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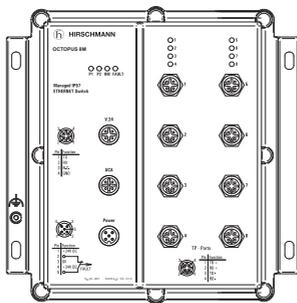
A **BELDEN** BRAND

User Manual

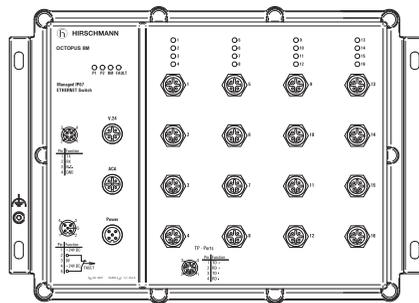
Installation

IP65/67 Switch

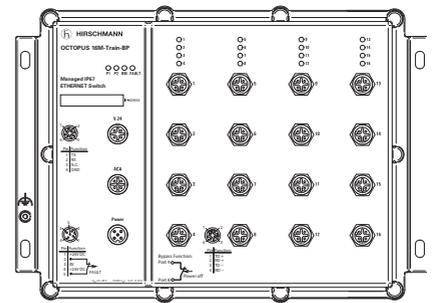
OCTOPUS 8M..., OCTOPUS 16M..., OCTOPUS 24M..., OCTOPUS OS32...



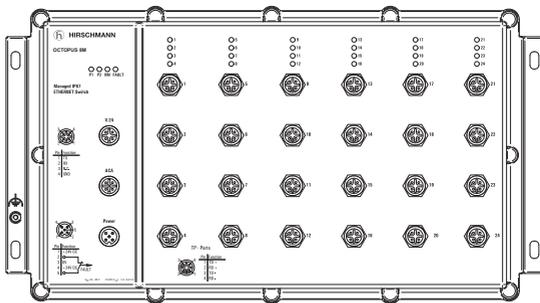
OCTOPUS 8M



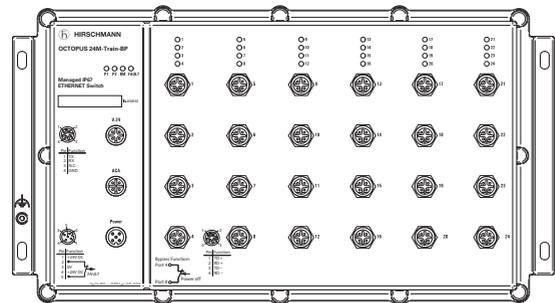
OCTOPUS 16M



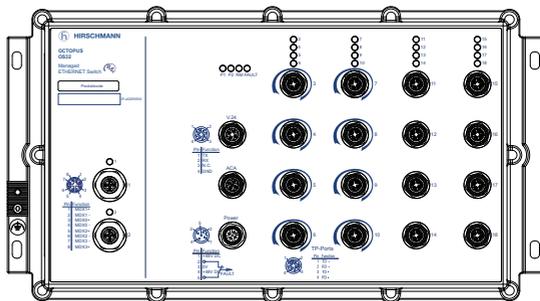
OCTOPUS 16M-Train-BP



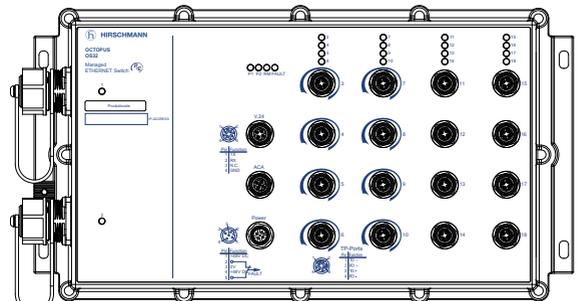
OCTOPUS 24M



OCTOPUS 24M-Train-BP



OCTOPUS OS32-081602T6T6...



OCTOPUS OS32-081602O6O6...

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You can get the latest version of this manual on the Internet at:
<https://www.doc.hirschmann.com>

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Important information

Note: Read these instructions carefully, and familiarize yourself with the device before trying to install, operate, or maintain it. The following notes may appear throughout this documentation or on the device. These notes warn of potential hazards or call attention to information that clarifies or simplifies a procedure.

■ Symbol explanation



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



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



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



DANGER

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



WARNING

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



CAUTION

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

NOTICE

NOTICE provides information about procedures that do not involve the risk of injury.

Safety instructions

WARNING

UNCONTROLLED MACHINE ACTIONS

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

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

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

■ **General safety instructions**

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

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

■ **Certified usage**

- Use the 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 39.](#)
- Connect to the product only components suitable for the requirements of the specific application case.

Operational environment:

- ▶ On the inside of vehicles
- ▶ On the inside of buildings

■ Strain relief

Note: If the strain relief is insufficient, there is a potential risk of torsion, contact problems and creeping interruptions.

- Relieve the connection points of cables and lines from mechanical stress.
- Design strain reliefs in such a way that they help prevent any mechanical damage to cables, wires or conductors caused by external influences or their own weight.
- To help prevent damage to device connections, connectors and cables, follow the instructions for proper installation in accordance with DIN VDE 0100-520:2013-06, sections 522.6, 522.7 and 522.13.

■ Device casing

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

- Never insert pointed objects (narrow screwdrivers, wires, etc.) into the device or into the connection terminals for electric conductors. Do not touch the connection terminals.
- At ambient air temperatures $> +60\text{ °C}$ ($+140\text{ °F}$):
The surfaces of the device housing may become hot. Avoid touching the device while it is operating.
- To preserve the suitability of your device for IP65/67, perform the following work steps:
 - Remove the premounted transport protection caps.
 - Seal unused sockets and plugs with your desired type of protection screws which you can order separately.

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

- Use a wire diameter for the ground conductor that is no smaller than the diameter of the supply voltage connection, however of at least 0.5 mm² (AWG20).
- Ground the device before connecting any other cables.
- Disconnect the grounding only after disconnecting all other cables.

■ **Shielding ground**

The overall shield of a connected shielded twisted pair cable is connected to the ground connection on the metal housing as a conductor.

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

■ **Supply voltage**

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

The supply voltage is electrically isolated from the housing.

- Only use voltage supply cables with the permitted diameter specified by the manufacturer of the right angled cable socket.
- Relevant for North America:
Devices without Power-over-Ethernet (PoE) may only be connected to a supply voltage of class 2 that fulfills the requirements of the National Electrical Code, Table 11(b). If the voltage is being supplied redundantly (two different voltage sources), the combined supply voltages must fulfill the requirements of the National Electrical Code, Table 11(b).
- Relevant for North America: For use in Class 2 circuits.
Only use copper wire/conductors of class 1, 75 °C (167 °F).

■ **E marking**

This applies to the following device variants only:

- ▶ OCTOPUS 8M-8PoE
- ▶ OCTOPUS 8M-6PoE
- ▶ OCTOPUS 16M-8PoE
- ▶ OCTOPUS 24M-8PoE

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

▶ **72/245/EEC**

Council Directive on the approximation of the laws of the Member States relating to the suppression of radio interference produced by sparkignition engines fitted to motor vehicles.

▶ **2009/19/EC**

Commission Directive amending, for the purposes of its adaption to technical progress, Council Directive 72/245/EEC relating to the radio interference (electromagnetic compatibility) of vehicles.

Certified devices are marked with an E type approval indicator.

Only applies to OCTOPUS OS32...:

UN/ECE Regulation No. 10

Uniform provisions concerning the approval of vehicles with regard to electromagnetic compatibility.

Note: For use in connection with a suitable type approved power supply only.

Note: Devices are not specified for operation during the motor start phase.

Certified devices are marked with an E type approval indicator.

■ **CE marking**

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

▶ **2011/65/EU and 2015/863/EU (RoHS)**

Directive of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

▶ **2014/30/EU (EMC)**

Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.

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
www.hirschmann.com

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

The device can be used in industrial environments.

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

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

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

■ **UKCA marking**

The labeled devices comply with the following UK regulations:

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



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

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

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

The device can be used in industrial environments.

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

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

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

■ **LED or laser components**

Relevant for OCTOPUS OS32-08xx02O6O6...:

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

■ **FCC note**

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

OCTOPUS 8M/16M/24M/OS32

U.S. Contact Information

Belden – St. Louis
1 N. Brentwood Blvd. 15th Floor
St. Louis, Missouri 63105, United States
Phone: 314.854.8000

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

■ **Recycling note**

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

About this Manual

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

The documentation for your device is made up of the following documents:

- ▶ Safety and general information sheet
- ▶ Installation user manual
- ▶ Basic Configuration user manual
- ▶ Redundancy Configuration user manual
- ▶ Reference manual for the graphical user interface
- ▶ Command Line Interface reference manual

You find these manuals as PDF files on the Internet on the Hirschmann product pages (www.hirschmann.com).

Key

The symbols used in this manual have the following meanings:

▶	Listing
□	Work step
■	Subheading

1 Description

1.1 General device description

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

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

The device works without a fan.

The device complies with the degree of protection IP65/67.

The voltage is supplied redundantly.

Depending on the device variant, you can choose various media to connect terminal devices and other infrastructure components:

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

The redundancy concept allows the network to be reconfigured quickly.

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

- ▶ Telnet
- ▶ Web browser
- ▶ Network management software (for example Industrial HiVision)
The Network Management Software Industrial HiVision provides you with options for smooth configuration and monitoring. You find further information on the Internet at the Hirschmann product pages:
<http://www.hirschmann.com/en/QR/INET-Industrial-HiVision>
- ▶ V.24 interface (locally on the device)

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

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

1.2 Description of the device variants

1.2.1 Devices without Power over Ethernet

The following device variants provide 8 to 24 10BASE-T/100BASE-TX ports (RJ45 connections) for connecting network segments or terminal devices:

- ▶ OCTOPUS 8M, OCTOPUS 8M-Train, OCTOPUS 8M-Train-BP
- ▶ OCTOPUS 16M, OCTOPUS 16M-Train, OCTOPUS 16M-Train-BP
- ▶ OCTOPUS 24M, OCTOPUS 24M-Train, OCTOPUS 24M-Train-BP

The following device variants also feature a bypass function on two ports for bridging periods without power:

- ▶ OCTOPUS 8M-Train-BP
- ▶ OCTOPUS 16M-Train-BP
- ▶ OCTOPUS 24M-Train-BP

As long as the device is switched off and during the system start, relays connect port 4 and port 8 to each other on a crossed basis. This passive bypass enables data communication between the devices connected to these ports.

As soon as the device is ready to operate, it automatically deactivates the bypass function and actively exchanges data.

The OCTOPUS devices ... Train and Train-BP correspond to the requirements as per EN 50155:

Rail applications – electronic systems in railway vehicles.

Device	Number of TX Ports	Number of these that are relay ports (bypass function)
OCTOPUS 8M, OCTOPUS 8M-Train	8	-
OCTOPUS 8M-Train-BP	8	2 (Port 4 and port 8)
OCTOPUS 16M, OCTOPUS 16M-Train	16	-
OCTOPUS 16M-Train-BP	16	2 (Port 4 and port 8)
OCTOPUS 24M, OCTOPUS 24M-Train	24	-
OCTOPUS 24M-Train-BP	24	2 (Port 4 and port 8)

1.2.2 Devices with Power over Ethernet

The following device variants, i.e. OCTOPUS ...PoE... and OS32..., support Power over Ethernet (PoE) in accordance with IEEE 802.3af:

- ▶ OCTOPUS 8M-8PoE
- ▶ OCTOPUS 8M-6PoE
- ▶ OCTOPUS 16M-8PoE
- ▶ OCTOPUS 24M-8PoE
- ▶ OCTOPUS OS32-081602T6T6TPEPHH
- ▶ OCTOPUS OS32-080802T6T6TPEPHH
- ▶ OCTOPUS OS32-081602O6O6TPEPHH
- ▶ OCTOPUS OS32-080802O6O6TPEPHH
- ▶ OCTOPUS OS32-080802O6O6TPEPH1
- ▶ OCTOPUS OS32-080802O6O6TPEPH2

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

Depending on the device variant, the OCTOPUS ...PoE... and OS32 provides 6 to 8 10BASE-T/100BASE-TX ports (M12 sockets) for connecting network segments or PoE end devices (PD, Powered Device) for all IEEE802.3af classes up to a maximum output power of 15.4 W.

You find the prescribed tightening torque in chapter:

[“General technical data” on page 39](#)

Device	Number FX ports	Number TX ports	Gigabit-capable TX ports included	PoE-capable TX ports included
OCTOPUS 8M-8PoE	—	8	—	8 (ports 1 to 8)
OCTOPUS 8M-6PoE	—	8	—	6 (ports 1 to 3 and 5 to 7)
OCTOPUS 16M-8PoE	—	16	—	8 (ports 1 to 8)
OCTOPUS 24M-8PoE	—	24	—	8 (ports 1 to 8)
OCTOPUS OS32-081602T6T6TPEPHH	—	18	2 (ports 1 and 2)	8 (ports 3 to 10)
OCTOPUS OS32-080802T6T6TPEPHH	—	10	2 (ports 1 and 2)	8 (ports 3 to 10)
OCTOPUS OS32-081602O6O6TPEPHH	2 (unequipped SFP slots)	16	—	8 (ports 3 to 10)
OCTOPUS OS32-080802O6O6TPEPHH	2 (unequipped SFP slots)	8	—	8 (ports 3 to 10)
OCTOPUS OS32-080802O6O6TPEPH1	2 (M-Fast-SFP SM/LC EEC pre-installed)	8	—	8 (ports 3 to 10)

Device	Number FX ports	Number TX ports	Gigabit-capable TX ports included	PoE-capable TX ports included
OCTOPUS OS32-080802O6O6TPEPH2	2 (1 M-Fast-SFP SM/LC EEC pre-installed in slot 1, SFP slot 2 unequipped)	8	—	8 (ports 3 to 10)

You will recognize the PoE-capable ports from the printed PoE logo.

The voltage is supplied through the wire pairs transmitting the signal (phantom voltage). The individual ports are not electrically insulated from each other.

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

- ▶ Endpoint PSE
- ▶ Alternative A

The OCTOPUS ...PoE... and OS32... devices meet the requirements of EN 50155:

Railway applications – electronic systems in railway vehicles.

1.3 Power supply

The supply voltage and the signal contact are connected via a 5-pin M12 connector (“A”-coded, e.g. ELWIK A 5012 PG7 from Hirschmann, included in the delivery).

You find the prescribed tightening torque in chapter:

[“General technical data” on page 39](#)

The supply voltage can be connected redundantly. Both inputs are uncoupled. There is no distributed load. With redundant supply, the power supply unit with the higher output voltage supplies the device on its own. The supply voltage is electrically isolated from the housing.

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

Further information:

[“Wiring the connectors for supply voltage and signal contact” on page 30](#)

1.4 PoE voltage (optional)

The PoE voltage for the OCTOPUS ...PoE... and OS32... devices is connected via a 5-pin M12 connector (“A”-coded, e.g. ELWIK A 5012 PG7 from Hirschmann, supplied).

You find the prescribed tightening torque in chapter:

[“General technical data” on page 39](#)

The OCTOPUS ... PoE... and OS32... devices are supplied with PoE voltage (48 V DC safety low voltage) via an external power supply unit. The PoE voltage is fed into the 5-pin M12 connector of the OCTOPUS ... PoE... or OS32... The PoE voltage to the twisted-pair cables is supplied via the wire pairs transmitting the signal (phantom voltage).

Further information:

[“Connecting the PoE voltage \(optional\)” on page 31](#)

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 the pin assignments for making patch cables here:

[“Pin assignments” on page 22](#)

1.5.1 10/100 Mbit/s twisted pair port

This port is a 4-pin, “D”-coded 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 (if autonegotiation is activated)
- ▶ 100 Mbit/s half-duplex mode, 100 Mbit/s full duplex mode
- ▶ 10 Mbit/s half-duplex mode, 10 Mbit/s full duplex mode

Delivery state: Autonegotiation activated

The socket housing is electrically connected with the device housing.

1.5.2 10/100 Mbit/s PoE port

This port is designed as an 4-pin M12 socket.

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

This port supports:

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

Delivery state: Autonegotiation activated

The socket housing is electrically connected with the device housing.

The PoE voltage is input via the wire pairs transmitting the signal (phantom supply).

1.5.3 10/100/1000 Mbit/s twisted pair port

This port is an 8-pin, "X"-coded M12 socket.

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

This port supports:

- ▶ Autonegotiation
(10/100/1000 Mbit/s half and full duplex)
- ▶ Autopolarity
- ▶ Autocrossing

The socket housing is electrically connected with the device housing.

1.5.4 100/1000 Mbit/s F/O port

This port is an IP67-V1 socket according to IEC 61076-3-106, variant 1, for SFP transceivers.

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

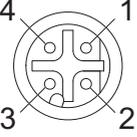
This port supports:

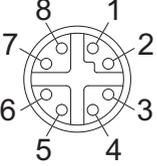
- ▶ Full duplex mode

Delivery state:

- ▶ OCTOPUS OS32-08xx02O6O6TPEPHH:
Empty SFP slots, prepared for the use of SFP transceivers
[See “Accessories” on page 50.](#)
- ▶ OCTOPUS OS32-08xx02O6O6TPEPH1:
SFP shafts equipped with the Fast Ethernet transceiver M-Fast SFP-SM/LC EEC
- ▶ OCTOPUS OS32-080802O6O6TPEPH2:
 - ▶ SFP slot 1 equipped with the Fast Ethernet transceiver M-Fast SFP-SM/LC EEC
[See figure 3 on page 28.](#)
 - ▶ SFP slot 2 empty, prepared for the use of SFP transceivers
[See “Accessories” on page 50.](#)

1.5.5 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

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

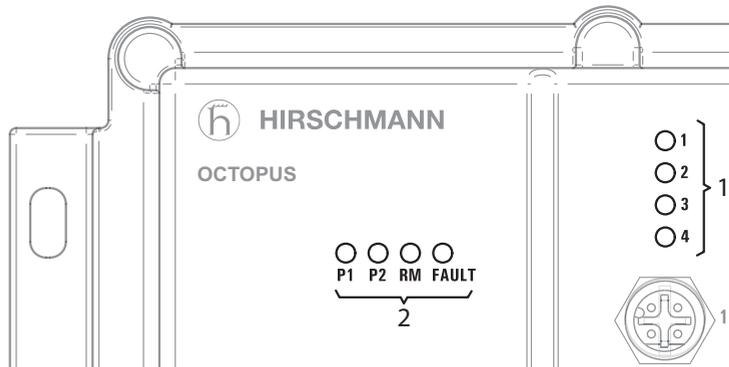


Figure 1: Display elements
 1 - Port status LEDs (here: for ports 1 to 4)
 2 - Device status LEDs

1.6.1 Device status

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

LED	Display	Color	Activity	Meaning
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	Signal contact	red	none	The signal contact is closed, it is not reporting any detected errors.
			lights up	The signal contact is open - it is reporting a detected error.
RM	Redundancy Manager	—	none	The RM function is deactivated.
		green	lights up	The RM function is active. The redundant port is disabled.
			flashing	The device detects an incorrect configuration of the HIPER-Ring (for example the ring is not connected to the ring port).
		yellow	lights up	The RM function is active. The redundant port is enabled.

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

1.6.2 Port Status

These LEDs display port-related information. During the boot phase, they indicate the status of the boot process.

LED	Display	Color	Activity	Meaning
Port No	Link status	—	none	Device detects an invalid or missing link
		green	lights up	Device detects a valid link
			flashes 1 × a period	Port is switched to stand-by
			flashes 3 × a period	Port is switched off
yellow	flashing	Device is transmitting and/or receiving data		

Note: You can query the port status for activated Power over Ethernet via the software management.

1.7 Management interfaces

1.7.1 V.24 interface (external management)

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

VT100 terminal settings	
Speed	9600 Baud
Data	8 bit
Stopbit	1 bit
Handshake	off
Parity	none

The socket housing is electrically connected to the housing of the device. For devices with PoE the V.24 interface uses the housing potential, and for devices without PoE it uses the supply voltage potential.

Figure	Pin	Function
	1	TX. Transmit Data
	2	RX Receive Data
	3	N.C. Not used
	4	GND Ground

Table 1: Pin assignment of the V.24 interface (M12 socket)

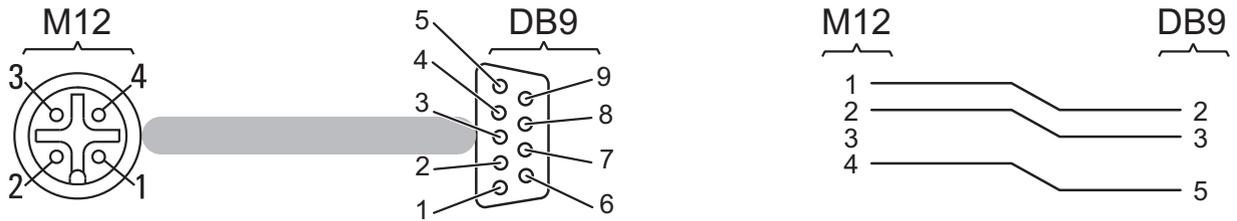


Figure 2: Terminal cable for connecting an external Management Station

The Terminal cable is available as an accessory.

See “Accessories” on page 50.

You will find a description of the V.24 interface in the “User Manual Basic Configuration” document.

1.7.2 ACA interface (ACA21-M12)

This interface offers you the ability to connect the storage medium AutoConfiguration Adapter . This storage medium is used for saving/loading the configuration and diagnostic functions, and for loading the software. This interface is a 5-pin, “A”-coded M12 socket with shielding.

Note: The AutoConfiguration adapter **ACA11-M12** available for certain Hirschmann devices is incompatible with OCTOPUS 8M/16M/24M/OS32 devices.

	Pin	Function
	1	U _{in} 5 V
	2	N.C. Not used
	3	D- Data -
	4	GND Ground (0 V)
	5	D+ Data +

Table 2: Pin assignment of the USB interface, 5-pin, “A”-coded M12 socket

1.8 Signal contact “FAULT”

The signal contact (“FAULT”) is used to monitor the device function, and thus supports remote diagnostics. You can specify the type of function monitoring in the Management.

You can also use the Management to set the signal contact manually and thus control external devices

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

- ▶ At least one power supply is inoperable.
- ▶ The device is not operational.
- ▶ The failure of the connection on at least one port.
The report of the link status can be masked by the Management for each port. In the delivery state is deactivated.
- ▶ Loss of the ring redundancy reserve.
- ▶ A detected error during the self-test.
- ▶ Incorrect configuration of the HIPER-Ring or ring coupling.

The following condition is also reported in RM mode:

- ▶ Ring redundancy reserve is available. On delivery, there is no ring redundancy monitoring.

2 Installation

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

On delivery, the device is ready for operation.

Perform the following steps to install and configure the device:

- ▶ [Checking the package contents](#)
- ▶ [Installing an SFP transceiver \(optional\)](#)
- ▶ [Installing and grounding the device](#)
- ▶ [Wiring the connectors for supply voltage and signal contact](#)
- ▶ [Connecting the PoE voltage \(optional\)](#)
- ▶ [Operating the device](#)
- ▶ [Connecting data cables](#)

Note: Dust, moisture and fire protection is only achieved under the following conditions:

- ▶ All the unused connections and ports are sealed with the appropriate protection screws.
[See “Accessories” on page 50.](#)
- ▶ All the connectors and cables connected also fulfill protection class IP65/67.

2.1 Checking the package contents

- Check whether the package includes all items named in the section [“Scope of delivery” on page 49.](#)
- Check the individual parts for transport damage.

2.2 Installing an SFP transceiver (optional)

Only use SFP transceivers intended for the operation of OS32 devices.

See [“Accessories” on page 50](#).

You have the option to combine these transceivers with each other in any way or also to leave SFP slots unoccupied.

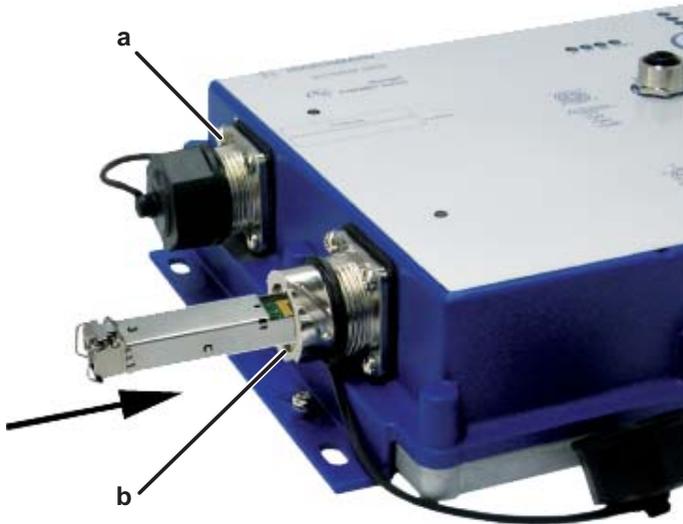


Figure 3: *Mounting an SFP transceiver*

a - SFP slot 1

b - SFP slot 2

Perform the following work steps:

- Remove the protection cap from the SFP transceiver.
- Push the transceiver with the lock closed into the slot until it latches in.

Note: The SFP mounting tool available as an accessory makes it easier for you to insert the SFP transceivers.

See [“Installing an SFP transceiver \(optional\)” on page 28](#).

2.3 Installing and grounding the device

2.3.1 Mounting on a flat surface

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

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. It can be mounted on temperature-isolating material.

Protection class IP65/67 is only achieved when all connections and ports are screwed.

Protection classes IP65/67 are **only** achieved when all the components connected fulfill the protection types IP65/67.

Only connect plugs and other components that fulfill protection classes IP65/67 and that are certified for a temperate range from -40 °C to +70 °C (-40 °F to +158 °F).

Perform the following work steps:

- Prepare the drill holes at the installation point.
- Mount the device on a level surface with 4 M5 screws.
- To preserve the suitability of your device for IP65/67, perform the following work steps:
 - Remove the premounted transport protection caps.
 - Seal unused sockets and plugs with your desired type of protection screws which you can order separately.

[See “Accessories” on page 50.](#)

2.3.2 Grounding the device

Using functional grounding you achieve an electromagnetically compatible installation of the device.

The overall shield of a connected shielded twisted pair cable is connected to the ground connection on the metal housing as a conductor.

- Connect the grounding conductor to the grounding screw at the device housing.
- Use toothed washers to ensure good electrical conductivity at the connection.

2.4 Wiring the connectors for supply voltage and signal contact

The supply voltage and the signal contact are connected via a 5-pin M12 connector.

You find the prescribed tightening torque in chapter:

[“General technical data” on page 39](#)

The supply voltage can be connected redundantly. Both inputs are uncoupled. There is no distributed load. With redundant supply, the power supply unit with the higher output voltage supplies the device on its own. The supply voltage is electrically isolated from the housing.

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

- ▶ The power supply cable is suitable for the voltage, the current and the physical load. Hirschmann recommends a conductor cross section of 0.5 mm² to 0.75 mm² (AWG20 up to AWG18).
- ▶ The permitted cable diameter for connector ELWIKA 5012 PG7 is 4 mm (0.15 in) to 6 mm (0.23 in). To ensure the watertightness of the OCTOPUS 8M/16M/24M/OS32 device, only use voltage supply cables with a diameter within the specified range.
- ▶ Use a back-up fuse suitable for the supply network.
[See “General technical data” on page 39.](#)
- ▶ Make sure that the disconnecting device is easily accessible for disconnecting the device from the mains voltage.

Note: Connectors are not electrical isolating devices. Therefore, first plug the connector into the power supply plug and then switch on the power supply.

- Mount the connector for the supply voltage and the signal contact on the front of the device.

Figure	Pin	Function
	1	+ 24 V DC (1)
	2	Fault
	3	0 V DC
	4	+ 24 V DC (2)
	5	Fault

Table 3: Pin assignment of the 5-pin M12 socket for connecting the 24 V supply voltage and the signal contact

2.5 Connecting the PoE voltage (optional)

- Verify that the external power supply unit you use to provide the PoE voltage complies with the following basic prerequisites:
 - ▶ Insulation requirements according to IEEE 802.3af (insulation resistance 48 V, output to “rest of the world” 2250 V DC for 1 min)
 - ▶ Output power < 150 W
 - ▶ Current limitation < 5 A
 - ▶ The power supply unit and the PoE media module form a “limited power source” according to IEC 60950-1.
 - ▶ The external PoE power supply unit provides the power for the connected PDs.
 - ▶ 10 ms failure bridging (inclusive Powered Devices) in accordance with EN 61131-2
 - ▶ CE marking in accordance with 2014/30/EU
 - ▶ Complies with requirements of EN 50155
- Connect the PoE voltage to the 5-pin M12 plug included in the scope of delivery.

You find the prescribed tightening torque in chapter:
[“General technical data” on page 39](#)

Comply with the following conditions:

- ▶ Supply line length < 3 m
- ▶ Cross section of the supply lines $\geq 0,75 \text{ mm}^2$ or AWG 18.

Note: Do not operate the OCTOPUS ...PoE... and OS32-... devices in series. Only connect single external power supply units directly to an OCTOPUS ...PoE... or OS32-... device.

Figure	Pin	Function
	1	+ 48 V DC (1)
	2	Fault
	3	0 V DC
	4	+ 48 V DC (2)
	5	Fault

Table 4: Pin assignment of the 5-pin M12 socket for connecting the PoE supply voltage and the signal contact

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. To reduce inductive coupling, verify that the power supply cables and data cables cross at a 90 ° angle.
- Use shielded data cables for gigabit transmission via copper cables, for example SF/UTP cables according to ISO/IEC 11801. To meet EN 50121-4 and marine application requirements, use shielded data cables at all transmission rates.
- Connect the data cables according to your requirements.
[See “Ethernet ports” on page 20.](#)
- ▶ Use a shielded CAT5 cable or better.
- ▶ Use shielded M12 connectors.
- ▶ Connect only PoE-powered devices whose data connections are located in the interior of the building and are specified as SELV circuits according to IEC 60950-1 or ES1 circuits according to IEC/EN 62368-1.
- ▶ Applies for the device variants OCTOPUS ...Train BP:
For coupling using relay ports, the maximum permitted overall length of all cable segments between the actively communicating devices is 100 m. Exceeding the maximum overall length compromises the data communication.

Perform the following work steps:

- Connect the data cables according to your requirements.
The tightening torque is 5.3 lb-in (0.6 Nm).
- Connect the cable shield to the connector housing.
- Seal all unused ports with the appropriate protection caps or protection screws.
[See “Accessories” on page 50.](#)

3 Making basic settings

The IP parameters must be entered when the device is installed for the first time. The device provides 6 options for configuring the IP addresses:

- ▶ Entry via V.24 connection
- ▶ Entry using the HiDiscovery protocol via the application HiDiscovery or Industrial HiVision application
- ▶ Configuration via BOOTP
- ▶ Configuration via DHCP
- ▶ Configuration via DHCP (Option 82)
- ▶ AutoConfiguration Adapter

Note: Applies for the device variants OCTOPUS ...Train BP:

- Avoid the use of the ring manager function for port 4 and port 8 (relay ports).
- Deactivate the Spanning Tree Protocol if you use the relay ports as data rate 10 Mbits/s.
- Use the same port configuration for the relay ports.
The device features the following options:
 - ▶ Auto-negotiation with autocrossing
 - ▶ MDI or MDIX
 - ▶ Half duplex or full duplex
 - ▶ 10 Mbit/s or 100 Mbit/s
- Test the device configuration for flawless operation by switching off the current to the devices connected via relay ports.

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

■ Default settings

- ▶ IP address: The device looks for the IP address using DHCP
- ▶ Password for management:
Login: user; password: public (read only)
Login: admin; password: private (read and write)
- ▶ Parameters that can be set via the management are set to pre-defined values in accordance with the MIB
- ▶ V.24 data rate: 9600 Baud
- ▶ Ring redundancy: deactivated
- ▶ Ethernet ports: link status is not evaluated (signal contact)
- ▶ Optical 100 Mbit/s ports: 100 Mbit/s full duplex
All other ports: autonegotiation
- ▶ Ring manager disabled

3.1 First log in (password change)

Perform the following steps:

- Open the Graphical User Interface or the Command Line Interface the first time you log on to the device.
- Log on to the device with the default password “private”. The device prompts you to type in a new password.
- Type in your new password.
Choose a password that contains at least 8 characters which includes upper-case characters, lower-case characters, numerical digits, and special characters.
- When you log on to the device with the Command Line Interface, then the device prompts you to confirm you new password.
- Log on to the device again with your new password.

4 Monitoring the ambient air temperature

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

See [“General technical data” on page 39](#).

The ambient air temperature is the temperature of the air at a distance of 5 cm (2 in) from the device. It depends on the installation conditions of the device, for example the distance from other devices or other objects, and the output of neighboring devices.

The temperature displayed in the CLI (Command Line Interface) and the GUI (Graphical User Interface) is the internal temperature of the device. It is higher than the ambient air temperature. The maximum internal temperature of the device named in the technical data is a guideline that indicates to you that the maximum ambient air temperature has possibly been exceeded.

5 Maintenance and service

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

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

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

6 Disassembly

6.1 Removing the device

Perform the following work steps:

- Disconnect the data cables.
- Disable the supply voltage.
- Disconnect the grounding.
- Unmount the device.

6.2 Unmounting an SFP transceiver (optional)

To unmount SFP transceivers on OS32 devices, you require the SFP mounting tool available.

See “Accessories” on page 50.



Figure 4: SFP mounting tool
1 – mounting side
2 – barbed hooks
3 – disassembly side

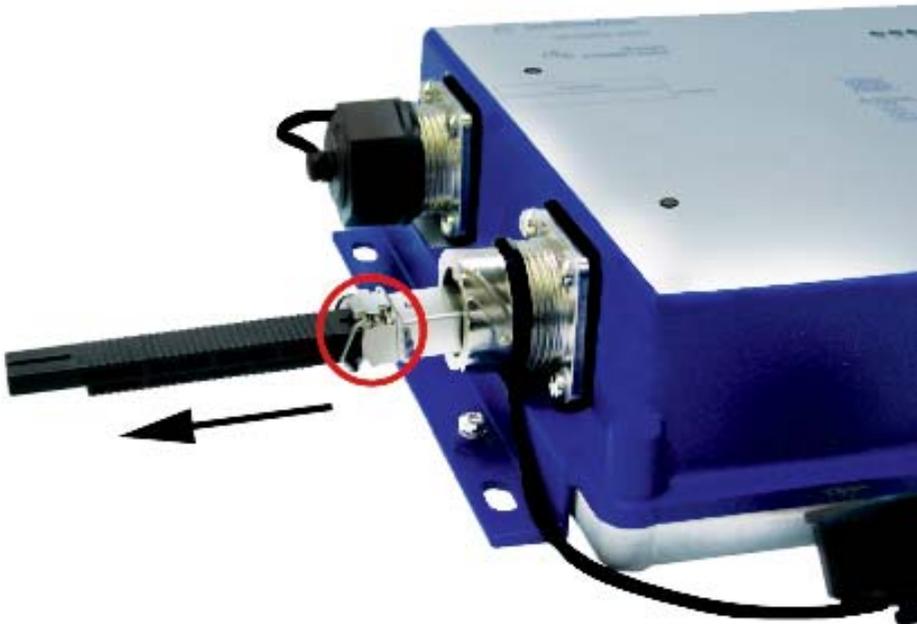


Figure 5: Unmounting an SFP transceiver

Perform the following work steps:

- Insert the SFP mounting tool into the SFP transceiver so that the barbed hooks point to the base plate of the device and snap into the lock of the SFP transceiver.
- Pull the SFP transceiver out of the SFP slot using the mounting tool.
- Close the SFP slot with the protection cap.

7 Technical data

7.1 General technical data

Dimensions W × D × H	OCTOPUS 8M... OCTOPUS 16M..., OCTOPUS OS32-0808... OCTOPUS 24M..., OCTOPUS OS32-0816...	See "Dimension drawings" on page 42.
Weight	OCTOPUS 8M	approx. 1.4 kg (3.09 lb)
	OCTOPUS 8M-Train	
	OCTOPUS 8M-Train-BP	
	OCTOPUS 8M-8PoE	
	OCTOPUS 8M-6PoE	
	OCTOPUS 16M	approx. 2.0 kg (4.41 lb)
	OCTOPUS 16M-Train	
	OCTOPUS 16M-Train-BP	
	OCTOPUS 16M-8PoE	
	OCTOPUS OS32-0808...	approx. 2.0 kg (4.41 lb)
	OCTOPUS 24M	approx. 2.6 kg (5.73 lb)
	OCTOPUS 24M-Train	
	OCTOPUS 24M-Train-BP	
	OCTOPUS 24M-8PoE	
	OCTOPUS OS32-0816...	approx. 2.6 kg (5.73 lb)

Power supply OCTOPUS... (without PoE)	Redundant power supply Safety extra-low voltage (SELV/PELV) redundant inputs disconnected. Relevant for North America: NEC Class 2 power source max. 2 A.			
	Rated voltage range	24 V DC ... 48 V DC		
	Voltage range incl. maximum tolerances	9.6 V DC ... 60 V DC		
	Rated voltage range for railway applications according to EN 50155	24 V DC ... 36 V DC		
	Voltage range including maximum tolerances for rail applications according to EN 50155 (permanent)	16.8 V DC ... 45 V DC		
	Voltage range including maximum tolerances for rail applications according to EN 50155 (0.6 × U _N for 0.1 s; 1.4 × U _N for 1 s)	14.4 V DC ... 50.4 V DC		
	Connection type	M12 connector, 5-pin		
		Tightening torque	0.6 Nm (5.3 lb-in)	
	Power loss buffer	>10 ms		
	Back-up fuse	Nominal rating:	5 A	
Characteristic:		slow blow		
Peak inrush current	13.8 A			
Power supply OCTOPUS...PoE..., OS32-...	Redundant power supply Safety extra-low voltage (SELV/PELV) redundant inputs disconnected. Max. 5 A			
	Rated voltage	48 V DC		
	Voltage range incl. maximum tolerances	46 V DC ... 57 V DC		
	Connection type	M12 connector, 5-pin		
		Tightening torque	0.6 Nm (5.3 lb-in)	
	Power loss buffer	>10 ms when using a PC150... power supply unit		
	Back-up fuse	Nominal rating:	5 A	
		Characteristic:	slow blow	
Peak inrush current	14 A			
Insulation voltage between supply voltage connections and housing	OCTOPUS ... (without PoE or Train)	800 V DC Protective elements limit the insulation voltage to 90 V DC (1 mA)		
	OCTOPUS ... Train	707 V DC		
	OCTOPUS ... Train-BP			
	OCTOPUS...PoE..., OS32-...	2,250 V DC		

Signal contact "FAULT"	Switching current	max. 1 A, resistive load ^{ab}
	Switching voltage	max. 60 V DC or max. 30 V AC SELV according to IEC 60950-1 or ES1 according to IEC/ EN 62368-1
	Connection type	M12 connector, 5-pin
	Tightening torque	0.6 Nm (5.3 lb-in)
Climatic conditions during operation	Ambient air temperature ^c	-40 °C ... +70 °C (-40 °F ... +158 °F)
	Humidity	10 % ... 100 % (also in condensing atmospheres) ^d
	Air pressure	min. 795 hPa (+2000 m ASL; +6562 ft ASL) max. 1060 hPa (-400 m ASL; -1312 ft ASL)
Climatic conditions during storage	Ambient air temperature ^a	-40 °C ... +85 °C (-40 °F ... +185 °F)
	Humidity	10 % ... 100 % (also in condensing atmospheres) ^e
	Air pressure	min. 700 hPa (+3000 m ASL; +9842 ft ASL) max. 1060 hPa (-400 m ASL; -1312 ft ASL)
Protection classes	Laser protection	Class 1 in compliance with IEC 60825-1
	Degree of protection	IP65/67 ^f
Pollution degree		2

- a. For switching voltages greater than 30 V DC: max. 0.5 A, resistive load
- b. Relevant for North America: max. 0.5 A, resistive load
- c. Temperature of the ambient air at a distance of 5 cm (2 in) from the device
- d. 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.
- e. 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.
- f. To preserve the suitability of your device for IP65/67, proceed as follows: Remove all provided transport protection caps. Seal unused sockets and plugs with your desired type of protection screws which you can order separately.

7.2 Dimension drawings

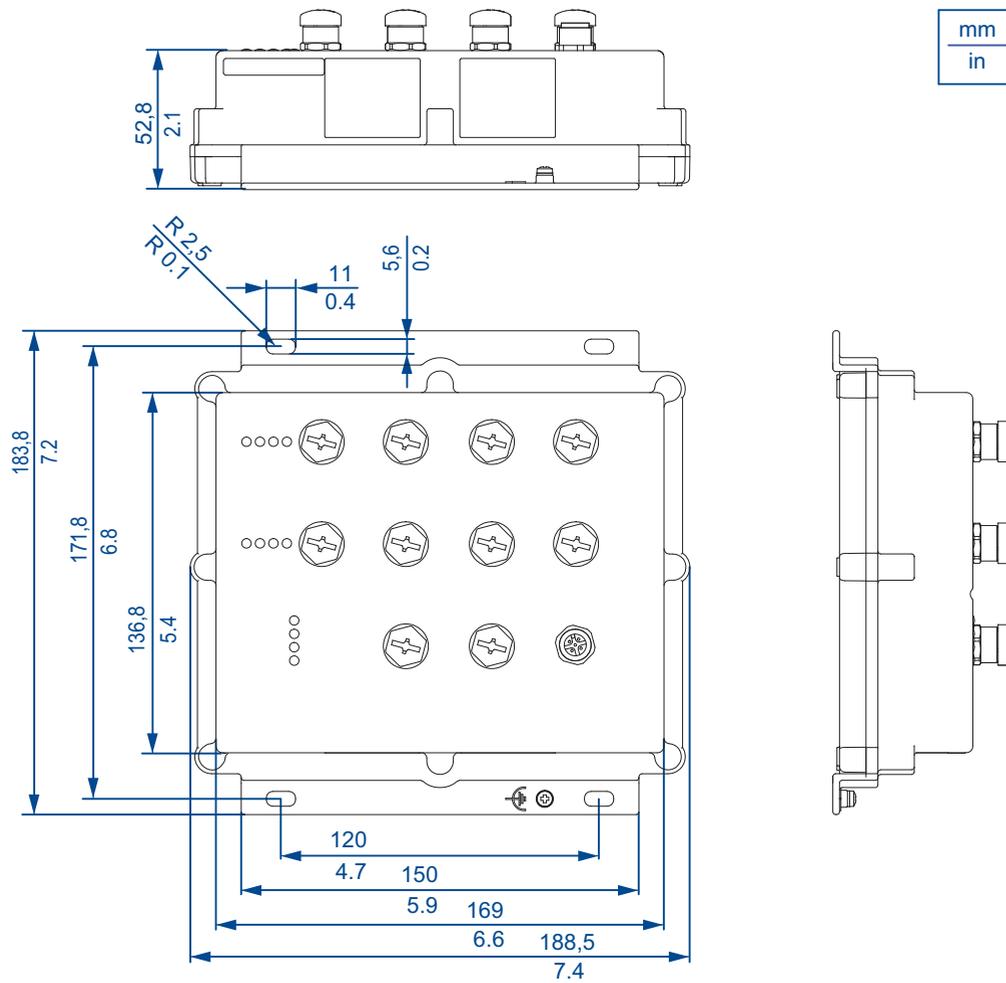


Figure 6: Measurements for the following devices:

- OCTOPUS 8M (shown in the figure)
- OCTOPUS 8M-Train
- OCTOPUS 8M-Train-BP
- OCTOPUS 8M-6PoE
- OCTOPUS 8M-8PoE

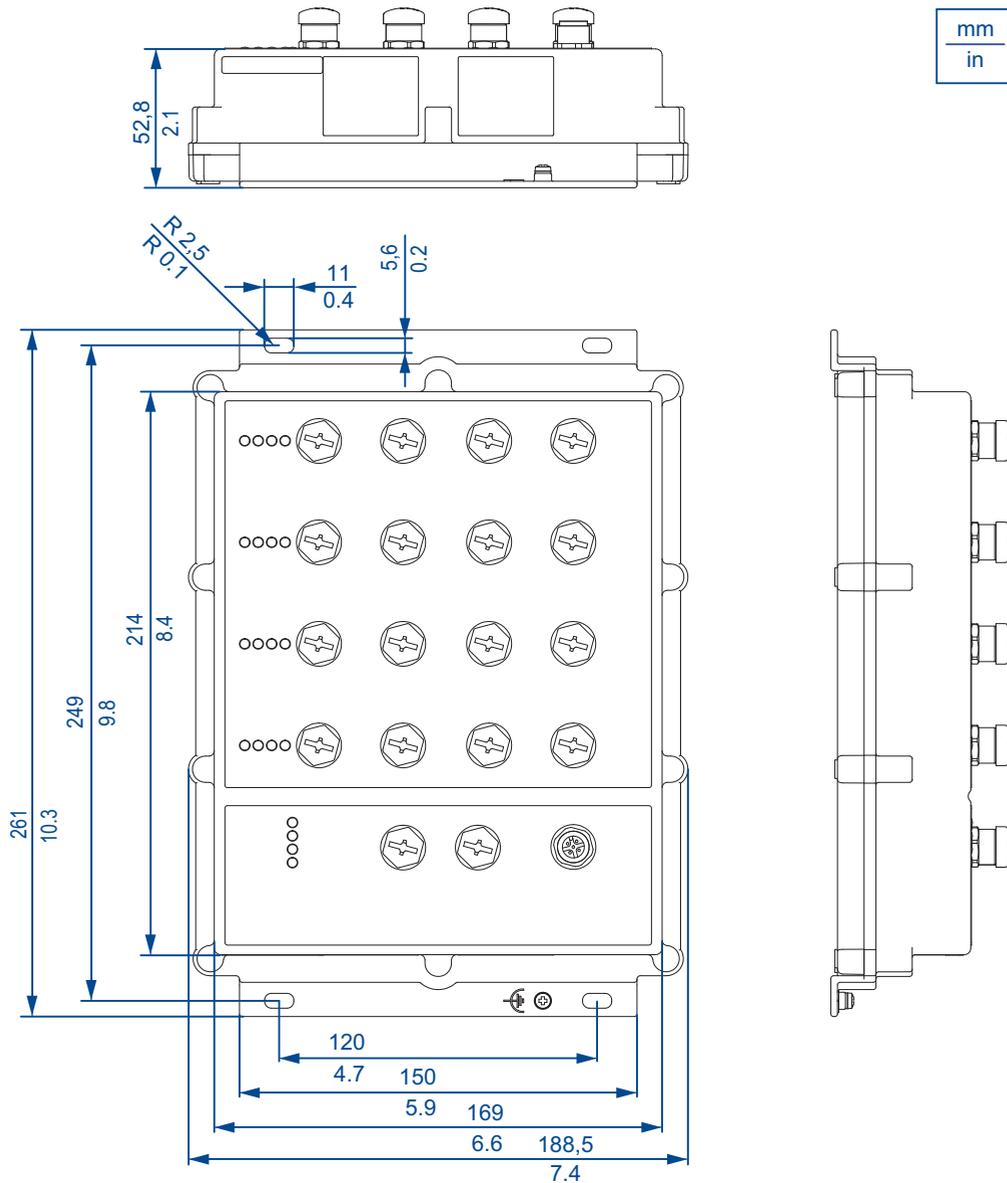


Figure 7: Dimensions for the following devices:

- OCTOPUS 16M (shown in the figure)
- OCTOPUS 16M-Train
- OCTOPUS 16M-Train-BP
- OCTOPUS 16M-8PoE
- OCTOPUS OS32-080802T6T6TPEPHH
- OCTOPUS OS32-080802O6O6TPEPHH
- OCTOPUS OS32-080802O6O6TPEPH1
- OCTOPUS OS32-080802O6O6TPEPH2

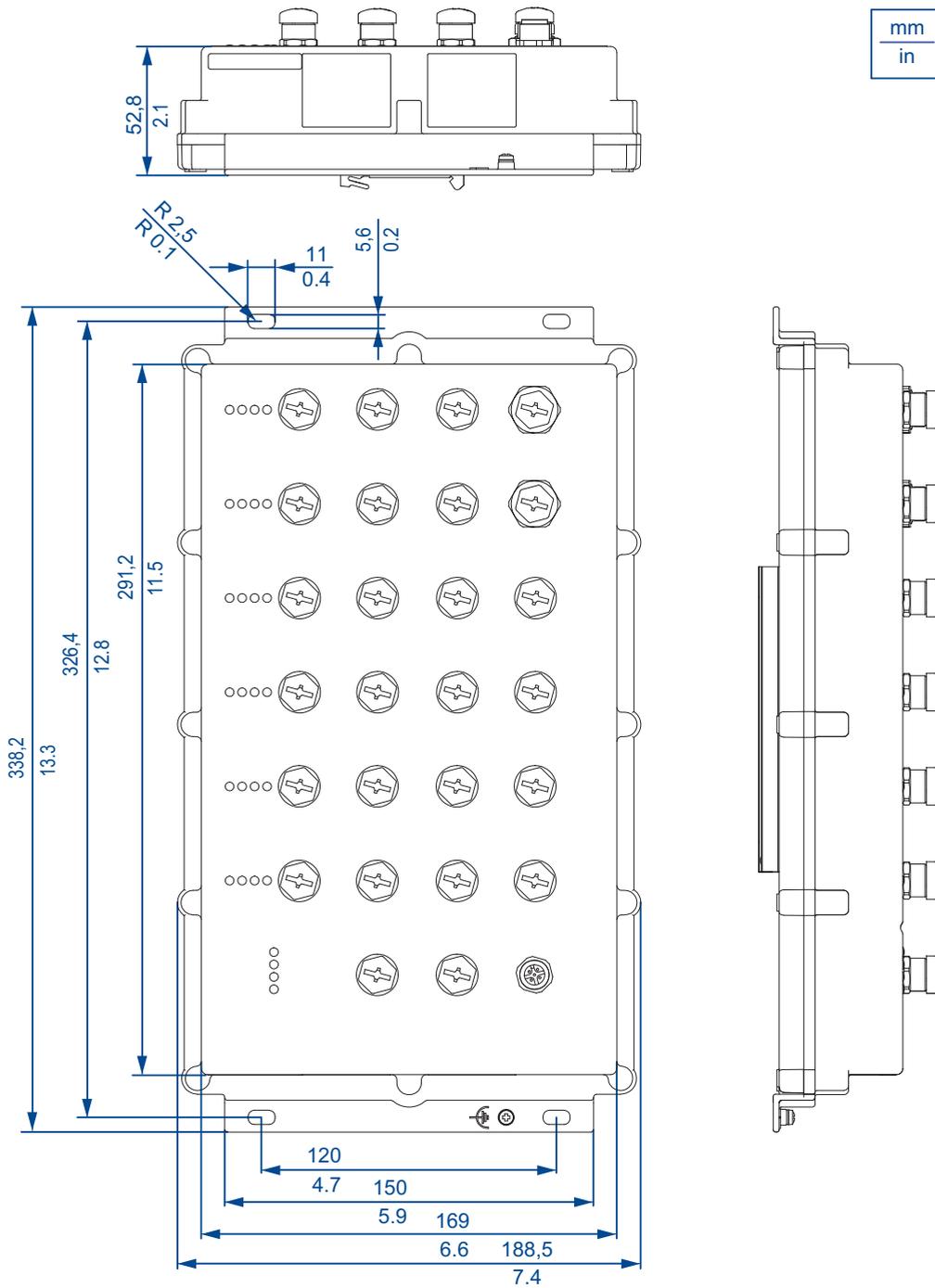


Figure 8: Dimensions for the following devices:
 - OCTOPUS 24M (shown in the figure)
 - OCTOPUS 24M-8PoE
 - OCTOPUS 24M-Train
 - OCTOPUS 24M-Train-BP
 - OCTOPUS OS32-081602T6T6TPEPHH
 - OCTOPUS OS32-081602O6O6TPEPHH

7.3 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 ... 1000 MHz	max. 20 V/m
	1.4 GHz ... 2.0 GHz	max. 10 V/m
	2.0 GHz ... 2.7 GHz	max. 5 V/m
	2.7 GHz ... 6.0 GHz	max. 3 V/m
IEC/EN 61000-4-4	Fast transients (burst)	
	Power line	4 kV
	Data line	4 kV
IEC/EN 61000-4-5	Voltage surges	
	Power line, line / line	1 kV
	Power Line, line / ground	2 kV
	Data line	1 kV
IEC/EN 61000-4-6	Conducted disturbances	
	150 kHz ... 80 MHz	10 V
EMC interference emission		
EN 55032	Class A	
FCC 47 CFR Part 15	Class A	
DNV Guidelines	EMC B (only for the OCTOPUS 8M, OCTOPUS 16M and OCTOPUS 24M devices)	
Immunity		
Vibration	IEC 60068-2-6 Test FC test level according to IEC 61131-2	
	DNV guidelines for the performance of type approvals – Part 1	
	IEC 60870-2-2 table 3 normal installation according to EN 61850-3	
	EN 61373, Category 1, Class A (broadband noise), installation in acc. with EN 50155	
Shock	IEC 60068-2-27 Test Ea test level according to IEC 61131-2	
	IEC 60870-2-2 table 3 normal installation according to EN 61850-3	
	EN 61373, Category 1, Class A (broadband noise), installation in acc. with EN 50155	

7.4 Network range

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

Product code M-FAST-SFP-...	Mode ^a	Wave length	Fiber	System attenuation	Example for F/O cable length ^b	Fiber attenuation	BLP/ Dispersion
-MM/LC...	MM	1310 nm	50/125 μm	0 dB ... 8 dB	0 km ... 5 km (0 mi ... 3.11 mi)	1.0 dB/km	800 MHz×km
-MM/LC...	MM	1310 nm	62.5/125 μm	0 dB ... 11 dB	0 km ... 4 km (0 mi ... 2.49 mi)	1.0 dB/km	500 MHz×km
-SM/LC...	SM	1310 nm	9/125 μm	0 dB ... 13 dB	0 km ... 25 km (0 mi ... 15.53 mi)	0.4 dB/km	3.5 ps/(nm×km)
-SM+/LC...	SM	1310 nm	9/125 μm	10 dB ... 29 dB	25 km ... 65 km (15.53 mi ... 40.39 mi)	0.4 dB/km	3.5 ps/(nm×km)
-LH/LC...	SM	1550 nm	9/125 μm	10 dB ... 29 dB	47 km ... 104 km (29.20 mi ... 64.62 mi)	0.25 dB/km	19 ps/(nm×km)
-LH/LC...	SM	1550 nm	9/125 μm	10 dB ... 29 dB	55 km ... 140 km (14.29 mi ... 86.99 mi)	0.18 dB/ km ^c	18 ps/(nm×km)

Table 5: Fiber port 100BASE-FX (SFP fiber optic Fast Ethernet Transceiver)

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

7.5 Power consumption/power output

Name		Maximum power consumption	Power output
OCTOPUS 8M		6.2 W	21 Btu (IT)/h
OCTOPUS 8M-Train		6.2 W	21 Btu (IT)/h
OCTOPUS 8M-Train-BP		7.0 W	24 Btu (IT)/h
OCTOPUS 8M-8PoE	non-PD (powered device)	10.0 W	34 Btu (IT)/h
	8 × Class0-PD	142.0 W	51 Btu (IT)/h
OCTOPUS 8M-6PoE	non-PD (powered device)	10.0 W	34 Btu (IT)/h
	6 × Class0-PD	110.0 W	50 Btu (IT)/h
OCTOPUS 16M		9.5 W	32 Btu (IT)/h
OCTOPUS 16M-Train		9.5 W	32 Btu (IT)/h
OCTOPUS 16M-Train-BP		12.0 W	41 Btu (IT)/h
OCTOPUS 16M-8PoE	non-PD (powered device)	13.5 W	46 Btu (IT)/h
	8 × Class0-PD	145.0 W	62 Btu (IT)/h
OCTOPUS 24M		13.5 W	46 Btu (IT)/h
OCTOPUS 24M-Train		13.5 W	46 Btu (IT)/h
OCTOPUS 24M-Train-BP		14.0 W	48 Btu (IT)/h
OCTOPUS 24M-8PoE	non-PD (powered device)	16.8 W	57 Btu (IT)/h
	8 × Class0-PD	148.8 W	74 Btu (IT)/h
OCTOPUS OS32-081602T6T6TPEPHH	non-PD (powered device)	18.0 W	62 Btu (IT)/h
	8 × Class0-PD	145.0 W	67 Btu (IT)/h
OCTOPUS OS32-080802T6T6TPEPHH	non-PD (powered device)	13.0 W	44 Btu (IT)/h
	8 × Class0-PD	140.0 W	52 Btu (IT)/h
OCTOPUS OS32-081602O6O6TPEPHH	non-PD (powered device)	18.0 W	62 Btu (IT)/h
	8 × Class0-PD	145.0 W	67 Btu (IT)/h
OCTOPUS OS32-080802O6O6TPEPHH	non-PD (powered device)	13.0 W	44 Btu (IT)/h
	8 × Class0-PD	140.0 W	52 Btu (IT)/h
OCTOPUS OS32-080802O6O6TPEPH1	non-PD (powered device)	13.0 W	44 Btu (IT)/h
	8 × Class0-PD	140.0 W	52 Btu (IT)/h
OCTOPUS OS32-080802O6O6TPEPH2	non-PD (powered device)	13.0 W	44 Btu (IT)/h
	8 × Class0-PD	140.0 W	52 Btu (IT)/h

8 Scope of delivery, order numbers and accessories

■ Scope of delivery

The connector ELWIK A 5012 PG7 (933 175-100) supports a temperature range from -25 °C to +70 °C (-13 °F to +158 °F). It may thus limit the application range of the overall system.

You can obtain special sockets for the total temperature range and with the degree of protection IP65/67 and on request.

Device	Scope of delivery
OCTOPUS 8M	▶ OCTOPUS device
OCTOPUS 8M-Train	▶ ELWIK A 5012 PG7 connector for supply
OCTOPUS 8M-Train-BP	voltage and signal contact
OCTOPUS 8M-8PoE	▶ Safety and general information sheet
OCTOPUS 8M-6PoE	
OCTOPUS 16M	
OCTOPUS 16M-Train	
OCTOPUS 16M-Train-BP	
OCTOPUS 16M-8PoE	
OCTOPUS 24M	
OCTOPUS 24M-Train	
OCTOPUS 24M-Train-BP	
OCTOPUS 24M-8PoE	
OCTOPUS OS32-081602T6T6TPEPHH	
OCTOPUS OS32-080802T6T6TPEPHH	
OCTOPUS OS32-081602O6O6TPEPHH	
OCTOPUS OS32-080802O6O6TPEPHH	
OCTOPUS OS32-080802O6O6TPEPH1	
OCTOPUS OS32-080802O6O6TPEPH2	

■ Accessories

Note that products recommended as accessories may have different characteristics to those of the device, which may limit the application range of the overall system. For example, if you add an accessory with IP20 to a device with IP65, the degree of protection of the overall system is reduced to IP20.

To sustain the IP65/67 suitability for your device, use the accessories with IP65/67 properties exclusively.

The following accessory parts are not suitable for use within IP65/67 areas:

- ▶ RJ45 adapters
- ▶ Terminal cable

You can obtain special sockets for the total temperature range and with the degree of protection IP65/67 and on request.

Name	Operating temperature (chassis)	Order number
AutoConfiguration Adapter ACA21-M12 (EEC)		943 913-003
Terminal cable		943 902-001
ELWIK A 5012 PG7 connector (5-pin M12 socket for power supply and signal contact)		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
M12 connector, 8 pin, "X"-coded		942 083-001
Connection line with M12 connectors, 4 pin, "D"-coded		
Length 2 m		934 578-001
Length 5 m		934 578-002
Length 10 m		934 578-003
Connection line with M12 connectors, 8 pin, "X"-coded		
Length 1 m		942 081-001
Length 2 m		942 081-002
Length 5 m		942 081-003
Transition M12 "D"-coded to RJ45		934 498-001
Protection screw for M12 socket, metal, IP67 (25 pieces)		942 057-001
Protection screw for M12 socket, plastic, IP67 (25 pieces)		942 057-002
Protection screw for M12 plug, metal, IP67 (10 pieces)		942 115-001
SFP mounting tool for IP67 socket		942 079-001
Industrial HiVision Network Management software		943 156-xxx
PoE power supply unit PC150/36V/48V-IP67, supply voltage 16.8 V DC ... 64 V DC		943 968-001
PoE power supply unit PC150/72 V/48V-IP67, supply voltage 50.4 V DC ... 154 V DC		943 968-101
Fast Ethernet SFP transceiver		

Name	Operating temperature (chassis)	Order number
M-FAST SFP-MM/LC EEC	-40 °C ... +70 °C (-40 °F ... +158 °F)	943 945-001
M-FAST SFP-SM/LC EEC	-40 °C ... +70 °C (-40 °F ... +158 °F)	943 946-001
M-FAST SFP-SM+/LC EEC	-40 °C ... +70 °C (-40 °F ... +158 °F)	943 947-001
M-FAST SFP-LH/LC EEC	-40 °C ... +70 °C (-40 °F ... +158 °F)	943 948-001
Gigabit Ethernet SFP transceiver		
M - SFP - SX / LC EEC	-40 °C ... +70 °C (-40 °F ... +158 °F)	943 896-001
M - SFP - LX / LC EEC	-40 °C ... +70 °C (-40 °F ... +158 °F)	943 897-001
M - SFP - LH / LC EEC	-40 °C ... +70 °C (-40 °F ... +158 °F)	943 898-001

■ Order numbers/product description

Device	Order number
OCTOPUS 8M	943 931-001
OCTOPUS 8M-Train	943 983-001
OCTOPUS 8M-Train-BP	942 091-001
OCTOPUS 8M-8PoE	943 967-001
OCTOPUS 8M-6PoE	943 967-101
OCTOPUS 16M	943 912-001
OCTOPUS 16M-Train	943 984-001
OCTOPUS 16M-Train-BP	942 092-001
OCTOPUS 16M-8PoE	943 960-001
OCTOPUS 24M	943 923-001
OCTOPUS 24M-Train	943 985-001
OCTOPUS 24M-Train-BP	942 093-001
OCTOPUS 24M-8PoE	942 063-001
OCTOPUS OS32-081602T6T6TPEPHH	942 069-001
OCTOPUS OS32-080802T6T6TPEPHH	942 069-002
OCTOPUS OS32-081602O6O6TPEPHH	942 069-003
OCTOPUS OS32-080802O6O6TPEPHH	942 069-004
OCTOPUS OS32-080802O6O6TPEPH1	942 069-005
OCTOPUS OS32-080802O6O6TPEPH2	942 069-006

9 Underlying technical standards

Name	
UL 508	Safety for Industrial Control Equipment
EN 45545-2	Railway applications - Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components.
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
DNV-CG-0339	Environmental test specification for electrical, electronic and programmable equipment and systems.
IEEE 802.1D	Switching, GARP, GMRP, Spanning Tree
IEEE 802.1D	Media access control (MAC) bridges (includes IEEE 802.1p Priority and Dynamic Multicast Filtering, GARP, GMRP)
IEEE 802.1Q	Virtual LANs (VLANs, MRP, Spanning Tree)
IEEE 802.1Q	Virtual Bridged Local Area Networks (VLAN Tagging, GVRP)
IEEE 802.1w	Rapid Reconfiguration
IEEE 802.3	Ethernet
72/245/EWG, 2009/19/EG	E type certification for use in vehicles

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

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

A Further support

Technical questions

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

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

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

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

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