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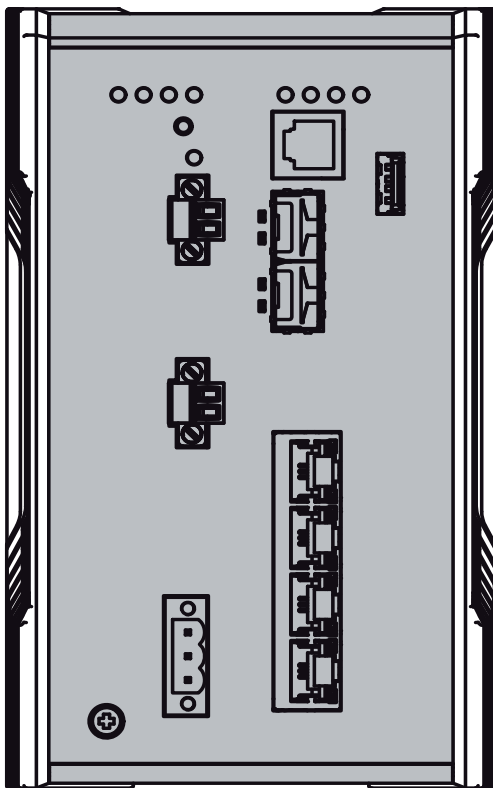
A **BELDEN** BRAND

User Manual

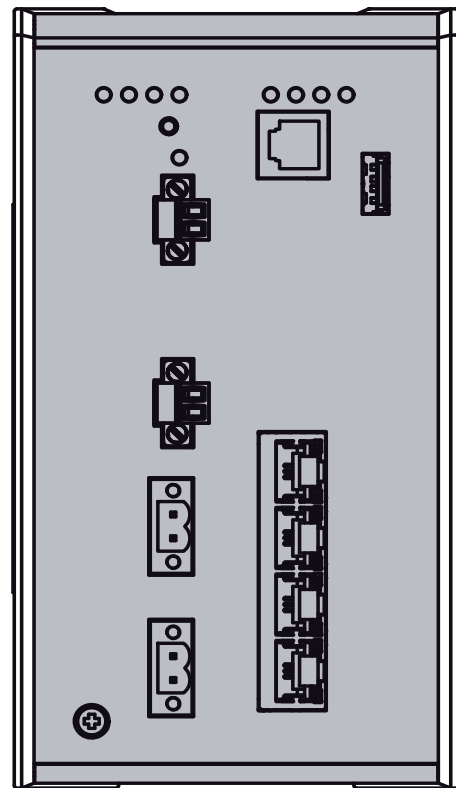
Installation

Industrial Ethernet Firewall

EAGLE20/30



EAGLE30-0402...



EAGLE20-0400...



039793001030313000

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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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Safety instructions

■ Certified usage

Only use the device for application cases that are described in the Hirschmann product information, including this manual. Only operate the device according to the technical specifications.

■ Supply voltage

Note: The supply voltage is only connected with the chassis via protective elements.

- For device variants with operating voltage type K exclusively:
For **every** supply voltage to be connected, make sure the following requirements are met:
 - ▶ The supply voltage complies with the description on the data plate of your device.
 - ▶ The power supply conforms to overvoltage category I or II.
 - ▶ The voltage supply has an easily accessible disconnecting device (e.g. a switch or a plug). This disconnecting device is clearly identified so that in the case of an emergency, it is clear which disconnecting device belongs to which line.
The disconnecting device is clearly identified so that in the case of an emergency, it is clear which disconnecting device belongs to which line.
 - ▶ The lines to be connected are voltage-free.
 - ▶ Supply with DC voltage:
A fuse suitable for DC voltage is located in the plus conductor of the power supply. A fuse is also located in the minus conductor, if this is not grounded.
Regarding the properties of this fuse: [See “General technical data” on page 35.](#)
 - ▶ Supply with AC voltage:
A fuse is located in the outer conductor of the power supply. A fuse is also located in the neutral conductor, if this is not grounded.
Regarding the properties of this fuse: [See “General technical data” on page 35.](#)
 - ▶ DC voltage Supply: the wire diameter for the input supply line is at least 1 mm² (North America: AWG16).
 - ▶ AC voltage Supply: the wire diameter for the input supply line is at least 0.75 mm² (North America: AWG18).
 - ▶ The cross-section of the protective conductor cable is the same size as or bigger than the cross-section of the voltage supply cables.

- ▶ The connection cables used are permitted for the specified temperature range.
- ▶ Relevant for North America:
The power supply lines are made up of copper wire (75 °C).
- For device variants with operating voltage type C exclusively:
For **every** supply voltage to be connected, make sure the following requirements are met:
 - ▶ The power supply conforms to overvoltage category I or II.
 - ▶ The voltage supply has an easily accessible disconnecting device (e.g. a switch or a plug). This disconnecting device is clearly identified so that in the case of an emergency, it is clear which disconnecting device belongs to which line.
 - ▶ The disconnecting device is clearly identified so that in the case of an emergency, it is clear which disconnecting device belongs to which line.
 - ▶ The lines to be connected are voltage-free.
 - ▶ A fuse suitable for DC voltage is located in the plus conductor of the power supply. A fuse is also located in the minus conductor, if this is not grounded.
Regarding the properties of this fuse: [See “General technical data” on page 35.](#)
 - ▶ The wire diameter for the input supply line is at least 1 mm² (North America: AWG16).
 - ▶ The connection cables used are permitted for the specified temperature range.
 - ▶ Relevant for North America:
The power supply lines are made up of copper wire (75 °C).
- ▶ Use undamaged parts.
- ▶ The device does not contain any service components. Internal fuses are only triggered if there is a fault in the device. If the device is not functioning correctly, or if it is damaged, switch off the voltage supply and return the device to the plant for inspection.

- Only switch on the supply voltage for the device when the following prerequisites are fulfilled:
 - ▶ The housing is closed
 - ▶ The terminal blocks are wired correctly
 - ▶ The terminal blocks for the voltage supply are connected
- Connect the protective conductor with the ground screw before you set up the other connections. When removing the connections, you remove the protective conductor last.
- For supply voltages with protective conductor connections: first connect the protective conductor before connecting the lines for the supply voltages.

■ **Shielded ground**

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

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

■ **Housing**

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

- Never insert sharp objects (small screwdrivers, wires, etc.) into the inside of the device.
- Never insert sharp objects (small screwdrivers, wires, etc.) into the connection terminals for the supply voltage, the signal contact or the input, and do not touch the terminals!
- Make sure there is at least 10 cm of space in front of the ventilation slits of the housing.
- Install the device in the vertical position.

■ **Grounding**

The device is grounded by the separate ground screw on the front panel.

■ **Environment**

- Install the device in a fire protected enclosure according to EN 60950-1.
- For device variants with operating voltage type K exclusively:
Only install this device in a switch cabinet or in an operating site with limited access, to which only maintenance staff have access.
- Operate the device at the specified surrounding air temperature (temperature of the surrounding air at a distance of up to 1.97 in (5 cm) from the device) and relative air humidity specified in the technical data.
- When you are selecting the installation location, make sure you observe the climatic threshold values specified in the technical data.
- Use the device in an environment within the pollution degree specified in the technical data.

■ **Qualification requirements for personnel**

Qualified personnel as understood in this manual and the warning signs, are persons who are familiar with the setup, assembly, startup, and operation of this product and are appropriately qualified for their job. This includes, for example, those persons who have been:

- ▶ trained or directed or authorized to switch on and off, to ground and to label power circuits and devices or systems in accordance with current safety engineering standards;
- ▶ trained or directed in the care and use of appropriate safety equipment in accordance with the current standards of safety engineering;
- ▶ trained in providing first aid.

■ **General safety instructions**

This device is operated by electricity. You must follow precisely the prescribed safety requirements for the voltage connections in this document.

See [“Supply voltage” on page 5](#).

Non-observance of these safety instructions can cause material damage and/or injuries.

- Only appropriately qualified personnel should work on this device or in its vicinity. The personnel must be thoroughly familiar with all the warnings and maintenance procedures outlined in this operating manual.
- The proper and safe operation of this device depends on proper handling during transportation, proper storage and assembly, and conscientious operation and maintenance procedures.
- Never start operation with damaged components.
- Only use the devices in accordance with this manual. In particular, observe all warnings and safety-related information.
- Any work that may be required on the electrical installation may only be carried out by personnel trained for this purpose.

Note: LED or LASER components in compliance with IEC 60825-1 (2007):

CLASS 1 LASER PRODUCT

CLASS 1 LED PRODUCT

■ **National and international safety regulations**

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

■ **CE marking**

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

Device variant	Directive
All variants	2011/65/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.
All variants	2004/108/EG (EMV) Directive of the European Parliament and the council for standardizing the regulations of member states with regard to electromagnetic compatibility.
For device variants with operating voltage type K exclusively:	2006/95/EC Directive of the European Parliament and the council for standardizing the regulations of member states with regard to electrical equipment to be used within specific voltage ranges.

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:

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The product can be used in the industrial sector.

- ▶ Interference immunity: EN 61000-6-2
- ▶ Emitted interference: EN 55022
- ▶ For device variants with operating voltage type K exclusively:
Reliability: EN 60950-1

Warning! This is a class A device. This device can cause interference in living areas, and in this case the operator may be required to take appropriate measures.

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

■ **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 high frequencies, and 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 living 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 following manuals are available as PDF files on the CD/DVD supplied:

- ▶ Installation user manual
- ▶ Basic Configuration user manual
- ▶ Reference manual for the graphical user interface
- ▶ Command Line Interface user manual

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

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

Key

The symbols used in this manual have the following meanings:

▶	Listing
□	Work step
■	Subheading

1 Device 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
- ▶ 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 provide 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 devices are mounted very quickly by snapping them onto the DIN rail.

You have the option to choose various media to connect terminal devices and other infrastructure components:

- ▶ twisted pair cable
- ▶ multimode F/O
- ▶ singlemode F/O

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

- ▶ a Web browser
- ▶ SSH
- ▶ HiDiscovery (Software for putting the device into operation)
- ▶ management software (such as 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 as PDF files on the enclosed CD/DVD, or you can download them from 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.

Item	Product characteristic	Character istic value	Value for the characteristic	
1 ... 7	Product	EAGLE20	Router without gigabit ports	
		EAGLE30	Router with gigabit ports	
8	(hyphen)	–		
9 ... 10	Number: 10/100 Mbit/s ports	04	4 ×	10/100 Mbit/s ports
11 ... 12	Number: 100/1000 Mbit/s ports	00	0 ×	100/1000 Mbit/s ports
		02	2 ×	100/1000 Mbit/s ports
13 ... 15	Configuration of the uplink ports	206	2 ×	SFP slot for 100/1000 Mbit/s F/O connection
		999	Not present	
16 ... 17	Configuration of the other ports	TT	All the other ports are RJ45 sockets for twisted pairs	
18	Cellular phone interface	9	Not present	
19 ... 20	WAN port	99	Not present	
21	Temperature range	S	Standard	+32 °F ... +140 °F (0 °C ... +60 °C)
		T	Extended	–40 °F ... +158 °F (–40 °C ... +70 °C)
		E	Extended with conformal coating	–40 °F ... +158 °F (–40 °C ... +70 °C)
22	Operating voltage	C	Voltage input Rated voltage range DC 24 V ... 48 V	
		K	Voltage input Rated voltage range AC 110 V ... 230 V, 50 Hz ... 60 Hz Rated voltage range DC 60 V ... 250 V	
23	Operating voltage	C	Voltage input Rated voltage range DC 24 V ... 48 V	
		9	Not present	

Table 1: Device name and product code

Item	Product characteristic	Character Value for the characteristic value	
24 ... 25	Certifications ^a	Z9	CE, FCC, EN 61131-2, EN 60950-1
		Y9	“Z9” + cUL 508, (UL 60950-1)
		X9	“Z9” + cUL 508, (UL 60950-1), ISA 12.12 Class 1 Div. 2
		V9	“Z9” + IEC 61850-3, Substation applications IEEE 1613
		VY	“V9” + cUL 508, Substation applications (UL 60950-1)
		VU	“V9” + cUL 508, Substation and navy (UL 60950-1), GL, applications (ABS, BV, DNS, LR)
		VT	“V9” + cUL 508, Sub-station and railway (UL 60950-1), applications (trackside) EN 50121-4
		U9	“Z9” + GL, (ABS, BV, Navy applications DNS, LR)
		UY	“U9” + cUL 508, Navy applications (UL 60950-1)
		UX	“U9” + cUL 508, Navy applications (UL 60950-1), ISA 12.12 Class 1 Div. 2
		UT	“U9” + cUL 508, Navy and rail applications (UL 60950-1), (trackside) EN 50121-4
		T9	“Z9” + EN 50121-4 Railway applications (trackside)
		TY	“T9” + cUL 508, Railway applications (UL 60950-1) (trackside)

Table 1: Device name and product code

- a. For certifications, in parenthesis, the following restrictions apply:
The EN60950-1 and UL60950-1 certifications apply exclusively to device variants with an operating voltage type “K” (see device name in position 22).
The ABS, BV, DNS and LR certifications are available on request.

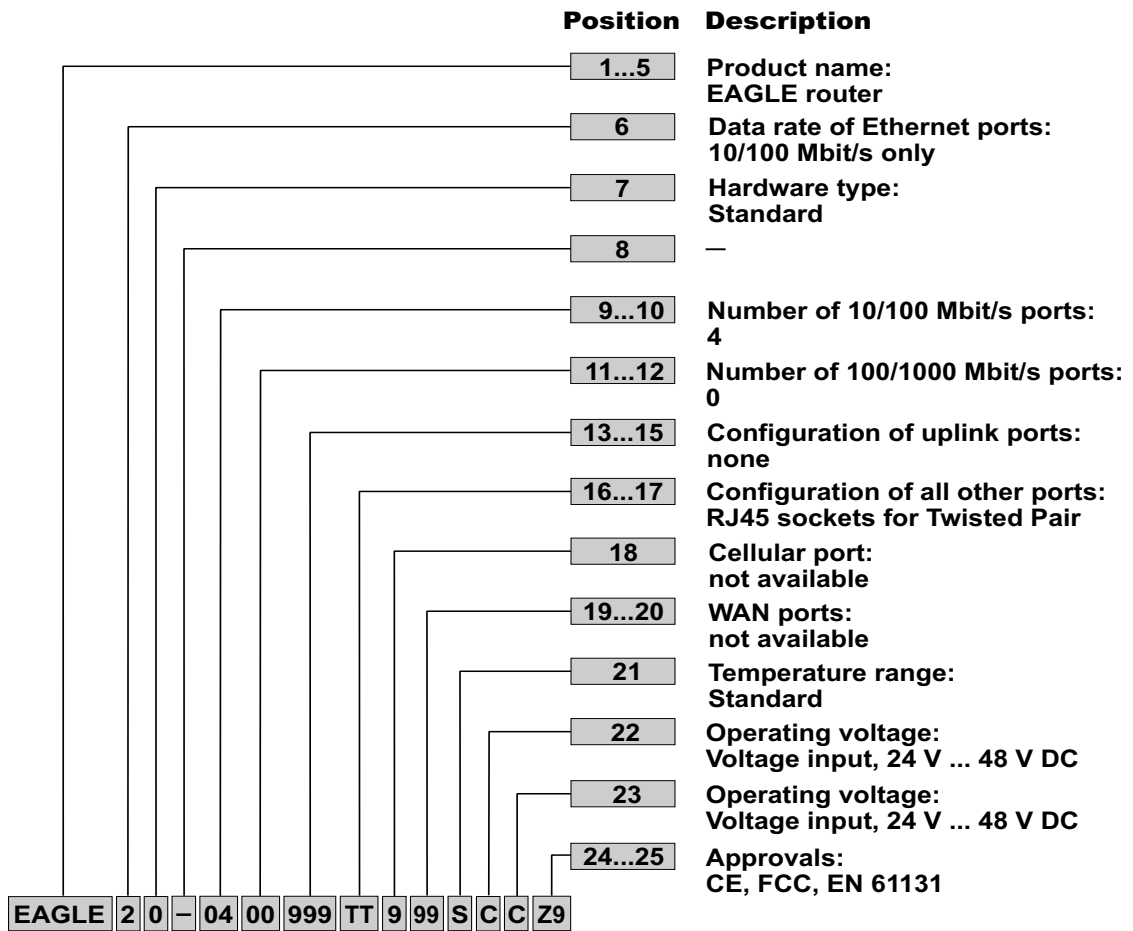


Figure 1: Example of a device name:
EAGLE20-0400999TT999SCCZ9

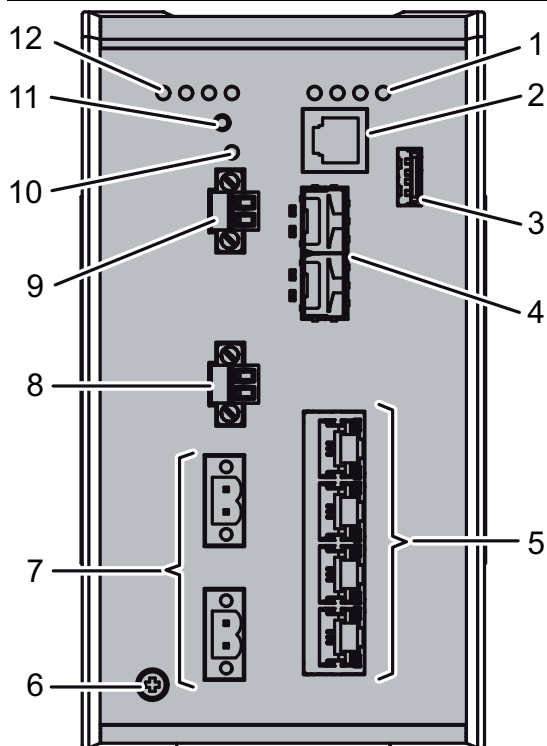
1.3 Combination options

Item	1 ... 5	6 ... 7	8	9 ... 10	11 ... 12	13 ... 15	16 ... 17	18	19 ... 20	21	22 ... 23	24 ... 25
Characteristic	Product Name	Data rate and hardware type	- (hyphen)	Number of 10/100 Mbit/s ports	Number of 100/1000 Mbit/s ports	Configuration of uplink ports	Configuration of other ports	Cellular phone interface	WAN port	Temperature range	Operating voltage	Certifications
Description	EAGLE	20	—	04	00	999	TT	9	99	S; T; E	CC; K9	Z9; Y9; X9; V9; VY; VU; VT; U9; UY; UX; UT; T9; TY; SY
	EAGLE	30	—	04	02	206	TT	9	99	S; T; E	CC; K9	Z9; Y9; X9; V9; VY; VU; VT; U9; UY; UX; UT; T9; TY; SY

Table 2: Combination options for the device variants of the EAGLE20/30

1.4 Device views

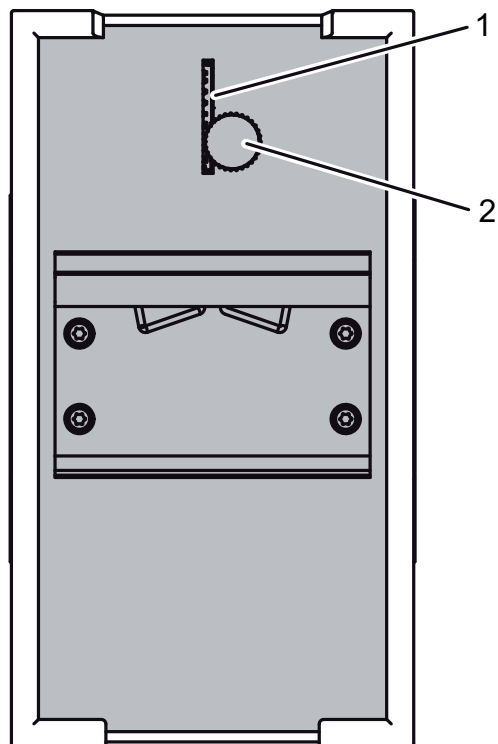
1.4.1 Front view



1	LED display elements for device status		
2	V.24 interface		
3	USB interface		
4	Optional: 2 × SFP slot for 100/1000 Mbit/s F/O connection		
5	4 × 10/100 Mbit/s twisted pair ports		
6	Grounding screw		
7	Connection for the supply voltage		
	alternatively, depending on device variant	2 × Operating voltage of the type: C	▶ Rated voltage range DC 24 V ... 48 V ▶ 2-pin terminal block
		1 × Operating voltage of the type: K	▶ Rated voltage range AC 110 V ... 230 V, 50 Hz ... 60 Hz ▶ Rated voltage range DC 60 V ... 250 V ▶ 3-pin terminal block
8	Connection for the signal contact		
9	Connection for input (no function in the existing device version)		
10	LED display element for input (no function in the existing device version)		
11	Save/Load/Reset button (no function in the existing device version)		
12	LED display elements for additional status information		

Table 3: Front view (example EAGLE30-04022O6TT999SCC...)

1.4.2 Rear view



-
- | | |
|---|----------------------|
| 1 | Slot for the SD card |
| 2 | Knurled screw |
-

1.5 Power supply

1.5.1 Operating voltage type K

A 3-pin terminal block is available to supply the device.

You will find more information on [page 27](#).

1.5.2 Operating voltage type C

For the redundant supply of the device, two 2-pin terminal blocks are available.

You will find more information on [page 28](#).

1.6 Ethernet ports

You can connect terminal devices and other segments on the ports of the device via twisted pair cables or F/O cables.

1.6.1 10/100 Mbit/s twisted pair connection

These connections are RJ45 sockets.

10/100 Mbit/s TP ports enable the connection of terminal devices or independent network segments according to the IEEE 802.3 10BASE-T/100BASE-TX standard.

These ports support:

- ▶ 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 to the front panel.

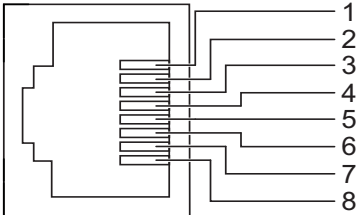
Figure	Pin	Operation
	1	1+2 One line pair: receiver path
	2	
	3	3+6 One line pair: sender path
	4	
	5	4,5,7,8 —
	6	
	7	
	8	

Table 4: Pin assignment of a TP/TX interface in MDI-X mode, RJ45 socket

1.6.2 100/1000 Mbit/s F/O connection

These ports are SFP slots.

100/1000 Mbit/s F/O ports enable the connection of terminal devices or independent network segments according to the IEEE 802.3 100BASE-FX/1000BASE-SX/1000BASE-LX standard.

These ports support:

- ▶ Full duplex mode

1.7 Display elements

After the operating 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.



LED	Display	Color	Activity	Meaning
Power	Power supply	—	None	The supply voltage is too low.
		Yellow	Lights up	Device variants with redundant voltage supply: The supply voltages 1 or 2 are on.
			flashes 4 times a period	Software update is running. Maintain the voltage supply.
		Green	Lights up	Device variants with redundant voltage supply: The supply voltages 1 and 2 are on. Device variants with simple voltage supply: The supply voltage is on.
Status	Device Status	—	None	Device starts Device is not ready for operation
		Green	Lights up	Device is ready for operation. Characteristics can be configured.
		Red	Lights up	The device reports a detected error. See “Reference Manual GUI Graphical User Interface”, Chapter “Device Status”. 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.
RM	Redundancy Manager	—	None	(no function in the existing device version)
ACA	Storage medium ACA31 ACA21	—	None	No ACA connected
		Green	Lights up	The storage medium ACA is inserted.
			Flashes 3 times a period	The device allows read and write access.
	Yellow	Lights up	The storage medium ACA is out of order. Check the file system format (see page 22). Deactivate the write protection on the ACA31 by pushing the lock upwards.	

1.7.2 Additional status information



LED	Display	Color	Activity	Meaning
VPN	(no function in the existing device version)			
RD				
S1				
S2				

1.7.3 Input

LED	Display	Color	Activity	Meaning
IN	(no function in the existing device version)			

1.7.4 Port state

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.

Display	Color	Activity	Meaning
Link status	—	None	The device detects an invalid or missing connection.
	Green	Lights up	The device detects a valid connection.
		Flashes 1 time a period	The port is switched to stand-by.
		Flashes 3 times a period	The port is disabled.
Yellow	Flashing	The device is sending and/or receiving data.	

1.8 Management interfaces

1.8.1 V.24 interface (external management)

Note: The location on the device is described on [page 17 “Front view”](#).

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 a connection to the Command Line Interface (CLI) and the system monitor to be made.

VT 100 terminal settings	
Speed	9,600 Baud
Data	8 bit
Stopbit	1 bit
Handshake	off
Parity	none

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

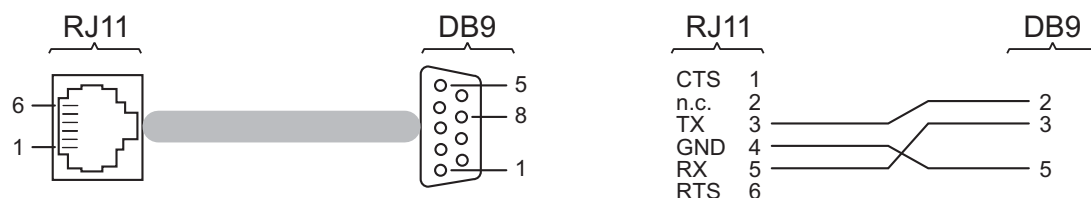


Figure 2: Pin assignment of the V.24 interface and the DB9 connector

Note: You will find the order number for the terminal cable, which is supplied separately, in the Technical Data chapter ([see page 44](#)).

1.8.2 SD card interface

Note: The location on the device is described on [page 18 “Rear view”](#).

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: The location on the device is described on [page 17 “Front view”](#).

The USB socket is an interface for the local connection of an AutoConfiguration Adapter ACA21-USB. 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 1.1 (data rate max. 12 MBit/s)
- ▶ Connectors: type A

- ▶ Supplies current of max. 500 mA
- ▶ Voltage not potential-separated
- ▶ Supported file system format: FAT16

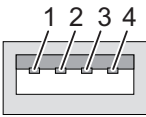
Figure	Pin	Operation
	1	VCC (VBus)
	2	- Data
	3	+ Data
	4	Ground (GND)

Table 5: Pin assignment of the USB interface

1.9 Input/output interfaces

1.9.1 Signal contact



Figure 3: 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 Input

(no function in the existing device version)

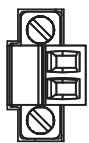


Figure 4: Input: 2-pin terminal block with screw locking

2 Device installation

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

On delivery, the device is ready for operation.

The following steps should be performed to install and configure a device:

- ▶ [Unpacking and checking](#)
- ▶ [Installing the SD card \(optional\)](#)
- ▶ [Installing the device and grounding](#)
- ▶ [Installing the SFP transceivers \(optional\)](#)
- ▶ [Connecting the terminal blocks](#)
- ▶ [Mounting the terminal blocks and switching on the supply voltage](#)
- ▶ [Connecting the data lines](#)
- ▶ [Insert data in label area](#)

2.1 Unpacking and checking

- Check whether the contents of the package are complete ([see page 43 “Scope of delivery”](#)).
- Check the individual parts for transport damage.

2.2 Installing the SD card (optional)

Note: The location on the device is described on [page 18 “Rear view”](#).

- ▶ Push the SD card into the slot with the serration facing downwards.
- ▶ Tighten the knurled screw to ensure that the SD card does not fall out.

2.3 Installing the device and grounding



WARNING

FIRE HAZARD

Install the device in a fire protected enclosure according to EN 60950-1.

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



WARNING

For device variants with operating voltage type K exclusively:

ELECTRIC SHOCK

Only install this device in a switch cabinet or in an operating site with limited access, to which only maintenance staff have access.

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

2.3.1 Mounting on the DIN rail

Note: Make sure there is at least 10 cm of space above and below the device.

Note: The shield ground wire of the twisted pair lines is connected to the front panel as a conductor.

- Mount the device on a 35 mm DIN rail in accordance with DIN EN 60175.
- Attach the upper snap-in guide of the device into the DIN rail and press the device down against the DIN rail until it snaps into place.

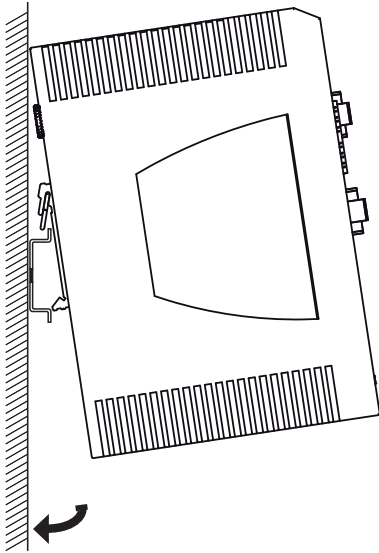


Figure 5: Mounting on the DIN rail

2.3.2 Grounding

For safety reasons, make sure you only connect the ground wire before you set up the other connections.

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

The device variants with operating voltage type K have a protective grounding.

The device variants with operating voltage type C have a function grounding.

- Connect the grounding to the ground screw of the device.

2.4 Installing the SFP transceivers (optional)

- Before attaching an SFP transceiver, first remove the protective cap over the socket.
- Push the SFP transceiver with the lock closed into the socket until you hear it latch in.



Figure 6: Fast Ethernet / Gigabit Ethernet Fiberoptic SFP Transceiver

Note: Only use Hirschmann SFP transceivers ([see page 44 “Accessories”](#)).

2.5 Connecting the terminal blocks

WARNING

ELECTRIC SHOCK

Ground the device before connecting the power supply.
Only connect a supply voltage as described in the data plate of your device.
Never insert sharp objects (small screwdrivers, wires, etc.) into the connection terminals for the supply voltage, the signal contact or the input, and do not touch the terminals!

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

Note: The supply voltage is only connected with the chassis via protective elements.

2.5.1 Operating voltage type K

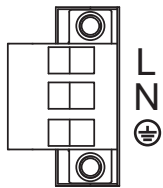


Figure 7: Operating voltage type K: 3-pin terminal block with screw locking



Type of the voltages that can be connected	Size of the supply voltage	Connections
DC voltage	Rated voltage range DC 60 V ... 250 V Voltage range DC incl. maximum tolerances 48 V ... 320 V	+/L Plus terminal of the supply voltage
		-/N Minus terminal of the supply voltage
		 Protective conductor
AC voltage	Rated voltage range AC 110 V ... 230 V, 50 Hz ... 60 Hz Voltage range AC incl. maximum tolerances 88 V ... 265 V, 47 Hz ... 63 Hz	+/L Outer conductor
		-/N Neutral conductor
		 Protective conductor

Table 6: Operating voltage type K: Type and size of the supply voltage, connections

⚠ WARNING

ELECTRIC SHOCK

Only start connecting the supply voltage if **all** the above mentioned requirements are fulfilled.

See “Supply voltage” on page 5.

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

To connect supply voltage, perform the following steps:

- ▶ Remove the power connector from the device.
- ▶ Connect the protective conductor to the protective conductor terminal.
- ▶ Connect the lines for the supply voltage to the terminals +/L and -/N.

2.5.2 Operating voltage type C

You have the option to supply the supply voltage redundantly, with no load distribution.

Both inputs are separate from one another.

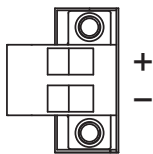


Figure 8: Operating voltage type C: 2-pin terminal block with screw locking

Type of the voltages that can be connected	Size of the supply voltage	Connections
DC voltage	Rated voltage range DC 24 V ... 48 V Voltage range DC incl. maximum tolerances 18 V ... 60 V	+ Plus terminal of the supply voltage - Minus terminal of the supply voltage

Table 7: Operating voltage type C: Type and size of the supply voltage, connections

WARNING

ELECTRIC SHOCK

Only start connecting the supply voltage if **all** the above mentioned requirements are fulfilled.

See [“Supply voltage” on page 5](#).

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

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

- Remove the power connector from the device.
- Connect the lines for the supply voltage to the + and – terminals.

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 via both inputs.

2.5.3 Signal contact

For every signal contact to be connected, make sure the following requirements are met:

- ▶ The lines to be connected are voltage-free.
- ▶ The connected voltage is limited by a current limitation device or a fuse. Observe the electrical threshold values for signal contact ([see on page 35 “General technical data”](#)).
- Connect the signal contact lines to the terminal block.

2.6 Mounting the terminal blocks and switching on the supply voltage

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 0.34 Nm (3 lb in).

- Use screws to secure the connectors to the device.
- Switch on the supply voltage.

2.7 Connecting the data lines

2.7.1 10/100 Mbit/s twisted pair connection

Note: In general, you should adhere to the following 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 cables for the data transmission between the buildings.
- When using copper cables, make sure there is a sufficient gap between the power supply cables and the data cables if they are laid over a long distance. Ideally, install the cables in separate cable channels.
- Use shielded cables.

- Install the data lines according to your requirements.

2.7.2 100/1000 Mbit/s F/O connection

Note: Make sure that the LH ports are only connected with LH ports, SX ports are only connected with SX ports, and LX ports only with LX ports.

- Install the data lines according to your requirements.

2.8 Insert data in label area

The information field for the IP address on the front of the device helps you to structure your network installation clearly.

3 Basic set-up

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 using the HiDiscovery protocol via the application HiDiscovery or Industrial HiVision
- ▶ Configuration via BOOTP
- ▶ Configuration via DHCP (Option 82)
- ▶ AutoConfiguration Adapter

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

■ **Default settings**

- ▶ IP address: The device looks for the IP address using DHCP
- ▶ Management password:
 - user, password: public (read only)
 - admin, password: private (read/write)
- ▶ 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**

Only operate the device up to the specified maximum ambient air temperature.

The ambient air temperature is the temperature of the air at a distance of 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 inner temperature of the device. It is up to 20 °C higher than the ambient temperature. This depends on the configuration of your device.

4 Maintenance and service

- When designing this device, Hirschmann was largely able to forego using parts that are subject to wear and tear. The parts subject to wear are designed to last longer than the lifetime of the product when it is operated properly. Operate this device according to the specifications (see “[Technical data](#)”).
- 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 to improve and develop our software. You should regularly check whether there is a new version of the software that provides you with additional benefits. You will find software information and downloads on the product pages of the Hirschmann website.
- Depending on the degree of pollution in the operating environment, check at regular intervals that the ventilation slots in the device are not obstructed.

You will find information about the complaints and returns procedures in the Internet under

<http://www.beldensolutions.com/en/Service/Repairs/index.phtml> .

5 Disassembly

5.1 Disassembling the device

- Disconnect the data lines.
- Switch off the supply voltage.
- Disconnect the terminal blocks.
- Disconnect the grounding.

Note: For safety reasons, make sure you disconnect the grounding from all connections last.

- To remove the device from the DIN rail, press the device downwards and pull it out from under the DIN rail.

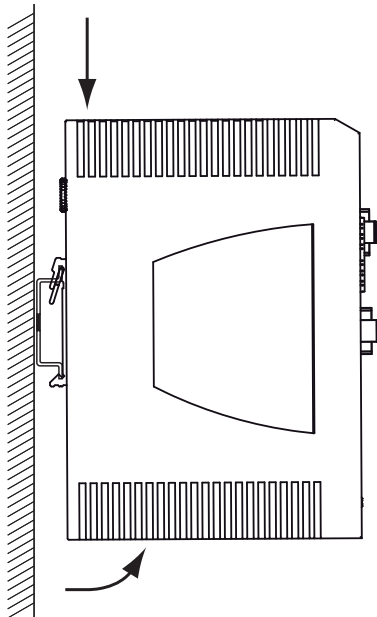


Figure 9: Removal from the DIN rail

5.2 Removing the SFP transceivers

- Pull the SFP transceiver out of the socket by means of the opened lock.
- Close the socket with the protective cap.



Figure 10: Deinstalling an SFP transceiver

6 Technical data

■ General technical data

Weight	EAGLE..-.....999S..	ca. 1,2 kg	
	EAGLE..-.....999T..	ca. 1,5 kg	
	EAGLE..-.....999E..		
Power supply	Nominal voltage DC	24 V ... 48 V	
Power supply type C	Voltage range DC	18 V ... 60 V (incl. max. tolerances)	
	Connection type	2-pin terminal block	
	Power failure bypass	> 10 ms at 20.4 V DC	
	Overload current protection at input	Non-replaceable fuse	
	Back-up fuse	Nominal rating:	6.3 A
		Characteristic:	slow blow
Peak inrush current	< 4 A		
Power supply	Nominal voltage AC	110 V ... 230 V, 50 Hz ... 60 Hz	
Power supply type K	Voltage range AC	88 V ... 265 V, 47 Hz ... 63 Hz	
	Nominal voltage DC	60 V ... 250 V	
	Voltage range DC	48 V ... 320 V (incl. max. tolerances)	
	Connection type	3-pin terminal block	
	Power failure bypass	> 10 ms at 98 V AC	
	Overload current protection at input	Non-replaceable fuse	
	Back-up fuse	Nominal rating:	2.5 A
Characteristic:		slow blow	
Peak inrush current	< 3.5 A		
Climatic conditions during operation	Ambient temperature	Devices with operating temperature type S (standard): +32 °F ... +140 °F (0 °C ... +60 °C) Devices with operating temperature type E and type T (extended): -40 °C ... +70 °C ^{a,b}	
	Humidity	10% ... 95% (non-condensing)	
	Air pressure	minimum 700 hPa (+3000 m) maximum 1060 hPa (-400 m)	
	Ambient temperature	-40 °F ... +185 °F (-40 °C ... +85 °C)	
Climatic conditions during storage	Humidity	10% ... 95% (non-condensing)	
	Air pressure	minimum 700 hPa (+3000 m) maximum 1060 hPa (-400 m)	
	Ambient temperature	-40 °F ... +185 °F (-40 °C ... +85 °C)	
"FAULT" signal contact	Switching current	max. 1 A, SELV	
	Switching voltage	max. 60 V DC or max. 30 V AC, SELV	
Pollution degree		2	
Protection classes	Laser protection	Class 1 in compliance with IEC 60825-1	
	Degree of protection	IP 30	

a. Only use SFP modules with the "EEC" extension.

b. +185 °F (+85 °C) for 16 hours (tested acc. to IEC60068-2-2)

■ Digital input

Maximum permitted input voltage range	-32 VDC ... +32 VDC
Input voltage, low level, status "0"	-0.3 VDC ... +5 VDC
Input voltage, high level, status "1"	+11 VDC ... +30 VDC
Maximum input current at 24 V input voltage	15 mA
Input characteristic acc. to IEC 61131-2 (current-consuming)	Type 3

■ Dimension drawings

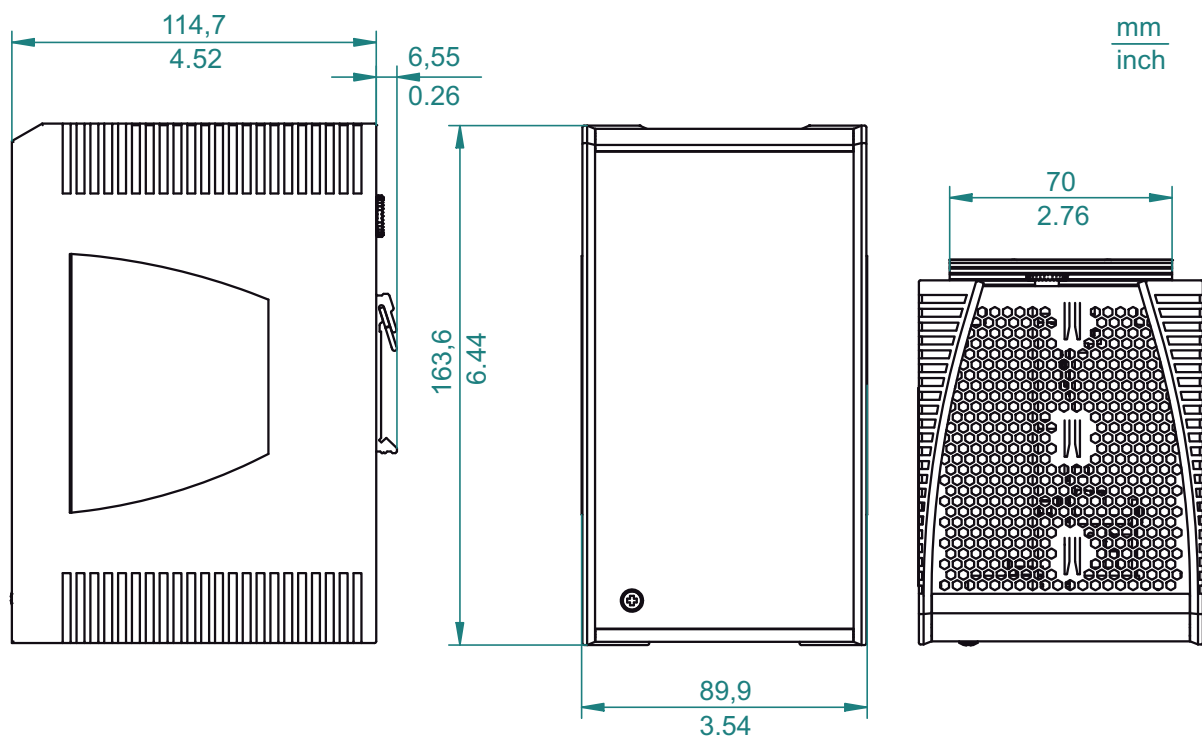


Figure 11: Dimensions of device variants with operating temperature type S (see page 13 "Device name and product code")

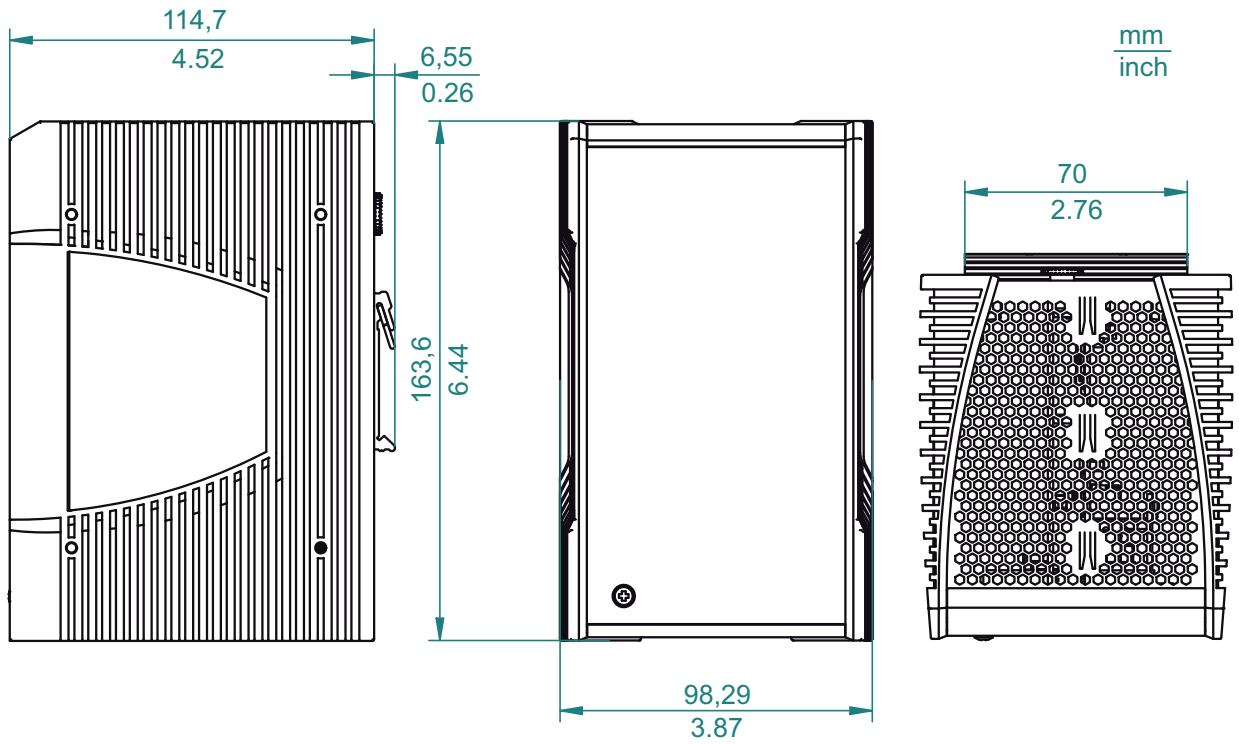


Figure 12: Dimensions of device variants with operating temperature type E and type T (see page 13 “Device name and product code”)

■ EMC and immunity

EMC interference emission		Standard applications ^a	Marine applications ^b	Railway applications (trackside) ^c	Sub-station applications ^d
Radiated emission					
EN 55022		Class A	—	—	Class A
GL Guidelines		—	EMC 1	—	—
FCC 47 CFR Part 15		Class A	—	—	Class A
EN 61000-6-4		Fulfilled	—	Fulfilled	—
Conducted emission					
EN 55022	AC and DC supply connections	Class A	—	—	Class A
GL Guidelines	AC and DC supply connections	—	EMC 1	—	—
FCC 47 CFR Part 15	AC and DC supply connections	Class A	—	—	Class A
EN 61000-6-4	AC and DC supply connections	Fulfilled	—	Fulfilled	—
EN 55022	Telecommunication connections	Class A	—	—	Class A
EN 61000-6-4	Telecommunication connections	Fulfilled	—	Fulfilled	—

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

b. Merchant Navy – applies to devices with the certification codes VU, U9, UY, UX, UT

c. EN 50121-4 – applies to devices with the certification codes VT, UT, T9, TY

d. EN 61850-3, IEEE 1613 – applies to devices with the certification codes V9, VY, VU, VT

EMC interference immunity		Standard applications^a	Marine applications^b	Railway applications (trackside)^c	Sub-station applications^d
Electrostatic discharge					
EN 61000-4-2 IEEE C37.90.3	Contact discharge	± 4 kV	± 6 kV	± 6 kV	± 8 kV
EN 61000-4-2 IEEE C37.90.3	Air discharge	± 8 kV	± 8 kV	± 8 kV	± 15 kV
Electromagnetic field					
EN 61000-4-3	80 MHz ... 3000 MHz	10 V/m	10 V/m	—	10 V/m
EN 61000-4-3	80 MHz ... 2700 MHz	—	—	20 V/m	—
IEEE 1613	80 MHz ... 1000 MHz	—	—	—	35 V/m
Fast transients (burst)					
EN 61000-4-4 IEEE C37.90.1	AC/DC supply connection	± 2 kV	± 2 kV	± 2 kV	± 4 kV
EN 61000-4-4 IEEE C37.90.1	Data line	± 4 kV	± 1 kV	± 2 kV	± 4 kV
Voltage surges - DC supply connection					
EN 61000-4-5 IEEE 1613	line/ground	± 2 kV	± 1 kV	± 2 kV	± 5 kV
EN 61000-4-5	line/line	± 1 kV	± 0.5 kV	± 1 kV	± 1 kV
Voltage surges - AC supply connection					
EN 61000-4-5 IEEE 1613	line/ground	± 2 kV	± 1 kV	± 2 kV	± 5 kV
EN 61000-4-5	line/line	± 1 kV	± 0.5 kV	± 1 kV	± 2 kV
Voltage surges - data line					
EN 61000-4-5	line/ground	± 1 kV	—	± 2 kV	± 4 kV
Conducted disturbances					
EN 61000-4-6	150 kHz ... 80 MHz	10 V	10 V	10 V	10 V

EMC interference immunity		Standard applications^a	Marine applications^b	Railway applications (trackside)^c	Sub-station applications^d
Damped oscillation - AC/DC supply connection					
EN 61000-4-12 IEEE C37.90.1	line/ground	—	—	—	2.5 kV
EN 61000-4-12 IEEE C37.90.1	line/line	—	—	—	1 kV
Damped oscillation - data line					
EN 61000-4-12 IEEE C37.90.1	line/ground	—	—	—	2.5 kV
EN 61000-4-12	line/line	—	—	—	± 1 kV
Pulse magnetic fields					
EN 61000-4-9		—	—	300 A/m	—

Stability		Standard applications^a	Marine applications^b	Railway applications (trackside)^c	Sub-station applications^d
IEC 60068-2-6, test Fc	Vibration	5 Hz ... 8.4 Hz with 3.5 mm amplitude	2 Hz ... 13.2 Hz with 1 mm amplitude	—	2 Hz ... 9 Hz with 3 mm amplitude
		8.4 Hz ... 150 Hz with 1 g	13.2 Hz ... 100 Hz with 0.7 g	—	9 Hz ... 200 Hz with 1 g
				—	200 Hz ... 500 Hz with 1.5 g
IEC 60068-2-27, Test Ea	Shock	15 g at 11 ms	—	—	10 g at 11 ms

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

b. Merchant Navy – applies to devices with the certification codes VU, U9, UY, UX, UT

c. EN 50121-4 – applies to devices with the certification codes VT, UT, T9, TY

d. EN 61850-3, IEEE 1613 – applies to devices with the certification codes V9, VY, VU, VT

■ Network range

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

Product code M-SFP-...	Wave length	Fiber	System attenuation	Example for F/O line length ^a	Fiber attenuation	BLP ^b /dispersion
-SX/LC...	MM 850 nm	50/125 μm	0-7.5 dB	0-550 m	3.0 dB/km	400 MHz×km
-SX/LC...	MM 850 nm	62.5/125 μm	0-7.5 dB	0-275 m	3.2 dB/km	200 MHz×km
-MX/LC	MM 1310 nm	50/125 μm	0-8 dB	2 km ^c	1.0 dB/km	500 MHz×km
-MX/LC	MM 1310 nm	62.5/125 μm	0-8 dB	1 km	1.0 dB/km	500 MHz×km
-LX/LC...	MM 1310 nm ^d	50/125 μm	0-10.5 dB	0-550 m	1.0 dB/km	800 MHz×km
-LX/LC...	MM 1310 nm ^d	62.5/125 μm	0-10.5 dB	0-550 m	1.0 dB/km	500 MHz×km
-LX/LC...	SM 1310 nm	9/125 μm	0-10.5 dB	0-20 km ^e	0.4 dB/km	3.5 ps/(nm×km)
-LX+/LC...	SM 1310 nm	9/125 μm	5-20 dB	14-42 km	0.4 dB/km	3.5 ps/(nm×km)
-LH/LC...	LH 1550 nm	9/125 μm	5-22 dB	23-80 km	0.25 dB/km	19 ps/(nm×km)
-LH+/LC	LH 1550 nm	9/125 μm	15-30 dB	71-108 km	0.25 dB/km	19 ps/(nm×km)
-LH+/LC	LH 1550 nm	9/125 μm	15-30 dB	71-128 km	0.21 dB/km (typically)	19 ps/(nm×km)

Table 8: Fiber port 1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver)

- including 3 dB system reserve when compliance with the fiber data is observed
- The bandwidth length product cannot be used to calculate the expansion.
- Distances of up to 3 km reachable, 1000 MHz×km (1300 nm)
- With F/O adapter compliant with IEEE 802.3-2002 clause 38 (single-mode fiber offset-launch mode conditioning patch cord)
- including 2.5 dB system reserve when compliance with the fiber data is observed

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

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

Table 9: F/O port (bidirectional Gigabit Ethernet SFP Transceiver)

- including 3 dB system reserve when compliance with the fiber data is observed

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

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

Table 10: 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

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

TP port	
Length of a twisted pair segment	max. 100 m/328 ft (for cat5e cable)

Table 11: TP port 10BASE-T / 100BASE-TX / 1000BASE-T

■ 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 13.

Device name	Maximum power consumption	Power output
EAGLE20-0400...	12 W	41 BTU (IT)/h
EAGLE30-0402...	14 W	48 BTU (IT)/h

■ Scope of delivery

Number	Article
1 ×	Device
2 ×	2-pin terminal block for signal contact and input
1 ×	3-pin terminal block for supply voltage (for device variants with operating voltage type K only)
2 ×	2-pin terminal block for supply voltage (for device variants with operating voltage type C exclusively)
1 ×	Installation user manual
1 ×	CD/DVD with manual

■ Accessories

Note: Please note that products recommended as accessories may have characteristics that do not fully match those of the corresponding product. This may limit their possible usage in the overall system.

Name	Order number
Terminal cable	943 301-001
AutoConfiguration Adapter ACA 21-USB EEC	943 271-002
AutoConfiguration Adapter ACA 31	942 074-001
For device variants with operating voltage type K: 3-pin terminal block (50 pieces) for supply voltage	943 845-008
For device variants with operating voltage type C: 2-pin terminal block (50 pieces) for supply voltage	943 845-009
2-pin terminal block (50 pcs.) for signal contact and input	943 845-010
Rail Power Supply RPS 30	943 662-003
Rail Power Supply RPS 80 EEC	943 662-080
Rail Power Supply RPS 120 EEC	943 662-120
Industrial HiVision Network Management Software	943 156-xxx

Gigabit Ethernet SFP transceiver	Order number
M-SFP-SX/LC	943 014-001
M-SFP-SX/LC EEC	943 896-001
M-SFP-MX/LC	942 035-001
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
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
Fast-Ethernet SFP transceiver	Order number
M-FAST SFP-MM/LC	943 865-001
M-FAST SFP-MM/LC EEC	943 945-001
M-FAST SFP-SM/LC	943 866-001
M-FAST SFP-SM/LC EEC	943 946-001
M-FAST SFP-SM+/LC	943 867-001
M-FAST SFP-SM+/LC EEC	943 947-001
M-FAST SFP-LH/LC	943 868-001
M-FAST SFP-LH/LC EEC	943 948-001

■ Underlying norms and standards

Description	
EN 61000-6-2	Generic norm – immunity in industrial environments
EN 55022	IT equipment – radio interference characteristics
EN 61131-2	Programmable logic controllers
EN 60950-1 + A11 + A1	Safety for the installation of IT equipment
UL 60950-1, 2. Edition	Safety for Information Technology Equipment
EN 50121-4	Railway applications - EMC - emitted interference and interference immunity for signal and telecommunication systems
FCC 47 CFR Part 15	Code of Federal Regulations
Germanischer Lloyd	Classification and Construction Guidelines VI-7-3 Part 1 Ed.2003
cUL 508	Safety for Industrial Control Equipment
IEC/EN 61850-3	Communications networks and systems in stations
ISA 12.12.01	Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations
NEMA TS 2	Traffic Controller Assemblies with NTCIP Requirements (environmental requirements)
IEEE 1613	Standard Environment and Testing Requirements for Communication Networking Devices in Electric Power Substations
IEEE 802.1 AB	Station and Media Access Control Connectivity Discovery
IEEE 802.1 D	Media Access Control Bridges
IEEE 802.1 Q	Virtual Bridged Local Area Networks
IEEE 802.3	Ethernet

Table 12: List of norms and standards

The device has a certification based on a specific standard only if the certification indicator appears on the housing.
 However, with the exception of Germanischer Lloyd, ship certifications are only included in the product information under www.hirschmann.com.

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>

Contact our support at <https://hirschmann-support.belden.eu.com>

You can contact us

in the EMEA region at

- ▶ Tel.: +49 (0)1805 14-1538
- ▶ E-mail: hac.support@belden.com

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- ▶ Tel.: +1 (717) 217-2270
- ▶ E-mail: inet-support.us@belden.com

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- ▶ Tel.: +65 6854 9860
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