting the terminal blocks
- Operating the device
- Connecting data cables
- Filling out the inscription label

2.1 Checking the package contents

☐ Check whether the package includes all items named in the section “Scope of delivery” on page 53.
☐ Check the individual parts for transport damage.

2.2 Installing the SD card (optional)

Note: For information about the position on the device see “Rear view” on page 20.

☐ Push the SD card into the slot with the beveled corner facing upwards.
☐ Tighten the thumb screw hand-tight to fix the SD card.
2.3 Installing and grounding the device

WARNING
FIRE HAZARD
Install the device in a fire enclosure according to EN 60950-1.

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

WARNING
Only for device variants featuring supply voltage with the characteristic value K9 or KK:

ELECTRIC SHOCK
Install this device solely in a switch cabinet or in an operating site with restricted access, to which maintenance staff have exclusive access.

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

2.3.1 Installing the device onto the DIN rail

Note: Verify that there is at least 4 in (10 cm) of space above and below the device.

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

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.
☐ Press the media module downwards onto the clip-in bar.
☐ Snap in the device.
2.3.2 Grounding the device

![Figure 4: Mounting on the DIN rail](image)

**WARNING**

**ELECTRIC SHOCK**

Ground the device before connecting any other cables.

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

The housing is grounded via the separate ground screw on the bottom left of the front panel.

The device variants with SHDSL ports and the device variants featuring supply voltage with the characteristic value K9 or KK have a connection for protective grounding 🔄.

The device variants featuring supply voltage with the characteristic value CC and not featuring SHDSL ports have a connection for functional grounding ⚡.

Ground the device via the ground screw.
2.4 Installing an SFP transceiver (optional)

Use only Hirschmann SFP transceivers which are suitable for usage with the device.
See “Accessories” on page 53.
☐ Remove the protection cap from the SFP transceiver.
☐ Push the transceiver with the lock closed into the slot until it latches in.

![Figure 5: F/O SFP transceiver](image)

2.5 Connecting the terminal blocks

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ELECTRIC SHOCK</strong></td>
</tr>
</tbody>
</table>

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.

Before connecting the electrical wires, **always** verify that the requirements listed are complied with.
See “Requirements for connecting electrical wires” on page 7.

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

The supply voltage is connected to the device casing through protective elements exclusively.
2.5.1 Supply voltage with the characteristic value K9

Figure 6: Supply voltage with the characteristic value K9: 3-pin terminal block with screw locking

<table>
<thead>
<tr>
<th>Type of the voltages that can be connected</th>
<th>Specification of the supply voltage</th>
<th>Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC voltage</td>
<td>Rated voltage range DC 60 V ... 250 V</td>
<td>+/L Plus terminal of the supply voltage</td>
</tr>
<tr>
<td></td>
<td>Voltage range DC incl. maximum tolerances 48 V ... 320 V</td>
<td>−/N Minus terminal of the supply voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Protective conductor</td>
</tr>
<tr>
<td>AC voltage</td>
<td>Rated voltage range AC 110 V ... 230 V, 50 Hz ... 60 Hz</td>
<td>+/L Outer conductor</td>
</tr>
<tr>
<td></td>
<td>Voltage range AC incl. maximum tolerances 88 V ... 265 V, 47 Hz ... 63 Hz</td>
<td>−/N Neutral conductor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Protective conductor</td>
</tr>
</tbody>
</table>

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

☐ Remove the power connector from the device.
☐ Connect the wires according to the pin assignment on the device with the clamps.
☐ Fasten the wires connected by tightening the terminal screws.
2.5.2 Supply voltage with the characteristic value KK

You have the option of supplying the supply voltage redundantly, without load distribution.
Both supply voltage inputs are uncoupled.
With a redundant supply, the supply voltage 1 (upper voltage input on the device) has priority.

![Supply voltage with the characteristic value KK: 3-pin terminal block with screw locking](image)

For every supply voltage to be connected, perform the following steps:
☐ Remove the power connector from the device.
☐ Connect the wires according to the pin assignment on the device with the clamps.
☐ Fasten the wires connected by tightening the terminal screws.

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

<table>
<thead>
<tr>
<th>Type of the voltages that can be connected</th>
<th>Specification of the supply voltage</th>
<th>Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC voltage</td>
<td>Rated voltage range DC</td>
<td>+/L</td>
</tr>
<tr>
<td></td>
<td>60 V ... 250 V</td>
<td>Plus terminal of the supply voltage</td>
</tr>
<tr>
<td></td>
<td>Voltage range DC incl.</td>
<td>−/N</td>
</tr>
<tr>
<td></td>
<td>maximum tolerances</td>
<td>Minus terminal of the supply voltage</td>
</tr>
<tr>
<td></td>
<td>48 V ... 320 V</td>
<td>Protective conductor</td>
</tr>
</tbody>
</table>

| AC voltage                                | Rated voltage range AC             | +/L          |
|                                           | 110 V ... 230 V, 50 Hz ... 60 Hz   | Outer conductor |
|                                           | Voltage range AC incl.             | −/N          |
|                                           | maximum tolerances                 | Neutral conductor |
|                                           | 88 V ... 265 V, 47 Hz ... 63 Hz    | Protective conductor |
### 2.5.3 Supply voltage with the characteristic value CC

You have the option of supplying the supply voltage redundantly, without load distribution. Both supply voltage inputs are uncoupled.

![Supplied voltage with characteristic value CC](image_url)

*Figure 8: Supply voltage with the characteristic value CC: 2-pin terminal block with screw locking*

<table>
<thead>
<tr>
<th>Type of the voltages that can be connected</th>
<th>Specification of the supply voltage</th>
<th>Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC voltage</td>
<td>Rated voltage range DC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24 V ... 48 V</td>
<td>+ Plus terminal of the supply voltage</td>
</tr>
<tr>
<td></td>
<td>Voltage range DC incl.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>maximum tolerances</td>
<td>- Minus terminal of the supply voltage</td>
</tr>
<tr>
<td></td>
<td>18 V ... 60 V</td>
<td></td>
</tr>
</tbody>
</table>

For every supply voltage to be connected, perform the following steps:
- Remove the power connector from the device.
- Connect the wires according to the pin assignment on the device with the clamps.
- Fasten the wires connected by tightening the terminal screws.

With non-redundant supply of the mains voltage, the device reports a power failure. You can avoid this message by changing the configuration in the management, or, with power supply units of the same type, by feeding the supply voltage in through both inputs.

### 2.5.4 Signal contact

For the signal contact to be connected, make sure the following requirements are met:
- The electrical wires are voltage-free.
- The connected voltage is limited by a current limitation device or a fuse. Observe the electrical threshold values for the signal contact. See “General technical data” on page 43.
- Connect the signal contact wires with the connectors of the terminal block.
2.6 Operating the device

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECTRIC SHOCK</td>
</tr>
</tbody>
</table>

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

See “Requirements for connecting electrical wires” on page 7.

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

**Note:** Relevant for North America:
The torque for tightening the supply voltage terminal block on the device is 4.5 lb-in (0.51 Nm).
The torque for tightening the signal contact and input terminal block on the device is 3 lb-in (0.34 Nm).

- Use screws to secure the connectors to the device.
- Enable the supply voltage.

2.7 Connecting data cables

2.7.1 Twisted Pair ports

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, and that ideally they are installed in separate cable channels. If reducing the inductive coupling is necessary, verify that the power supply cables and data cables cross at a 90° angle.
- Use shielded cables (SF/UTP cables as per ISO/IEC 11801:2002).

- Connect the data cables according to your requirements.

See “10/100 Mbit/s twisted pair port” on page 21.
See “100/1000 Mbit/s twisted pair port (optional)” on page 22.
2.7.2 100/1000 Mbit/s F/O port (optional)
Verify that you connect LH ports only with LH ports, SX ports only with SX ports, and LX ports only with LX ports.
☐ Connect the data cables according to your requirements.

See “Ethernet ports” on page 21.

2.7.3 WAN port (optional)

Note: In general, you should adhere to the following recommendations for data cable connections in environments with high electrical interference levels:
☐ Provide copper cabling to ensure sufficient distance between the power supply cables and data cables. Ideally, install the cables in separate cable channels.
☐ Use shielded cables.

2.8 Filling out the inscription label
The information field for the IP address helps you identify your device.
3 Making basic settings

Note: Two or more devices configured with the same IP address can cause unpredictable operation of your network. Install and maintain a process that assigns a unique IP address to every device in the network.

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

- Entry via V.24 connection
- Entry via the HiDiscovery protocol in the applications HiDiscovery or Industrial HiVision
- AutoConfiguration Adapter

Further information on the basic settings of the device can be found in the user manual.

- Default settings
  - V.24 data rate: 9,600 Baud
  - Ethernet ports: link status is not evaluated (signal contact)
  - Optical ports: Full duplex
  - TP ports: Autonegotiation

- Monitoring the ambient air temperature
  Operate the device below the specified maximum ambient air temperature exclusively.
  See “General technical data” on page 43.

  The ambient air temperature is the temperature of the air at a distance of 2 in (5 cm) from the device. It depends on the installation conditions of the device, e.g. the distance from other devices or other objects, and the output of neighboring devices.
  The temperature displayed in the CLI and the GUI is the internal temperature of the device. It is up to 68 °F (20 °C) higher than the ambient temperature. This depends on the configuration of your device.
4 Maintenance and service

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

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

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

5.1 Removing the device

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECTRIC SHOCK</td>
</tr>
<tr>
<td>Disconnect the grounding only after disconnecting all other cables.</td>
</tr>
<tr>
<td>Failure to follow these instructions can result in death, serious injury, or equipment damage.</td>
</tr>
</tbody>
</table>

- Disconnect the data cables.
- Disable the supply voltage.
- Disconnect the terminal blocks.
- Disconnect the grounding.
- To remove the device from the DIN rail, press the device downwards and pull it out from under the DIN rail.

Figure 9: Removal from the DIN rail
5.2  Removing an SFP transceiver (optional)

☐ Pull the SFP transceiver out of the slot by means of the opened lock.
☐ Close the SFP transceiver with the protective cap.
# Technical data

## General technical data

<table>
<thead>
<tr>
<th>Weight</th>
<th>EAGLE-.........999S..</th>
<th>approx. 2.65 lb (1.2 kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EAGLE-.........999T..</td>
<td>approx. 3.31 lb (1.5 kg)</td>
</tr>
<tr>
<td></td>
<td>EAGLE-.........999E..</td>
<td>approx. 4.19 lb (1.9 kg)</td>
</tr>
<tr>
<td></td>
<td>EAGLE-.........9H2S..</td>
<td>approx. 3.31 lb (1.5 kg)</td>
</tr>
<tr>
<td></td>
<td>EAGLE-.........9H2E..</td>
<td>approx. 4.19 lb (1.9 kg)</td>
</tr>
<tr>
<td></td>
<td>EAGLE-.........9H2T..</td>
<td>approx. 4.19 lb (1.9 kg)</td>
</tr>
</tbody>
</table>

### Power supply with the characteristic value CC

<table>
<thead>
<tr>
<th>Supply voltage</th>
<th>Nominal voltage DC</th>
<th>24 V ... 48 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage range DC incl. maximum tolerances</td>
<td>18 V ... 60 V</td>
<td></td>
</tr>
<tr>
<td>Voltage range DC in Hazardous Locations (Class I, Division 2) incl. maximum tolerances</td>
<td>22 V ... 52 V</td>
<td></td>
</tr>
<tr>
<td>Connection type</td>
<td>2-pin terminal block</td>
<td></td>
</tr>
<tr>
<td>Power loss buffer</td>
<td>&gt; 10 ms at 20.4 V DC</td>
<td></td>
</tr>
<tr>
<td>Overload current protection at input</td>
<td>Non-replaceable fuse</td>
<td></td>
</tr>
<tr>
<td>Back-up fuse</td>
<td>Nominal rating: 6.3 A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Characteristic: slow blow</td>
<td></td>
</tr>
<tr>
<td>Peak inrush current</td>
<td>&lt; 4 A</td>
<td></td>
</tr>
</tbody>
</table>

### Power supply with the characteristic value K9 and KK

<table>
<thead>
<tr>
<th>Supply voltage</th>
<th>Nominal voltage AC</th>
<th>110 V ... 230 V, 50 Hz ... 60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage range AC incl. maximum tolerances</td>
<td>88 V ... 265 V, 47 Hz ... 63 Hz</td>
<td></td>
</tr>
<tr>
<td>Voltage range AC in Hazardous Locations (Class I, Division 2) incl. maximum tolerances</td>
<td>99 V ... 253 V</td>
<td></td>
</tr>
<tr>
<td>Nominal voltage DC</td>
<td>60 V ... 250 V</td>
<td></td>
</tr>
<tr>
<td>Voltage range DC incl. maximum tolerances</td>
<td>48 V ... 320 V</td>
<td></td>
</tr>
<tr>
<td>Voltage range DC in Hazardous Locations (Class I, Division 2) incl. maximum tolerances</td>
<td>54 V ... 275 V</td>
<td></td>
</tr>
<tr>
<td>Connection type</td>
<td>3-pin terminal block</td>
<td></td>
</tr>
<tr>
<td>Power loss buffer</td>
<td>&gt; 10 ms at 98 V AC</td>
<td></td>
</tr>
<tr>
<td>Overload current protection at input</td>
<td>Non-replaceable fuse</td>
<td></td>
</tr>
<tr>
<td>Back-up fuse</td>
<td>Nominal rating: min. 2.5 A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>max. 20 A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Characteristic: slow blow</td>
<td></td>
</tr>
<tr>
<td>Peak inrush current</td>
<td>&lt; 3.5 A</td>
<td></td>
</tr>
</tbody>
</table>
### Digital input (optional)

**Note:** Only for supply voltage with the following characteristic values:

- CC
- K9

The support of the function depends on the software release. Software support for the function is unimplemented at the time of printing this manual.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient air temperature&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Devices with operating temperature characteristic value S (standard): 0 °C ... +60 °C (+32 °F ... +140 °F) Devices with operating temperature characteristic value E and T (extended): −40 °C ... +70 °C&lt;sup&gt;b,c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Humidity</td>
<td>5 % ... 95 % (non-condensing)</td>
</tr>
<tr>
<td>Air pressure</td>
<td>minimum 700 hPa (+9842 ft; +3000 m) maximum 1060 hPa (~1312 ft; ~400 m)</td>
</tr>
<tr>
<td>Ambient air temperature&lt;sup&gt;d&lt;/sup&gt;</td>
<td>−40 °F ... +185 °F (−40 °C ... +85 °C)</td>
</tr>
<tr>
<td>Humidity</td>
<td>10% ... 95% (non-condensing)</td>
</tr>
<tr>
<td>Air pressure</td>
<td>minimum 700 hPa (+9842 ft; +3000 m) maximum 1060 hPa (~1312 ft; ~400 m)</td>
</tr>
<tr>
<td>Switching current</td>
<td>max. 1 A, SELV</td>
</tr>
<tr>
<td>Switching voltage</td>
<td>max. 60 V DC or max. 30 V AC, SELV</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>2</td>
</tr>
<tr>
<td>Laser protection</td>
<td>Class 1 in compliance with IEC 60825-1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP20</td>
</tr>
</tbody>
</table>

<sup>a</sup> Temperature of the ambient air at a distance of 2 inches (5 cm) from the device

<sup>b</sup> Only use the SFP transceiver with the extension "EEC"

<sup>c</sup> +85 °C for 16 hours (tested in accordance with IEC 60068-2-2)

<sup>d</sup> Temperature of the ambient air at a distance of 2 inches (5 cm) from the device
### SHDSL range

<table>
<thead>
<tr>
<th>Profile</th>
<th>Data rate per link (kbit/s)</th>
<th>Data rate per port (with activated link aggregation) (kbit/s)</th>
<th>Power (dBm)</th>
<th>Region</th>
<th>Configuration</th>
<th>Range(^a) (m (ft))</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5696</td>
<td>11392</td>
<td>13.5</td>
<td>North America (Annex A)</td>
<td>32-TCPAM</td>
<td>2000 (6562)</td>
</tr>
<tr>
<td>2</td>
<td>3072</td>
<td>6144</td>
<td>13.5</td>
<td>North America (Annex A)</td>
<td>32-TCPAM</td>
<td>2800 (9186)</td>
</tr>
<tr>
<td>3</td>
<td>2048</td>
<td>4096</td>
<td>13.5</td>
<td>North America (Annex A)</td>
<td>16-TCPAM</td>
<td>3300 (10827)</td>
</tr>
<tr>
<td>4</td>
<td>1024</td>
<td>2048</td>
<td>13.5</td>
<td>North America (Annex A)</td>
<td>16-TCPAM</td>
<td>4500 (14764)</td>
</tr>
<tr>
<td>5</td>
<td>704</td>
<td>1408</td>
<td>13.5</td>
<td>North America (Annex A)</td>
<td>16-TCPAM</td>
<td>5100 (16732)</td>
</tr>
<tr>
<td>6</td>
<td>512</td>
<td>1024</td>
<td>13.5</td>
<td>North America (Annex A)</td>
<td>16-TCPAM</td>
<td>5700 (18701)</td>
</tr>
<tr>
<td>7</td>
<td>5696</td>
<td>11392</td>
<td>14.5</td>
<td>Europe (Annex B)</td>
<td>32-TCPAM</td>
<td>2000 (6562)</td>
</tr>
<tr>
<td>8</td>
<td>3072</td>
<td>6144</td>
<td>14.5</td>
<td>Europe (Annex B)</td>
<td>32-TCPAM</td>
<td>2900 (9514)</td>
</tr>
<tr>
<td>9</td>
<td>2048</td>
<td>4096</td>
<td>14.5</td>
<td>Europe (Annex B)</td>
<td>16-TCPAM</td>
<td>3300 (10827)</td>
</tr>
<tr>
<td>10</td>
<td>1024</td>
<td>2048</td>
<td>13.5</td>
<td>Europe (Annex B)</td>
<td>16-TCPAM</td>
<td>4500 (14764)</td>
</tr>
<tr>
<td>11</td>
<td>704</td>
<td>1408</td>
<td>13.5</td>
<td>Europe (Annex B)</td>
<td>16-TCPAM</td>
<td>5100 (16732)</td>
</tr>
<tr>
<td>12</td>
<td>512</td>
<td>1024</td>
<td>13.5</td>
<td>Europe (Annex B)</td>
<td>16-TCPAM</td>
<td>5700 (18701)</td>
</tr>
</tbody>
</table>

\(^a\) The range depends on the installed cable quality and electromagnetic interference. There may be deviations depending on environmental conditions.
Dimension drawings

Figure 10: Dimensions of the device variants without WAN ports with operating characteristic value S. For the characteristic value, see “Device name and product code” on page 16.

Figure 11: Dimensions of the device variants without WAN ports with operating characteristic value E and T. For the characteristic value, see “Device name and product code” on page 16.
Figure 12: Dimensions of the device variants with WAN ports with operating characteristic value S. For the characteristic value, see “Device name and product code” on page 16.

Figure 13: Dimensions of the device variants with WAN ports with operating characteristic value E and T. For the characteristic value, see “Device name and product code” on page 16.
## EMC and immunity

**Note:** You will find detailed information on the certificates and declarations applying to your device in a separate overview.  
See table 5 on page 18.

### Radiated emission

<table>
<thead>
<tr>
<th>Standard applications</th>
<th>Navy applications</th>
<th>Railway applications</th>
<th>Substation applications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EN 55022</strong></td>
<td>Class A</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td><strong>GL Guidelines</strong></td>
<td>—</td>
<td>EMC 1</td>
<td>—</td>
</tr>
<tr>
<td><strong>FCC 47 CFR Part 15</strong></td>
<td>Class A</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td><strong>EN 61000-6-4</strong></td>
<td>Fulfilled</td>
<td>—</td>
<td>Fulfilled</td>
</tr>
</tbody>
</table>

### Conducted emission

<table>
<thead>
<tr>
<th>Standard applications</th>
<th>Navy applications</th>
<th>Railway applications</th>
<th>Substation applications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EN 55022</strong></td>
<td>AC and DC supply connections</td>
<td>Class A</td>
<td>—</td>
</tr>
<tr>
<td><strong>GL Guidelines</strong></td>
<td>AC and DC supply connections</td>
<td>—</td>
<td>EMC 1</td>
</tr>
<tr>
<td><strong>FCC 47 CFR Part 15</strong></td>
<td>AC and DC supply connections</td>
<td>Class A</td>
<td>—</td>
</tr>
<tr>
<td><strong>EN 61000-6-4</strong></td>
<td>AC and DC supply connections</td>
<td>Fulfilled</td>
<td>—</td>
</tr>
<tr>
<td><strong>EN 55022</strong></td>
<td>Telecommunication connections</td>
<td>Class A</td>
<td>—</td>
</tr>
<tr>
<td><strong>EN 61000-6-4</strong></td>
<td>Telecommunication connections</td>
<td>Fulfilled</td>
<td>—</td>
</tr>
</tbody>
</table>

### Electrostatic discharge

<table>
<thead>
<tr>
<th>Standard applications</th>
<th>Navy applications</th>
<th>Railway applications</th>
<th>Substation applications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EN 61000-4-2</strong></td>
<td>Contact discharge</td>
<td>± 4 kV</td>
<td>± 6 kV</td>
</tr>
<tr>
<td><strong>IEEE C37.90.3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EN 61000-4-2</strong></td>
<td>Air discharge</td>
<td>± 8 kV</td>
<td>± 8 kV</td>
</tr>
<tr>
<td><strong>IEEE C37.90.3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Electromagnetic field

<table>
<thead>
<tr>
<th>Standard applications</th>
<th>Navy applications</th>
<th>Railway applications</th>
<th>Substation applications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EN 61000-4-3</strong></td>
<td>80 MHz ... 3000 MHz</td>
<td>10 V/m</td>
<td>10 V/m</td>
</tr>
<tr>
<td>EMC interference immunity</td>
<td>Standard applications</td>
<td>Navy applications</td>
<td>Railway applications</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------------</td>
<td>------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>EN 61000-4-3</td>
<td>80 MHz ... 2700 MHz</td>
<td>—</td>
<td>20 V/m</td>
</tr>
<tr>
<td>IEEE 1613</td>
<td>80 MHz ... 1000 MHz</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Fast transients (burst)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN 61000-4-4</td>
<td>AC/DC supply connection</td>
<td>± 2 kV</td>
<td>± 2 kV</td>
</tr>
<tr>
<td>IEEE C37.90.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN 61000-4-4</td>
<td>Data line</td>
<td>± 4 kV</td>
<td>± 1 kV</td>
</tr>
<tr>
<td>IEEE C37.90.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage surges - DC supply connection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN 61000-4-5</td>
<td>line/ground</td>
<td>± 2 kV</td>
<td>± 1 kV</td>
</tr>
<tr>
<td>IEEE 1613</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN 61000-4-5</td>
<td>line/line</td>
<td>± 1 kV</td>
<td>± 0.5 kV</td>
</tr>
<tr>
<td>Voltage surges - AC supply connection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN 61000-4-5</td>
<td>line/ground</td>
<td>± 2 kV</td>
<td>± 1 kV</td>
</tr>
<tr>
<td>IEEE 1613</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN 61000-4-5</td>
<td>line/line</td>
<td>± 1 kV</td>
<td>± 0.5 kV</td>
</tr>
<tr>
<td>Voltage surges - data line</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN 61000-4-5</td>
<td>line/ground</td>
<td>± 1 kV</td>
<td>—</td>
</tr>
<tr>
<td>Conducted disturbances</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| EN 61000-4-6              | 150 kHz ... 80 MHz    | 10 V             | 10 V                 | 10 V                  | 10 V
### EMC interference immunity

<table>
<thead>
<tr>
<th>Damped oscillation - AC/DC supply connection</th>
<th>Standard applications</th>
<th>Navy applications</th>
<th>Railway applications</th>
<th>Substation applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61000-4-12 line/ground</td>
<td></td>
<td>—</td>
<td>—</td>
<td>2.5 kV</td>
</tr>
<tr>
<td>IEEE C37.90.1</td>
<td></td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>EN 61000-4-12 line/line</td>
<td></td>
<td>—</td>
<td>—</td>
<td>1 kV</td>
</tr>
<tr>
<td>IEEE C37.90.1</td>
<td></td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Damped oscillation - data line</th>
<th>Standard applications</th>
<th>Navy applications</th>
<th>Railway applications</th>
<th>Substation applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61000-4-12 line/ground</td>
<td></td>
<td>—</td>
<td>—</td>
<td>2.5 kV</td>
</tr>
<tr>
<td>IEEE C37.90.1</td>
<td></td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>EN 61000-4-12 line/line</td>
<td></td>
<td>—</td>
<td>—</td>
<td>± 1 kV</td>
</tr>
<tr>
<td>IEEE C37.90.1</td>
<td></td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pulse magnetic fields</th>
<th>Standard applications</th>
<th>Navy applications</th>
<th>Railway applications</th>
<th>Substation applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61000-4-9</td>
<td></td>
<td>—</td>
<td>—</td>
<td>300 A/m</td>
</tr>
</tbody>
</table>

### Stability

<table>
<thead>
<tr>
<th>IEC 60068-2-6, test Fc Vibration</th>
<th>Standard applications</th>
<th>Navy applications</th>
<th>Railway applications</th>
<th>Substation applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Hz ... 8.4 Hz with 0.14 in. (3.5 mm) amplitude</td>
<td></td>
<td>2 Hz ... 13.2 Hz with 0.04 in. (1 mm) amplitude</td>
<td>—</td>
<td>2 Hz ... 9 Hz with 0.12 in. (3 mm) amplitude</td>
</tr>
<tr>
<td>8.4 Hz ... 150 Hz with 1 g</td>
<td></td>
<td>13.2 Hz ... 100 Hz with 0.7 g</td>
<td>9 Hz ... 200 Hz with 1 g</td>
<td>200 Hz ... 500 Hz with 1.5 g</td>
</tr>
<tr>
<td>IEC 60068-2-27, test Ea Shock</td>
<td>15 g at 11 ms</td>
<td>—</td>
<td>—</td>
<td>10 g at 11 ms</td>
</tr>
</tbody>
</table>
**Network range**

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

<table>
<thead>
<tr>
<th>Product code</th>
<th>Wave length</th>
<th>Fiber</th>
<th>System attenuation</th>
<th>Example for F/O line length</th>
<th>Fiber attenuation</th>
<th>BLP dispersion</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-SFP-...</td>
<td>MM 850 nm</td>
<td>50/125 µm</td>
<td>0-7.5 dB</td>
<td>0-550 m</td>
<td>3.0 dB/km</td>
<td>400 MHz×km</td>
</tr>
<tr>
<td>-SX/LC...</td>
<td>MM 850 nm</td>
<td>62.5/125 µm</td>
<td>0-7.5 dB</td>
<td>0-275 m</td>
<td>3.2 dB/km</td>
<td>200 MHz×km</td>
</tr>
<tr>
<td>-MX/LC EEC</td>
<td>MM 1310 nm</td>
<td>50/125 µm</td>
<td>0-12 dB</td>
<td>0-1.5 km</td>
<td>1.0 dB/km</td>
<td>800 MHz×km</td>
</tr>
<tr>
<td>-MX/LC EEC</td>
<td>MM 1310 nm</td>
<td>62.5/125 µm</td>
<td>0-12 dB</td>
<td>0-500 m</td>
<td>1.0 dB/km</td>
<td>500 MHz×km</td>
</tr>
<tr>
<td>-LX/LC...</td>
<td>MM 1310 nm</td>
<td>50/125 µm</td>
<td>0-10.5 dB</td>
<td>0-550 m</td>
<td>1.0 dB/km</td>
<td>800 MHz×km</td>
</tr>
<tr>
<td>-LX/LC...</td>
<td>MM 1310 nm</td>
<td>62.5/125 µm</td>
<td>0-10.5 dB</td>
<td>0-550 m</td>
<td>1.0 dB/km</td>
<td>500 MHz×km</td>
</tr>
<tr>
<td>-LX/LC...</td>
<td>SM 1310 nm</td>
<td>9/125 µm</td>
<td>0-10.5 dB</td>
<td>0-20 km</td>
<td>0.4 dB/km</td>
<td>3.5 ps/(nm×km)</td>
</tr>
<tr>
<td>-LX+/Lc...</td>
<td>SM 1310 nm</td>
<td>9/125 µm</td>
<td>5-20 dB</td>
<td>14-42 km</td>
<td>0.4 dB/km</td>
<td>3.5 ps/(nm×km)</td>
</tr>
<tr>
<td>-LH/LC...</td>
<td>LH 1550 nm</td>
<td>9/125 µm</td>
<td>5-22 dB</td>
<td>23-80 km</td>
<td>0.25 dB/km</td>
<td>19 ps/(nm×km)</td>
</tr>
<tr>
<td>-LH+/LC</td>
<td>LH 1550 nm</td>
<td>9/125 µm</td>
<td>15-30 dB</td>
<td>71-108 km</td>
<td>0.25 dB/km</td>
<td>19 ps/(nm×km)</td>
</tr>
<tr>
<td>-LH+/LC</td>
<td>LH 1550 nm</td>
<td>9/125 µm</td>
<td>15-30 dB</td>
<td>71-128 km</td>
<td>0.21 dB/km</td>
<td>19 ps/(nm×km)</td>
</tr>
</tbody>
</table>

**Table 9: Fiber 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. Including 2.5 dB system reserve when compliance with the fiber data is observed

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

<table>
<thead>
<tr>
<th>Product code</th>
<th>Wave length TX</th>
<th>Wave length RX</th>
<th>Fiber</th>
<th>System attenuation</th>
<th>Example for F/O line length</th>
<th>Fiber attenuation</th>
<th>Dispersion</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-SFP-BIDI...</td>
<td>SM 1310 nm</td>
<td>1550 nm</td>
<td>9/125 µm</td>
<td>0-11 dB</td>
<td>0-20 km</td>
<td>0.4 dB/km</td>
<td>3.5 ps/(nm×km)</td>
</tr>
<tr>
<td>-LX/LC EEC</td>
<td>SM 1550 nm</td>
<td>1310 nm</td>
<td>9/125 µm</td>
<td>0-11 dB</td>
<td>0-20 km</td>
<td>0.25 dB/km</td>
<td>19 ps/(nm×km)</td>
</tr>
<tr>
<td>-LH/LC EEC</td>
<td>LH 1940 nm</td>
<td>1590 nm</td>
<td>9/125 µm</td>
<td>5-24 dB</td>
<td>23-80 km</td>
<td>0.25 dB/km</td>
<td>19 ps/(nm×km)</td>
</tr>
<tr>
<td>-LH+/LC EEC</td>
<td>LH 1590 nm</td>
<td>1490 nm</td>
<td>9/125 µm</td>
<td>5-24 dB</td>
<td>23-80 km</td>
<td>0.25 dB/km</td>
<td>19 ps/(nm×km)</td>
</tr>
</tbody>
</table>

**Table 10: F/O port (bidirectional Gigabit Ethernet SFP Transceiver)**

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

- MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul
Table 11: Fiber port 100BASE-FX (SFP fiber optic Fast Ethernet Transceiver)

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

<table>
<thead>
<tr>
<th>Product code</th>
<th>Wave length</th>
<th>Fiber</th>
<th>System attenuation</th>
<th>Example for F/O line length (^a)</th>
<th>Fiber attenuation</th>
<th>BLP/ dispersion</th>
</tr>
</thead>
<tbody>
<tr>
<td>-MM/LC... MM</td>
<td>1310 nm</td>
<td>50/125 µm</td>
<td>0-8 dB</td>
<td>0-5 km</td>
<td>1.0 dB/km</td>
<td>800 MHz×km</td>
</tr>
<tr>
<td>-MM/LC... MM</td>
<td>1310 nm</td>
<td>62.5/125 µm</td>
<td>0-11 dB</td>
<td>0-4 km</td>
<td>1.0 dB/km</td>
<td>500 MHz×km</td>
</tr>
<tr>
<td>-SM/LC... SM</td>
<td>1310 nm</td>
<td>9/125 µm</td>
<td>0-13 dB</td>
<td>0-25 km</td>
<td>0.4 dB/km</td>
<td>3.5 ps/(nm×km)</td>
</tr>
<tr>
<td>-SM+/LC... SM</td>
<td>1310 nm</td>
<td>9/125 µm</td>
<td>10-29 dB</td>
<td>25-65 km</td>
<td>0.4 dB/km</td>
<td>3.5 ps/(nm×km)</td>
</tr>
<tr>
<td>-LH/LC... SM</td>
<td>1550 nm</td>
<td>9/125 µm</td>
<td>10-29 dB</td>
<td>47-104 km</td>
<td>0.25 dB/km</td>
<td>19 ps/(nm×km)</td>
</tr>
<tr>
<td>-LH/LC... SM</td>
<td>1550 nm</td>
<td>9/125 µm</td>
<td>10-29 dB</td>
<td>55-140 km</td>
<td>0.18 dB/km(^b)</td>
<td>18 ps/(nm×km)</td>
</tr>
</tbody>
</table>

**Table 11: Fiber port 100BASE-FX (SFP fiber optic Fast Ethernet Transceiver)**

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

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

Length of a twisted pair segment max. 109 yards (100 m) (for Cat5e cable)

### Power consumption/power output, order numbers

The order numbers correspond to the product codes of the devices. See “Device name and product code” on page 16.

<table>
<thead>
<tr>
<th>Device name</th>
<th>Maximum power consumption</th>
<th>Power output</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAGLE20-0400999TT999...</td>
<td>12 W</td>
<td>41 BTU (IT)/h</td>
</tr>
<tr>
<td>EAGLE30-04022O6TT999...</td>
<td>14 W</td>
<td>48 BTU (IT)/h</td>
</tr>
<tr>
<td>EAGLE30-04022O6TT9H2...</td>
<td>19 W</td>
<td>65 BTU (IT)/h</td>
</tr>
</tbody>
</table>
### Scope of delivery

<table>
<thead>
<tr>
<th>Number</th>
<th>Article</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ×</td>
<td>Device</td>
</tr>
<tr>
<td>2 ×</td>
<td>2-pin terminal block for signal contact and input (only for device variants featuring supply voltage with characteristic value K9 and CC)</td>
</tr>
<tr>
<td>1 ×</td>
<td>2-pin terminal block for signal contact (only for device variants featuring supply voltage with characteristic value KK)</td>
</tr>
<tr>
<td>1 ×</td>
<td>3-pin terminal block for the supply voltage (only for device variants featuring supply voltage with characteristic value K9)</td>
</tr>
<tr>
<td>2 ×</td>
<td>3-pin terminal block for the supply voltage (only for device variants featuring supply voltage with characteristic value KK)</td>
</tr>
<tr>
<td>2 ×</td>
<td>2-pin terminal block for the supply voltage (only for device variants featuring supply voltage with characteristic value CC)</td>
</tr>
<tr>
<td>1 ×</td>
<td>General safety instructions</td>
</tr>
</tbody>
</table>

### 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 IP of the overall system is reduced to IP20.

<table>
<thead>
<tr>
<th>Name</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal cable</td>
<td>943 301-001</td>
</tr>
<tr>
<td>AutoConfiguration Adapter ACA22-USB (EEC)</td>
<td>942 124-001</td>
</tr>
<tr>
<td>AutoConfiguration Adapter ACA 31</td>
<td>942 074-001</td>
</tr>
<tr>
<td>For device variants featuring supply voltage with characteristic value K9 or KK: 3-pin terminal block (50 pieces) for supply voltage</td>
<td>943 845-008</td>
</tr>
<tr>
<td>For device variants featuring supply voltage with characteristic value CC: 2-pin terminal block (50 pieces) for supply voltage</td>
<td>943 845-009</td>
</tr>
<tr>
<td>2-pin terminal block (50 pcs.) for signal contact and input</td>
<td>943 845-010</td>
</tr>
<tr>
<td>Rail Power Supply RPS 30</td>
<td>943 662-003</td>
</tr>
<tr>
<td>Rail Power Supply RPS 80 EEC</td>
<td>943 662-080</td>
</tr>
<tr>
<td>Rail Power Supply RPS 120 EEC (CC)</td>
<td>943 662-121</td>
</tr>
<tr>
<td>Industrial HiVision Network Management Software</td>
<td>943 156-xxx</td>
</tr>
</tbody>
</table>
Gigabit Ethernet SFP transceiver | Order number
---|---
M-SFP-TX/RJ45 | 943 977-001
M-SFP-TX/RJ45 EEC | 942 161-001

The following operating conditions apply to twisted pair transceivers:

- Usable with:
  - HiOS as of software version 03.0.00
  - Classic Switch software, as of software version 04.1.00.
  - HiSecOS as of software version 01.2.00
  - SPIDER II- MSP/MSM
  - EES

- 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.
- Only support of the autonegotiation mode including autocrossing.

M-SFP-SX/LC | 943 014-001
M-SFP-SX/LC EEC | 943 896-001
M-SFP-MX/LC EEC | 942 108-001
M-SFP-LX/LC | 943 015-001
M-SFP-LX/LC EEC | 943 897-001
M-SFP-LX+/LC | 942 023-001
M-SFP-LX+/ LC EEC | 942 024-001
M-SFP-LH/LC | 943 042-001
M-SFP-LH/LC EEC | 943 898-001
M-SFP-LH+/LC | 943 049-001
M-SFP-LH+/LC EEC | 942 119-001
SFP-GIG-LX/LCa | 942 196-001
SFP-GIG-LX/LC EECa | 942 196-002

a. Further information on certifications can be found on the Internet at the Hirschmann productpages (www.hirschmann.com).

Bidirectional Gigabit Ethernet SFP transceiver | Order number
---|---
M-SFP-BIDI Type A LX/LC EEC | 943 974-001
M-SFP-BIDI Type B LX/LC EEC | 943 974-002
M-SFP-BIDI Type A LH/LC EEC | 943 975-001
M-SFP-BIDI Type B LH/LC EEC | 943 975-002
M-SFP-BIDI Bundle LX/LC EEC (type A + B) | 943 974-101
M-SFP-BIDI Bundle LH/LC EEC (type A + B) | 943 975-101
Installation EAGLE20/30
Release 10 08/2016

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

The following operating conditions apply to twisted pair transceivers:

- Usable with:
  - HiOS as of software version 03.0.00
  - for PRP ports on RSP devices, as of software version 02.0.01
  - for PRP ports on EES devices, as of software version 02.0.02
  - Classic switch software as of software version 08.0.00
  - HiSecOS as of software version 01.2.00

- Longer RSTP switching times and link loss detection times compared to twisted pair ports provided by the device directly.

- Not applicable for combo ports.

- Not applicable for ports which support only Gigabit Ethernet.

- To set autocrossing manually is currently not possible.

M-FAST SFP-MM/LC | 943 865-001
M-FAST SFP-MM/LC EEC | 943 945-001
M-FAST SFP-SM/LC | 943 866-001
M-FAST SFP-SM/LC EEC | 943 946-001
M-FAST SFP-SM+/LC | 943 867-001
M-FAST SFP-SM+/LC EEC | 943 947-501
M-FAST SFP-LH/LC | 943 868-001
M-FAST SFP-LH/LC EEC | 943 948-001
SFP-FAST-MM/LCa | 942 194-001
SFP-FAST-MM/LC EECa | 942 194-002
SFP-FAST-SM/LCa | 942 195-001
SFP-FAST-SM/LC EECa | 942 195-002

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a. Further information on certifications can be found on the Internet at the Hirschmann productpages (www.hirschmann.com).
The device generally fulfills the technical standards named in their current versions.

The device has an approval based on a specific standard only 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.

### Table 12: List of the technical standards

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSA C22.2 No. 142</td>
<td>Canadian National Standard(s) – Process Control Equipment – Industrial Products</td>
</tr>
<tr>
<td>ISA 12.12.01</td>
<td>Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations</td>
</tr>
<tr>
<td>CAN/CSA C22.2 No. 213</td>
<td>Non-incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations.</td>
</tr>
<tr>
<td>CSA C22.2 No. 950</td>
<td>Canadian National Standard(s) – Safety of Information Technology Equipment – Canadian safety standard</td>
</tr>
<tr>
<td>EN 50121-4</td>
<td>Railway applications – EMC – Emission and immunity of the signaling and telecommunications apparatus (Rail Trackside)</td>
</tr>
<tr>
<td>EN 55022</td>
<td>Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement</td>
</tr>
<tr>
<td>EN 60950-1</td>
<td>Information technology equipment – Safety – Part 1: General requirements</td>
</tr>
<tr>
<td>EN 61000-6-2</td>
<td>Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments</td>
</tr>
<tr>
<td>EN 61000-6-4</td>
<td>Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments</td>
</tr>
<tr>
<td>EN 61131-2</td>
<td>Programmable controllers – Part 2: Equipment requirements and tests</td>
</tr>
<tr>
<td>Germanischer Lloyd</td>
<td>Rules for Classification and Construction VI-7-2 – GL</td>
</tr>
<tr>
<td>IEC/EN 61850-3</td>
<td>Communication networks and systems in substations – Part 3: General requirements</td>
</tr>
<tr>
<td>IEEE 1613</td>
<td>Standard Environment and Testing Requirements for Communication Networking Devices in Electric Power Substations</td>
</tr>
<tr>
<td>IEEE 802.1AB</td>
<td>Station and Media Access Control Connectivity Discovery</td>
</tr>
<tr>
<td>IEEE 802.1D</td>
<td>MAC Bridges (switching function)</td>
</tr>
<tr>
<td>IEEE 802.1Q</td>
<td>Virtual LANs (VLANs, MRP, Spanning Tree)</td>
</tr>
<tr>
<td>IEEE 802.3</td>
<td>Ethernet</td>
</tr>
<tr>
<td>ISA 12.12.01</td>
<td>Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations.</td>
</tr>
<tr>
<td>NEMA TS 2</td>
<td>Traffic Controller Assemblies with NTCIP Requirements (environmental requirements)</td>
</tr>
<tr>
<td>UL 60950-1</td>
<td>Information technology equipment – Safety – Part 1: General requirements</td>
</tr>
<tr>
<td>UL 508</td>
<td>Safety for Industrial Control Equipment</td>
</tr>
</tbody>
</table>
A Further Support

- **Technical Questions**
  For technical questions, please contact any Hirschmann dealer in your area or Hirschmann directly.
  You will 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.eu.com.

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

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  - Training offers you an introduction to the basics, product briefing and user training with certification.
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