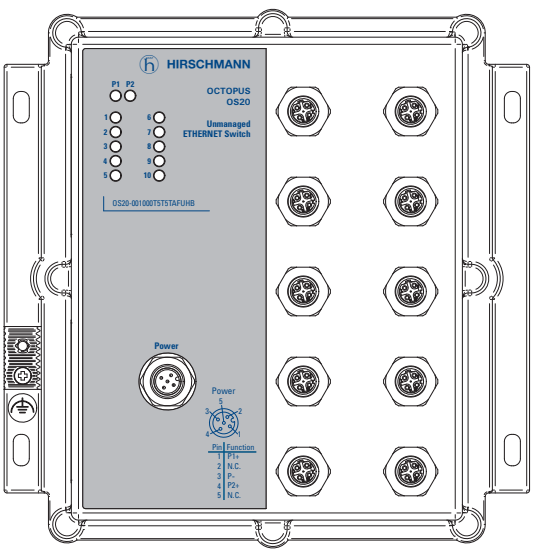
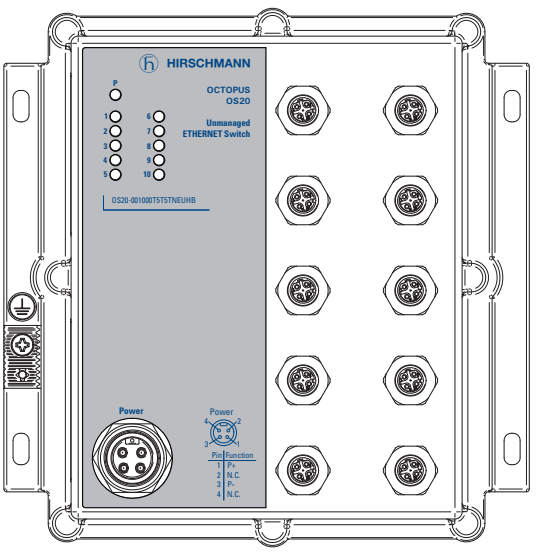
HIRSCHMANN
A BELDEN BRAND

User Manual

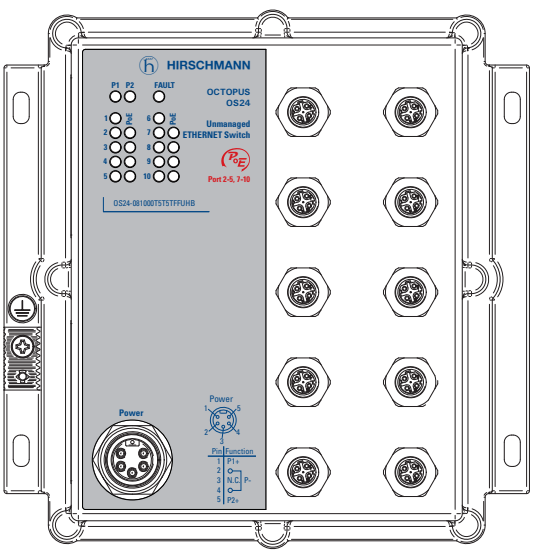
Installation
Unmanaged IP65/67 Switch
OCTOPUS OS20 / OS24



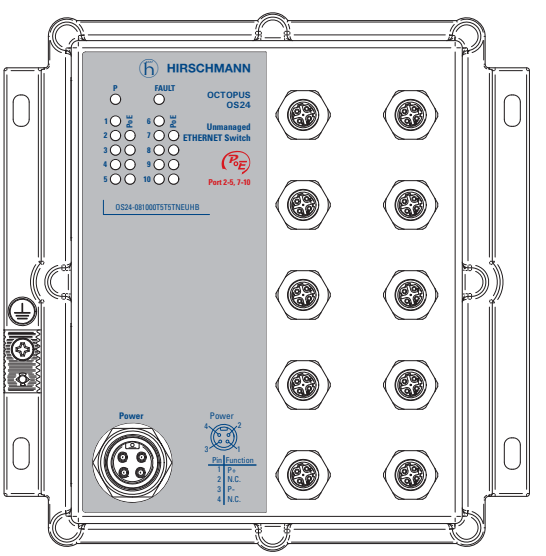
OS20–001000T5T5TAFUHB



OS20–001000T5T5TNEUHB



OS24–081000T5T5TFFUHB



OS24–081000T5T5TNEUHB

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

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

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

You can get the latest version of this manual on the Internet at the Hirschmann product site (www.hirschmann.com).

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

Contents

Safety instructions

WARNING

UNCONTROLLED MACHINE ACTIONS

To avoid uncontrolled machine actions caused by data loss, configure all the data transmission devices individually.
Before you start any machine which is controlled via data transmission, be sure to complete the configuration of all data transmission devices.

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

General safety instructions

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

- ☐ Before connecting any cable, read this document, and the safety instructions and warnings.
- ☐ Operate the device with undamaged components exclusively.
- ☐ The device is free of any service components. In case of a damaged or malfunctioning 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 32.
- ☐ Connect to the product only components suitable for the requirements of the specific application case.

Certification type See “Device name and product code” on page 13.	Operational environment
E	On the inside of buildings On the inside of trains
F	On the inside of buildings On the inside of trains On the inside of ships On the inside of vehicles

Table 1: Operational environment

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.
- ☐ 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

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

- ☐ Use a wire diameter for the ground conductor that is no smaller than the diameter of the supply voltage connection, however of at least 0.75 mm² (AWG18).
- ☐ 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 metal housing as a conductor.

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

Supply voltage

The supply voltage is electrically isolated from the housing.

- ☐ Use undamaged parts.
- ☐ Relevant for North America:
  Only use copper wire/conductors of class 1, 167 °F (75 °C).
- ☐ Applies to devices featuring supply voltage with the characteristic value F:
  Exclusively connect SELV circuits with the voltage restrictions in accordance with IEC/EN 60950-1 to the supply voltage connections.
- ☐ Applies to devices featuring supply voltage with the characteristic value A:
  Ensure that the externally power unit connected upstream fulfills one of following conditions:
  - ▶ NEC Class 2
  - ▶ Limited Power Source based on EN 60950-1

Operating conditions

Operate the device at the specified ambient temperature (temperature of the ambient air at a distance of 2 inches (5 cm) from the device) and at the specified relative humidity exclusively.

- ☐ Install the device in a location where the climatic threshold values specified in the technical data are adhered to. Make sure the environment does not heat the device.
- ☐ Use the device in an environment with a maximum pollution degree that complies with the specifications in the technical data.

Relevant for use in North America

Use this device solely in Class 2 Circuits.

Relevant for usage under conditions that comply with the the technical standard UL 60950-1:

Note: The following information applies only to device variants with UL 60950-1 approval and protective conductor connection.

Protective conductor connection for the crimp connection:
Use a wire diameter for the ground conductor that is no smaller than the diameter of the supply voltage connection, however of at least 0.75 mm² (AWG18).
Use a professional crimping tool specified for the wire size. Follow the instruction of the crimping tool. The pull out force the crimped connection is at least 135 N according to the technical standard IEC 60352-2.

E marking

The labeled devices comply with the regulations contained in the following European directive(s):
Regulation No. 10 of the Economic Commission for Europe of the United Nations (UN/ECE): **Devices with an approval are labeled with the E type approval mark.**
(Relevant for devices with certification type F)

CE marking

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

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.

2014/35/EU
Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits.

2014/30/EU (EMC)
Directive of the European Parlament and of the Council on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.

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

The device can be used in the industrial sector.

- Interference immunity: EN 61000-6-2
- Emitted interference: EN 55032

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

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

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.

Legend

The symbols used in this manual have the following meanings:

▶	Listing
☐	Work step
■	Subheading

1 Description

1.1 General device description

The OCTOPUS OS20/OS24 Unmanaged 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 industrial Ethernet networks that conform to the IEEE 802.3 standard in the line structure.
The devices work without a fan.

The 10 twisted pair ports are M12 sockets.

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

Mount the device on a level surface with four M5 screws.
The Hirschmann network components help you ensure continuous communication across all levels of the company.

Connect your devices to:
- devices of the OCTOPUS family
- devices of the Open Rail family
- devices of the MICE family
- backbone devices of the MACH family
- the BAT wireless transmission system
- the EAGLE security system
- products for the LION control room / MACH 100 family

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.

Item	Product characteristic	Product code	Value for the characteristic	
1 ... 4	Product	OS20	OCTOPUS device	▶ with Fast Ethernet ports ▶ without PoE ports
		OS24	OCTOPUS device	▶ with Fast Ethernet ports ▶ with PoE+ ports
5	(hyphen)	—		
6 ... 7	Number: Special ports	00	0 ×	PoE(+) ports
		08	8 ×	PoE(+) ports
8 ... 9	Number: 100 Mbit/s ports	10	10 ×	100 Mbit/s ports
10 ... 11	Number: 1000 Mbit/s ports	00	0 ×	1000 Mbit/s ports
12 ... 13	uplink port	T5	1 ×	100 Mbit/s ports Twisted pair M12
14 ... 15	uplink port	T5	1 ×	100 Mbit/s ports Twisted pair M12
16	Temperature range	T	Extended	−40 °F ... +158 °F (−40 °C ... +70 °C)

Table 2: Device name and product code

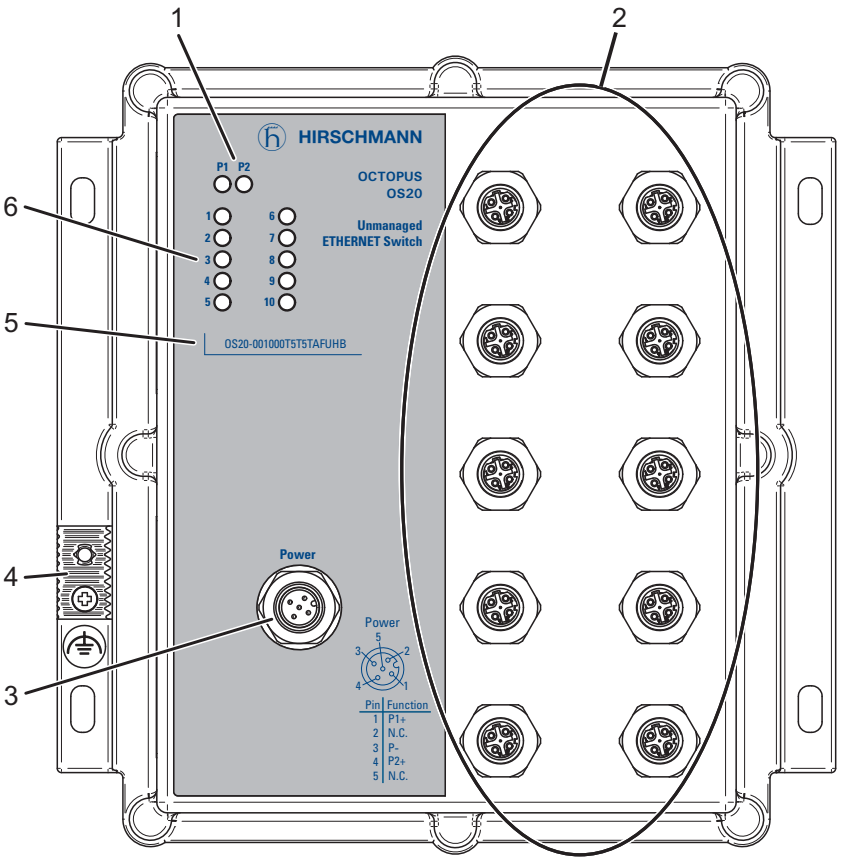
Item	Product characteristic	Product code	Value for the characteristic
17	Supply voltage See “Power supply” on page 19.	A	Rated voltage range DC 24 V ... 48 V ⚠ Observe the warning for railway standard EN 50155! See “Devices featuring supply voltage with the characteristic value A” on page 23.
			Voltage range DC incl. maximum tolerances 9.6 V ... 60 V
			Connection type M12
		F	Rated voltage range DC 24 V ... 48 V ⚠ Observe the warning for railway standard EN 50155! See “Devices featuring supply voltage with the characteristic value F” on page 24.
			Voltage range DC incl. maximum tolerances 16.8 V ... 60 V
			Connection type 7/8" connectors, 5-pin
		N	Rated voltage range DC 72 V ... 110 V
			Voltage range DC incl. maximum tolerances 50.4 V ... 138 V
			Connection type 7/8" connectors, 4-pin
18	Certifications	E	▶ UL ▶ Railway (along track) ▶ Railway (train)
		F	▶ UL ▶ Railway (along track) ▶ Railway (train) ▶ Germanischer Lloyd ▶ E1
19	Software variant	U	Unmanaged
20	Configuration	H	Hirschmann
21	Device model	B	IP65/67

Table 2: Device name and product code

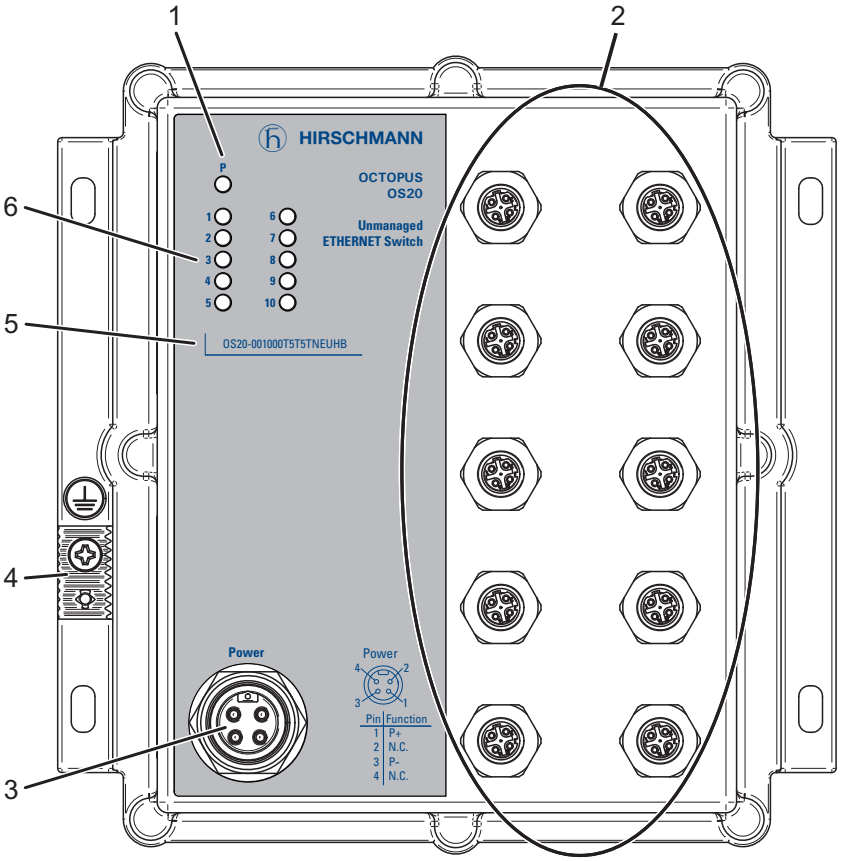
The following table informs you about the possible device variants.

Device name and product code	Order number	Characteristics
OS20-001000T5T5TAFUHB	942 025-001	24 V
OS20-001000T5T5TNEUHB	942 025-002	110 V
OS24-081000T5T5TFFUHB	942 025-003	24 V, PoE
OS24-081000T5T5TNEUHB	942 025-004	110 V, PoE

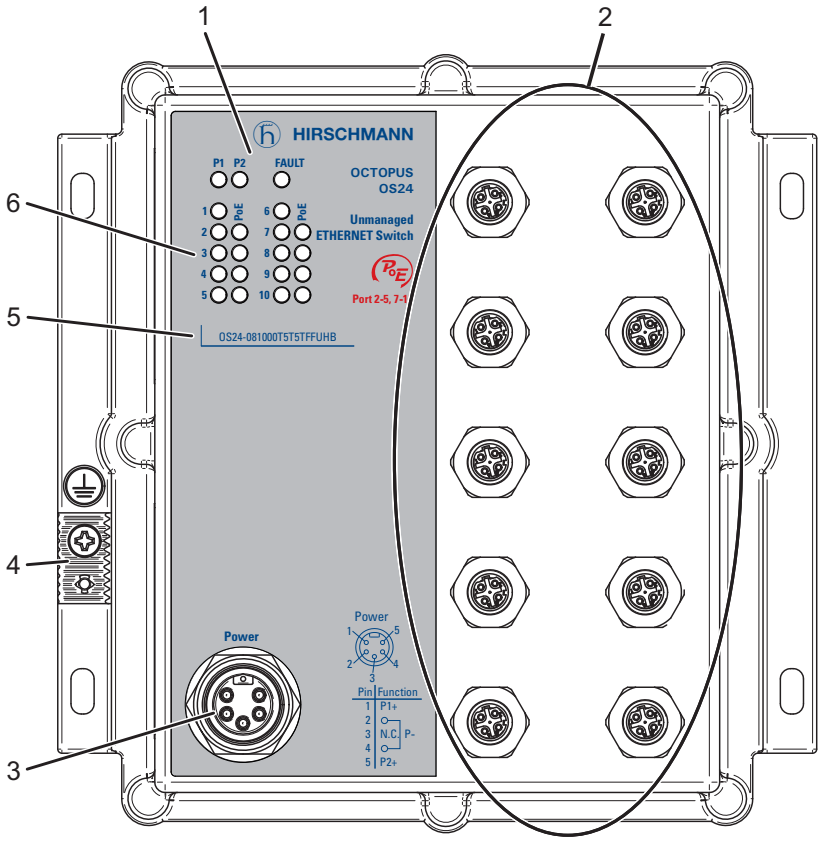
1.3 Device view



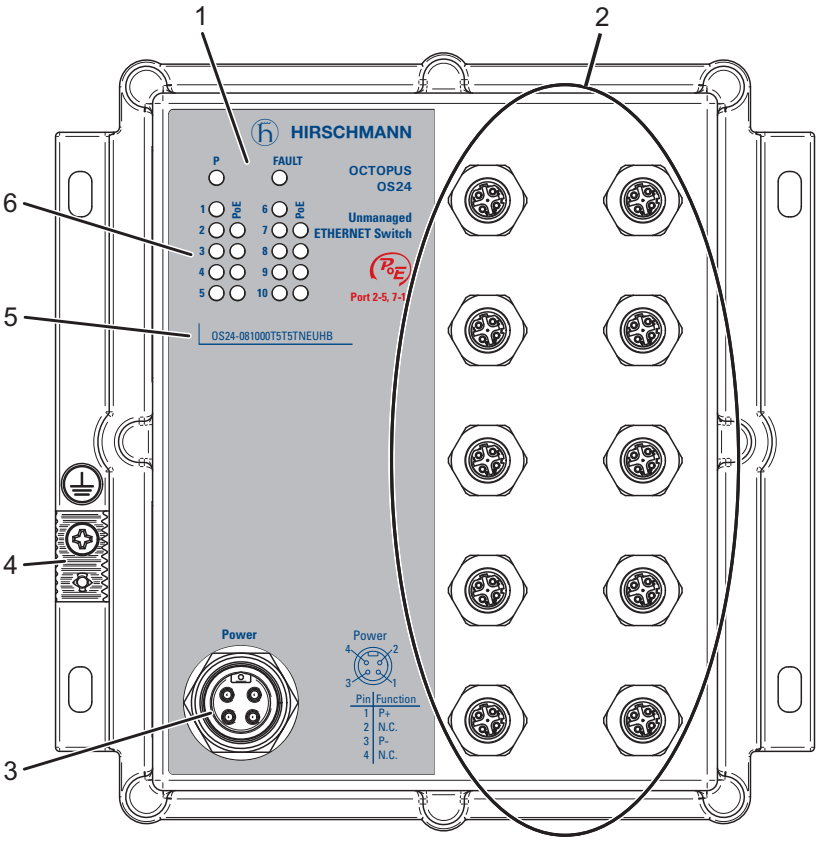
OS20-001000T5T5TAFUHB			
1	LED display elements	Device Status	
		P1	Supply voltage 1
		P2	Supply voltage 2
2	100 Mbit/s ports		
3	Connecting the supply voltage		
4	Grounding screw	M3	
5	Product code		
6	LED display elements	Port status	



OS20-001000T5T5TNeUHB		
1	LED display elements	Device Status
		P Supply voltage
2	100 Mbit/s ports	
3	Connecting the supply voltage	
4	Grounding screw	M4
5	Product code	
6	LED display elements	Port status



OS24-081000T5T5TFFUHB			
1	LED display elements	Device Status	
		P1	Supply voltage 1
		P2	Supply voltage 2
		FAULT	Total PoE output
2	Ports 1,6	100 Mbit/s ports	
	Ports 2,3,4,5,7,8,9,10	100 Mbit/s PoE+ ports	
3	Connecting the supply voltage		
4	Grounding screw	M4	
5	Product code		
6	LED display elements	Port status	



OS24-081000T5T5TNEUHB			
1	LED display elements	Device Status	
		P	Supply voltage
		FAULT	Total PoE output
2	Ports 1,6	100 Mbit/s ports	
	Ports 2,3,4,5,7,8,9,10	100 Mbit/s PoE+ ports	
3	Connecting the supply voltage		
4	Grounding screw	M4	
5	Product code		
6	LED display elements	Port status	

1.4 Power supply

1.4.1 Supply voltage with the characteristic value A

A 5-pin M12 plug is available for the redundant supply to the device.
See “Devices featuring supply voltage with the characteristic value A” on page 23.

1.4.2 Supply voltage with the characteristic value F

A 5-pin 7/8" connector is available to supply the device with PoE redundantly.
See “Devices featuring supply voltage with the characteristic value F” on page 24.

1.4.3 Supply voltage with the characteristic value N

A 4-pin 7/8" connector is available to supply the device.
See “Devices featuring supply voltage with the characteristic value N” on page 25.

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:
“Pin assignments” on page 21

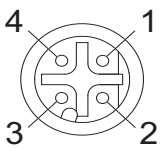
1.5.1 10/100 Mbit/s twisted pair port

This port is designed as an 4-pin M12 socket.
The 10/100 Mbit/s twisted pair port allows you to connect network components according to the IEEE 802.3 10BASE-T/100BASE-TX standard.
This port supports:

- Autonegotiation
- Autopolarity
- Autocrossing

Delivery state: Autonegotiation activated
The socket housing is electrically connected with the device housing.

Note: Some of these ports also support Power over Ethernet (PoE).
See “10/100 Mbit/s PoE port” on page 20.



Pin	Function	
1	TD+	Transmission path
2	RD+	Receive path
3	TD−	Transmission path
4	RD−	Receive path
Housing: shield		

Table 3: Pin assignment of 10/100 Mbit/s twisted pair port, M12 socket

1.5.2 10/100 Mbit/s PoE port

Some device variants support Power over Ethernet based on IEEE 802.3at (PoE+) via a twisted pair:

Device	Number of TX ports	PoE-capable TX ports included
OS20-...	10	None
OS24-...	10	8 (Port 2 ... 5, 7 ... 10)

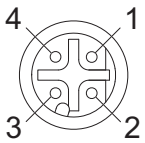
Table 4: Device types: Twisted-pair ports and PoE support

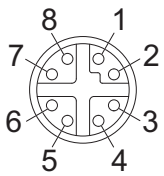
The PoE ports allow the connection and remote supply of, for example, IP telephones (Voice over IP), webcams, sensors, printer servers and WLAN access points. With PoE, power is supplied to these terminal devices via the twisted-pair cable.

The devices are supplied with PoE voltage (53 V DC safety low voltage) via the internal voltage supply. The PoE voltage to the twisted-pair cables is supplied via the wire pairs transmitting the signal (phantom voltage).

The total PoE power output is limited to 61.6 W.

1.5.3 Pin assignments

M12 4-pin (“D”-coded)	Pin	Data	PoE
	1	TX+	Positive V_{PSE}
	2	RX+	Negative V_{PSE}
	3	TX−	Positive V_{PSE}
	4	RX−	Negative V_{PSE}

M12 8-pin (“X”-coded)	Pin	10/100 Mbit/s	1000 Mbit/s	PoE
	1	RX+	BI_DB+	Negative V_{PSE}
	2	RX−	BI_DB−	Negative V_{PSE}
	3	TX+	BI_DA+	Positive V_{PSE}
	4	TX−	BI_DA−	Positive V_{PSE}
	5	—	BI_DC+	—
	6	—	BI_DC−	—
	7	—	BI_DD−	—
	8	—	BI_DD+	—

1.6 Display elements

Device state

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

LED	Display	Color	Activity	Meaning
P P1	Supply voltage 1	Green	Lights up	Supply voltage is on
			None	Supply voltage is too low
P2	Supply voltage 2	Green	Lights up	Supply voltage is on
			None	Supply voltage is too low
FAULT	Total PoE output	Red	None	The total PoE output is sufficient.
			Lights up	The total PoE output has been exceeded.

Port status

The green and yellow LEDs at the individual twisted pair ports provide port-related information.

LED	Display	Color	Activity	Meaning
1 ... 10	Link status	—	None	Device detects an invalid or missing link
		Green	Lights up	Device detects a valid link
		Yellow	Flashing	Device is transmitting and/or receiving data
PoE	PoE status	Green	None	No powered device connected
			Lights up	Powered device is supplied with power
			Flashes 1 time a period	No power supply to the powered device, as the total PoE output of the device has been exceeded

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
- Wiring the connector for the supply voltage
- Installing and grounding the device
- Connecting the ferrite
- Connecting the supply voltage
- Operating the device
- Connecting data cables

2.1 Checking the package contents

☐ Check whether the package includes all items named in the section “Scope of delivery” on page 36.
☐ Check the individual parts for transport damage.

2.2 Wiring the connector for the supply voltage

Note: Only connect the device to a power supply that complies to surge voltage category II or lower.

2.2.1 Devices featuring supply voltage with the characteristic value A

⚠ WARNING
ELECTRIC SHOCK The nominal voltage of 48 V specified for trains can temporarily exceed the SELV threshold of 60 V based on EN 50155 para. 5.1.1.1. Use additional measures to limit the surge voltage to 60 V or use a lower nominal voltage. **Failure to follow this instruction can result in death, serious injury, or equipment damage.**

Type and specification of the supply voltage	
Rated voltage range DC	24 V ... 48 V
Voltage range DC incl. maximum tolerances	9.6 V ... 60 V

- The input voltage is electrically isolated from the housing.
- You have the option of supplying the supply voltage redundantly, without load distribution.
- Use a power supply cable which is suitable for the voltage, the current and the physical load.
  Hirschmann recommends a wire diameter of 0.5 mm² to 0.75 mm² (AWG20 to AWG18).
- The supply voltage is connected via a 5-pin M12 connector (A coding, e.g. ELWIKA 5012 PG7 from Hirschmann, supplied).
  You find the prescribed tightening torque in General technical data section on page 32.

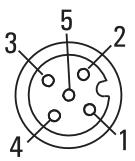
Figure	Pin	Function
	1	+ 24 ... 48 V DC (1)
	2	Not used
	3	0 V
	4	+ 24 ... 48 V DC (2)
	5	Not used

Table 5: Pin assignment of the 5-pin M12 socket for connecting the supply voltage

☐ Connect the power supply cables.

2.2.2 Devices featuring supply voltage with the characteristic value F

WARNING

ELECTRIC SHOCK
The nominal voltage of 48 V specified for trains can temporarily exceed the SELV threshold of 60 V based on EN 50155 para. 5.1.1.1. Use additional measures to limit the surge voltage to 60 V or use a lower nominal voltage.

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

Type and specification of the supply voltage	
Rated voltage range DC	24 V ... 48 V
Voltage range DC incl. maximum tolerances	16.8 V ... 60 V

- The input voltage is electrically isolated from the housing.
- You have the option of supplying the supply voltage redundantly, without load distribution.
- Use a power supply cable which is suitable for the voltage, the current and the physical load.
  Hirschmann recommends a wire diameter of 0.75 mm² to 1.0 mm² (AWG18 to AWG16).
- The supply voltage is connected via a 5-pin 7/8" connector.
  See “Accessories” on page 37.
  You find the prescribed tightening torque in General technical data section on page 32.

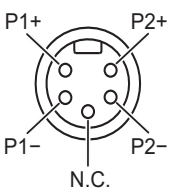
Figure	Pin	Function
	1	+ 24 ... 48 V DC (1)
	2	0 V (1)
	3	Not used
	4	0 V (2)
	5	+ 24 ... 48 V DC (2)

Table 6: Pin assignment of the 5-pin 7/8" connector for connecting the supply voltage

☐ Connect the power supply cables.

2.2.3 Devices featuring supply voltage with the characteristic value N

Type and specification of the supply voltage	
Rated voltage range DC	72 V ... 110 V
Voltage range DC incl. maximum tolerances	50.4 V ... 138 V

- The input voltage is electrically isolated from the housing.
- The supply voltage is connected via a 4-pin 7/8" connector.
  See “Accessories” on page 37.
  You find the prescribed tightening torque in General technical data section on page 32.
- Use a power supply cable which is suitable for the voltage, the current and the physical load.
  Hirschmann recommends a wire diameter of 0.75 mm² (AWG18).

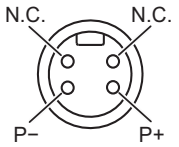
Figure	Pin	Function
	1	+ 72 ... 110 V DC
	2	Not used
	3	0 V
	4	Not used

Table 7: Pin assignment of the 4-pin 7/8" connector for connecting the supply voltage

☐ Connect the power supply cables.

2.3 Installing and grounding the device

⚠ WARNING

ELECTRIC SHOCK
Applies to devices featuring supply voltage with the characteristic value N:
Install the device in such a way that it is protected against mechanical forces.

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

⚠ WARNING

RISK OF BURNING
Applies to devices featuring supply voltage with the characteristic value N:
Only install the device in “operating sites with restricted access” based on EN 60950-1.

Applies to devices featuring supply voltage with the characteristic value A and F:
At ambient temperatures > 49 °F (>45 °C):
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 this instruction can result in death, serious injury, or equipment damage.

To protect the exposed uninstalled contacts of the components from dirt, connect the individual system components in a dry and clean working area.

☐ When you are selecting the installation location, make sure you observe the climatic threshold values specified in the technical data.
Prevent heat from the surroundings from affecting the device.

☐ Applies to devices featuring supply voltage with the characteristic value F:
Take care that the temperature of the device base plate remains under 194 °F (90 °C) during operation.
You achieve this, for example, by means of one of the following measures:
- You make sure that the operating voltage of the device is at least 20 V.
- You limit the total PoE output to a maximum of 47 W.
- You limit the ambient temperature to a maximum of 149 °F (65 °C).
- You install the device on a 1.62 ft^2 (0.15 m^2) metal plate to which you will connect no other heat sources.

☐ Prepare the drill holes at the installation point.

☐ Mount the device on a level surface with four M5 screws.

2.3.1 Grounding the device

The device is grounded via the separate ground screw.
See “Device view” on page 15.
The overall shield of a connected shielded twisted-pair cable is connected to the metal housing as a conductor.

☐ Applies to devices featuring supply voltage with the characteristic value A:
Use the M3 screw for the function ground.
Applies to devices featuring supply voltage with characteristic value F and N:
Use the M4 screw for the protective ground.

☐ Use toothed washers to ensure good electrical conductivity at the connection.

2.4 Connecting the ferrite

Applies to devices featuring supply voltage with the characteristic value F:
To adhere to EMC conformity, you connect the ferrite supplied to the voltage input via the power supply cable.

☐ Insert the power supply cable through the ferrite 3 times.
☐ Position the ferrite as close as possible to the voltage input (max. distance 19.7 in (50 cm)).
☐ Lock the ferrite.

Note: To open the ferrite use the key supplied.

2.5 Connecting the supply voltage

- ▶ Use a back-up fuse suitable for the supply network.
  See “General technical data” on page 32.
- ▶ Do not use connectors as electrical isolating devices.
- ▶ Make sure that the disconnecting device is easily accessible for disconnecting the device from the mains voltage.

☐ Connect the power supply connector to the power supply socket of the device.

2.6 Operating the device

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

2.7 Connecting data cables

You have the option to connect end devices or other segments to the ports of the device via twisted pair cables.

Note the following general recommendations for data cable connections in environments with high electrical interference levels:

- Keep the length of the data cables as short as possible.
- Use optical data cables for the data transmission between the buildings.
- When using copper cables, provide a sufficient separation between the power supply cables and the data cables. Ideally, install the cables in separate cable channels.
- Verify that power supply cables and data cables do not run parallel over longer distances, 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 SF/UTP cables as per ISO/IEC 11801:2002.
- Use a shielded CAT5 cable or better.
- Use a shielded 4-pin M12 plug.
- Connect only PoE-supplier devices whose data connections are located in the interior of the building and are specified as SELV circuits.
- There is no galvanic separation between the PoE ports of an OCTOPUS OS24 device. If you are using these devices in ring structures, wire a PoE port with a non-PoE port to avoid a potential difference.

Proceed as follows:

☐ Connect the data cables according to your requirements.
The tightening torque is 5.3 lb-in (0.6 Nm).

☐ Seal all unused connections and ports with protection screws.
See “Accessories” on page 37.

3 Monitoring the ambient air temperature

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

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 higher than the ambient air temperature. The maximum internal temperature of the device named in the technical data is a guideline that indicates to you that the maximum ambient air temperature has possibly been exceeded.

Therefore, the temperature value displayed in the CLI and the GUI differs from the ambient air temperature.

To determine the actual permitted maximum value for operating the device, you perform a reference measurement:

- ☐ Install the device at the planned location.
- ☐ Switch the device on and wait until it has reached its maximum operating temperature.
- ☐ Measure the ambient air temperature at a distance of 2 in (5 cm) from the device.
- ☐ Read the temperature value displayed in the CLI or the GUI.
- ☐ Calculate the temperature difference.
- ☐ Add the difference to the maximum ambient air temperature specified in the manual.

This calculated value corresponds to the actual maximum permitted ambient air temperature, up to which you can operate the 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.
Hirschmann is continually working on improving and developing their software. Check regularly whether there is an updated version of the software that provides you with additional benefits. You find information and software downloads on the Hirschmann product pages on the Internet (www.hirschmann.com).

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

5 Technical data

General technical data

Dimensions W × H × D	See “Dimension drawings” on page 34.		
Weight		67.02 oz (1900 g)	
Power supply Type A	Redundant power supply		
	Note: Ensure that the externally power unit connected upstream fulfills one of following conditions: ▶ NEC Class 2 ▶ Limited Power Source based on EN 60950-1		
	Rated voltage range DC	24 V ... 48 V ⚠ Observe the warning for railway standard EN 50155! See “Devices featuring supply voltage with the characteristic value A” on page 23.	
	Voltage range DC incl. maximum tolerances	9.6 V ... 60 V	
	Connection type	M12 connector, 5 pin	
		Tightening torque	5.3 lb-in (0.6 Nm)
	Power loss buffer	> 10 ms	
	Overload current protection at input	Non-replaceable fuse	
	Back-up fuse	Nominal rating: Characteristic:	2 A slow blow
	Peak inrush current	14 A	
Power supply Type F	Redundant power supply		
	Rated voltage range DC	24 V ... 48 V ⚠ Observe the warning for railway standard EN 50155! See “Devices featuring supply voltage with the characteristic value F” on page 24.	
	Voltage range DC incl. maximum tolerances	16.8 V ... 60 V	
	Connection type	7/8" connectors, 5-pin	
		Tightening torque	22 lb-in (2.5 Nm)
	Power loss buffer	> 10 ms No buffering of powered devices (PDs)	
	Overload current protection at input	Non-replaceable fuse	
	Back-up fuse	Nominal rating: Characteristic:	7 A slow blow
	Peak inrush current	4.9 A	

Power supply Type N	Rated voltage range DC	72 V ... 110 V	
	Voltage range DC incl. maximum tolerances	50.4 V ... 138 V	
	Connection type	7/8" connectors, 4-pin	
		Tightening torque	22 lb-in (2.5 Nm)
	Power loss buffer	> 10 ms No buffering of powered devices (PDs)	
	Overload current protection at input	Non-replaceable fuse	
	Back-up fuse	Nominal rating: Characteristic:	2.5 A slow blow
	Peak inrush current	2.5 A	
Insulation voltage between supply voltage connections and housing		Supply voltage	
		Type A	707 V DC
		Type F	707 V DC
		Type N	1414 V DC
Connection type	M12 connector, 5 pin		
	Tightening torque	5.3 lb-in (0.6 Nm)	
Climatic conditions during operation	Ambient temperature	−40 °F ... +158 °F (−40 °C ... +70 °C) [a]	
	Humidity	5 % ... 100 % (also in condensing atmospheres)[b]	
	Air pressure	minimum 795 hPa (+6562 ft; +2000 m) maximum 1060 hPa (−1312 ft; −400 m)	
Climatic conditions during storage	Ambient temperature	−40 °F ... +185 °F (−40 °C ... +85 °C)	
	Humidity	5 % ... 100 % (also in condensing atmospheres)[c]	
	Air pressure	minimum 700 hPa (+9842 ft; +3000 m) maximum 1060 hPa (−1312 ft; −400 m)	
Degree of protection		IP65/67[d]	
Mounting	Flat surface mounting		
	Screw type	M5	
Pollution degree		2	

a. Applies to devices with PoE only as long as the temperature of the device base plate remains under 194 °F (90 °C).
b. Remove the provided transport protection caps and the transport protection screws from the device. Seal unused sockets and plugs with your desired type of protection screws which you can order separately.
c. Remove the provided transport protection caps and the transport protection screws from the device. Seal unused sockets and plugs with your desired type of protection screws which you can order separately.
d. To preserve the suitability of your device for IP65/67, proceed as follows: Remove all provided transport protection caps and transport protection screws. Seal unused sockets and plugs with your desired type of protection screws which you can order separately.

Dimension drawings

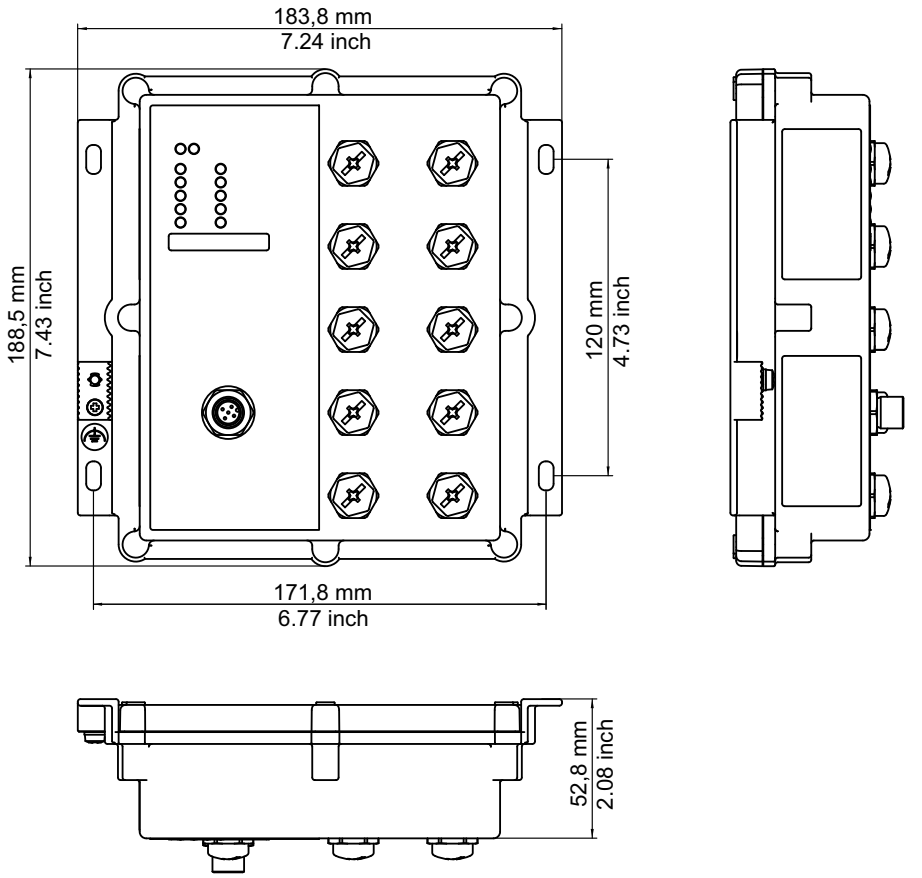


Figure 1: Dimensions

EMC and immunity

EMC interference immunity			
IEC/EN 61000-4-2	Electrostatic discharge		
	Contact discharge		6 kV
	Air discharge		8 kV
IEC/EN 61000-4-3	Electromagnetic field		
	80 MHz ... 2700 MHz		20 V/m
IEC/EN 61000-4-4	Fast transients (burst)		
	AC/DC supply connection		2 kV
	Data line		4 kV
IEC/EN 61000-4-5	Voltage surges		
	DC supply connection	line/line	1 kV
		line/ground	2 kV
	Data line		1 kV
IEC/EN 61000-4-6	Conducted disturbances		
	150 kHz ... 80 MHz		10 V
EN 61000-4-9	Pulse magnetic fields		300 A/m

EMC interference emission		
EN 55032	Class A	Yes
FCC 47 CFR Part 15	Class A	Yes

EMC interference emission		
German Lloyd	Classification + Construction Guidelines VI-7-3 Part 1 Ed.2001	Yes

Stability		
Vibration	IEC 60068-2-6 Test FC test level according to IEC 61131-2	Yes
	Germanischer Lloyd Guidelines for the Performance of Type Tests Part 1	Yes
	IEC 60870-2-2 table 3 normal installation according to EN 61850-3	Yes
	EN 61373, Category 1, Class A (broadband noise), installation in acc. with EN 50155	Yes
Shock	IEC 60068-2-27 Test Ea test level according to IEC 61131-2	Yes
	IEC 60870-2-2 table 3 normal installation according to EN 61850-3	Yes
	EN 61373, Category 1, Class A (broadband noise), installation in acc. with EN 50155	Yes

Network range

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

Power consumption/power output

Device name and product code	Maximum power consumption	Power output
OS20-001000T5T5TAFUHB	5.8 W	19.8 Btu (IT)/h
OS20-001000T5T5TNEUHB	12 W	41 Btu (IT)/h
OS24-081000T5T5TFFUHB	80 W	68 Btu (IT)/h
OS24-081000T5T5TNEUHB	80 W	68 Btu (IT)/h

Scope of delivery

Device name and product code	Scope of delivery
OS20-001000T5T5TAFUHB	OCTOPUS device
	Connector ELWIKA 5012 PG7 for supply voltage **Note:** The connector ELWIKA 5012 PG7 (933 175-100) supports a temperature range from −13 °F to +158 °F (−25 °C to +70 °C). It may thus limit the application range of the overall system. Special connectors with protection classes IP65/67 and an extended temperature range are available on request.
	General safety instructions
OS24-081000T5T5TFFUHB	OCTOPUS device
	Ferrite with key
	General safety instructions
OS20-001000T5T5TNEUHB OS24-081000T5T5TNEUHB	OCTOPUS device
	General safety instructions

Order numbers/product description

Device name and product code	Order number
OS20-001000T5T5TAFUHB	942 025-001
OS20-001000T5T5TNEUHB	942 025-002
OS24-081000T5T5TFFUHB	942 025-003
OS24-081000T5T5TNEUHB	942 025-004

Table 8: Device types: product code, order number

Accessories

Note: Some products recommended as accessories do not support the entire temperature range specified for the device. They can thus restrict the possible range of usage for the overall system. Special sockets with protection class IP65/67 and an extended temperature range are available on request. Unsealed accessory parts such as RJ45 adapters or terminal cables are not suitable for use within an IP65/67 area.

Name	Order number
Connector ELWIKA 5012 PG7 (5-pin M12 socket for voltage supply)	933 175-100
Field-attachable 5-pin M12 socket, “A”-coded with 2 cable outputs	RKC5/Duo
M12 connector, 4-pin, “D”-coded	934 445-001
7/8" connectors, 4-pin	942 086-004
7/8" connectors, 5-pin	942 086-005
Connection cable with M12 connector, “D”-coded	934 497-00x
Transition M12 “D”-coded to RJ45	934 498-001
Protection screw for M12 socket, metal, IP65/67 (25 pieces)	942 057-001
Protection screw for M12 socket, plastic, IP65/67 (25 pieces)	942 057-002
Protection screw for M12 plug, metal, IP65/67 (10 pieces)	942 115-001

Underlying technical standards

Name	
EN 50121-4	Railway applications - EMC - emitted interference and interference immunity for signal and telecommunication systems
EN 50155	Railway applications - Electronic equipment used on rolling stock
EN 55032	Electromagnetic compatibility of multimedia equipment – Emission Requirements
EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
EN 61131-2	Programmable controllers – Part 2: Equipment requirements and tests
FCC 47 CFR Part 15	Code of Federal Regulations
Germanischer Lloyd	Rules for Classification and Construction VI-7-2 – GL
72/245/EWG, 2009/19/EG	E type certification for use in vehicles
DIN 5510-2, NF F 16-101, NF F 16-102	Fire protection in railway vehicles
UL 60950-1	Information technology equipment – Safety – Part 1: General requirements

Table 9: List of the technical standards

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.

A Further support

Technical questions

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

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

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

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

Hirschmann Competence Center

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

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

With the Hirschmann Competence Center, you decided against making any compromises. Our client-customized package leaves you free to choose the service components you want to use.

Internet:
http://www.hicomcenter.com

HIRSCHMANN

A BELDEN BRAND