![HIRSCHMANN - A BELDEN BRAND]

# User Manual

Installation
IP65/67 Switch
OCTOPUS 8TX-EEC
OCTOPUS 8TX PoE-EEC

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 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 36.
☐ 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

■ Installation site requirements

- ☐ When you are selecting the installation location, make sure you observe the climatic threshold values specified in the technical data.
- ☐ Operate the device at the specified ambient temperature (temperature of the ambient air at a distance of 2 in (5 cm) from the device) and at the specified relative humidity exclusively.
- ☐ Use the device in an environment with a maximum pollution degree that complies with the specifications in the technical data.

Note: Operation of the device in high humidity or condensing atmospheres is exclusively allowed when using recommended accessories with IP67 rating.

■ Device casing

- ☐ At ambient air 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.

■ 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.

■ Requirements for connecting electrical wires

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

General requirements for connecting electrical wires

The following requirements apply without restrictions:

- ▶ The electrical wires are voltage-free.
- ▶ The cables used are permitted for the temperature range of the application case.
- ▶ Ground the device via the ground screw.
  Disconnect the grounding only after disconnecting all other cables.
- ▶ Exclusively use 60/75 °C (140/167 °F) or 75 °C (167 °F) copper (Cu) wire.
- ▶ The power supply cable to be connected is suitable for ambient air temperature of at least 212 °F (100 °C).
- ▶ The power supply complies with the requirements for a safety extra-low voltage (SELV) as per IEC/EN 60950-1.

Requirements for connecting the supply voltage

The following requirements apply without restrictions:

All of the following requirements are complied with:
- ▶ The supply voltage corresponds to the voltage specified on the type plate of the device.
- ▶ The power supply conforms to overvoltage category I or II.
- ▶ The power supply has an easily accessible disconnecting device (for example a switch or a plug). This disconnecting device is clearly identified. So in the case of an emergency, it is clear which disconnecting device belongs to which power supply cable.
- ▶ The power supply cable 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 up to AWG18).

The following requirements apply alternatively:

Relevant when the device is supplied via 1 voltage input:	
Alternative 1	The power supply complies with the requirements for a limited power source (LPS) as per EN 60950-1.
Alternative 2	Relevant for North America: The power supply complies with the requirements according to NEC Class 2.
Alternative 3	**All** of the following requirements are complied with: ▶ The power supply complies with the requirements for a safety extra-low voltage (SELV) as per IEC/EN 60950-1. ▶ Install a fuse suitable for DC voltage in the plus conductor of the power supply. Connect the minus conductor to the ground potential. If the minus conductor is not connected to the ground potential, also install an external fuse in the minus conductor. Regarding the properties of this fuse: See "General technical data" on page 36.

Relevant when the device is supplied via 2 voltage inputs:	
Alternative 1	The **total** voltage supply meets the requirements for a limited power source (LPS) as per EN 60950-1.
Alternative 2	Relevant for North America: The **total** voltage supply complies with the requirements as per NEC Class 2.

Requirements for connecting the supply voltage	
Alternative 3	**All** of the following requirements are complied with: ▶ The power supply complies with the requirements for a safety extra-low voltage (SELV) as per IEC/EN 60950-1. ▶ In both voltage inputs, install a fuse suitable for DC voltage in the plus conductor of the power supply. In both voltage inputs, connect the minus conductor to the ground potential. If the minus conductor is not connected to the ground potential, also install an external fuse in the minus conductor. Regarding the properties of this fuse: See "General technical data" on page 36.

■ Relevant for use in explosion hazard areas (Hazardous Locations, Class I, Division 2)

This equipment is exclusively suitable for use in Class I, Division 2, Groups A, B, C, and D or non-hazardous locations.

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

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

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

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

These devices are open-type devices that are to be installed in an enclosure suitable for the environment.

Exclusively use the device for the application cases specified by the manufacturer. Failure to follow these instructions can impair device protection.

■ E marking

The labeled devices comply with the conditions of ECE Directive No. 10: Certified devices must be labeled with the E type approval indicator.

OCTOPUS 8TX-EEC devices are suited for installation in vehicles according to the conditions of ECE Regulation No. 118.

■ 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.

2014/30/EU (EMC)
Directive of the European Parliament and the council for standardizing the regulations of member states with regard 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

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

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

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.

■ 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.

Documentation mentioned in the "Installation" user manual that is not supplied with your device in print can be found as PDF download on the Internet at the Hirschmann product pages (www.hirschmann.com).

Legend

The symbols used in this manual have the following meanings:

▶	Listing
☐	Work step
■	Subheading

1   Description

1.1   General device description

The OCTOPUS 8TX-EEC 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.

The devices comply with the degrees of protection IP65/67.
The devices work without a fan.

The voltage is supplied redundantly.

1.2 Device view

1.2.1 Devices without Power over Ethernet
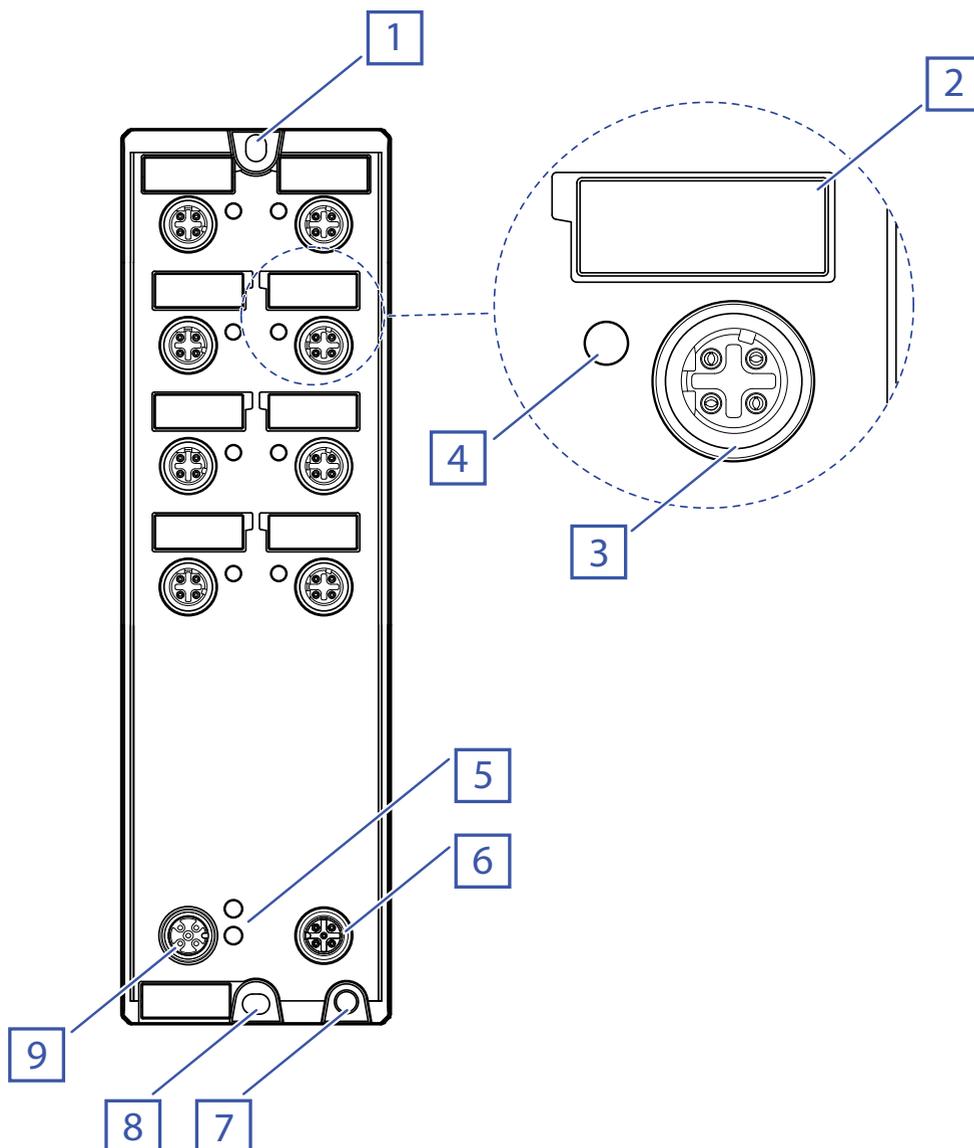
Item	Characteristic
1	Slot hole for mounting on a flat surface
2	8 × Indicator plate
3	8 × 4-pin, "D"-coded M12 socket for 10/100 Mbit/s twisted pair connections
4	8 × LED display elements for port status
5	LED display elements for supply voltage
6	M12 interface for the connection of ACA21-M12 (EEC) and ACA22-M12 (EEC)
7	Ground connection
8	Slot hole for mounting on a flat surface
9	Supply voltage connection

1.2.2   Devices with Power over Ethernet
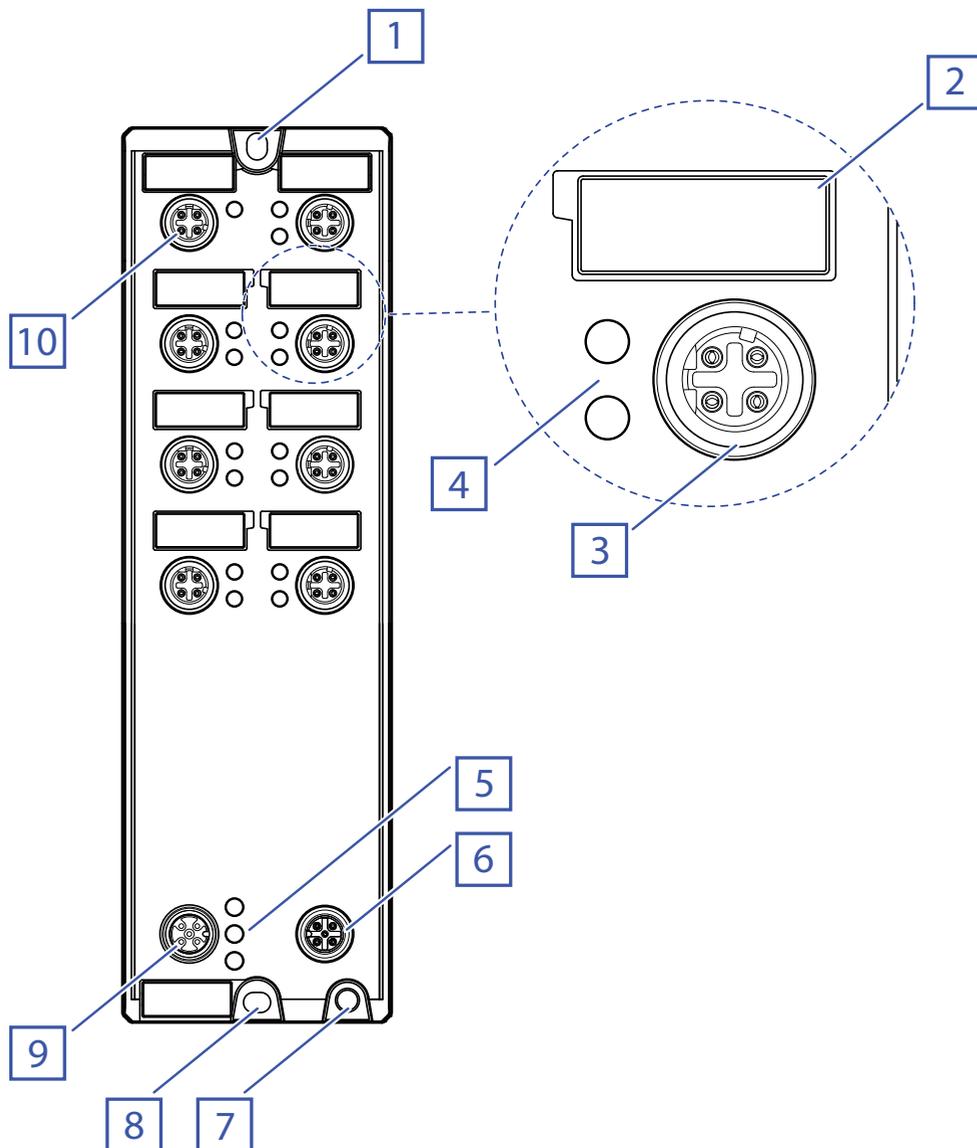
Item	Characteristic
1	Slot hole for mounting on a flat surface
2	8 × Indicator plate
3	7 × 4-pin, "D"-coded M12 socket for 10/100 Mbit/s twisted pair connections with PoE support
4	15 × LED display elements for port status PoE status
5	LED display elements for supply voltage
6	M12 interface for the connection of ACA21-M12 (EEC) and ACA22-M12 (EEC)
7	Ground connection
8	Slot hole for mounting on a flat surface
9	Supply voltage connection
10	4-pin, "D"-coded M12 socket for 10/100 Mbit/s twisted pair connections without PoE support

The device supports Power over Ethernet Plus in accordance with
IEEE 802.3at (PoE+) and enables you to supply current to terminal devices
such as IP phones via the twisted-pair cable.
The Power over Ethernet Plus function is activated both globally and on the
PoE-capable ports on delivery.
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.
In accordance with IEEE 802.3af and IEEE 802.3at:
▶ Endpoint PSE
▶ Alternative A.

1.3   Power supply

The supply voltage is connected by means of a 5-pin, "A"-coded M12
connector (e. g. ELWIKA 5012 PG7).
You will find more information here:

1.4   Ethernet ports

You can connect terminal devices and other segments at the ports of the
device via twisted pair cables.

You find information on pin assignments for making patch cables here:

1.4.1   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 screw threads of the M12 ports are electrically connected to the device casing.

1.4.2   10/100 Mbit/s PoE port

The PoE ports support the connection and a remote power supply of (for example) IP phones (Voice-over-IP), webcams, sensors, print servers, and WLAN access points. With PoE, these end devices are powered via the twisted pair cable.

This port is a 4-pin, "D"-coded M12 socket.
The 10/100 Mbit/s PoE(+) port allows you to connect network components as a powered device (PD) according to standards IEEE 802.3 10BASE-T/ 100BASE-TX and IEEE 802.3af/at.
This port supports:
▶ Autonegotiation
▶ Autopolarity
▶ Autocrossing
▶ 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/PoE+)

Devices are supplied with PoE voltage (54 V DC SELV) using the internal power supply. PoE voltage via twisted pair cables is supplied using the wire pairs transmitting the signal (phantom supply).
Delivery state: Autonegotiation activated
The screw threads of the M12 ports are electrically connected to the device casing.

The PoE voltage is uncoupled from the power supply.

The maximum PoE output of the device is 35 W.

1.4.3   Pin assignments

■ Pin assignment OCTOPUS 8TX-EEC
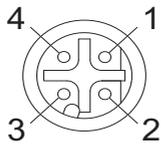
Figure	Pin	Function	
	1	TD+	Transmit Data+
	2	RD+	Receive Data+
	3	TD−	Transmit Data−
	4	RD−	Receive Data−
	Casing: shield		

■ Pin assignment OCTOPUS 8TX PoE-EEC

Figure	Pin	Function		PoE voltage input
	1	TD+	Transmit Data +	V+
	2	RD+	Receive Data +	V−
	3	TD−	Transmit Data−	V+
	4	RD−	Receive Data−	V−
	Casing: shield			

1.5 Display elements

After the supply voltage is set up, the software starts and initializes itself.
During this process, various LEDs light up.

1.5.1 Device state

These LEDs provide information about conditions which affect the operation
of the whole device.
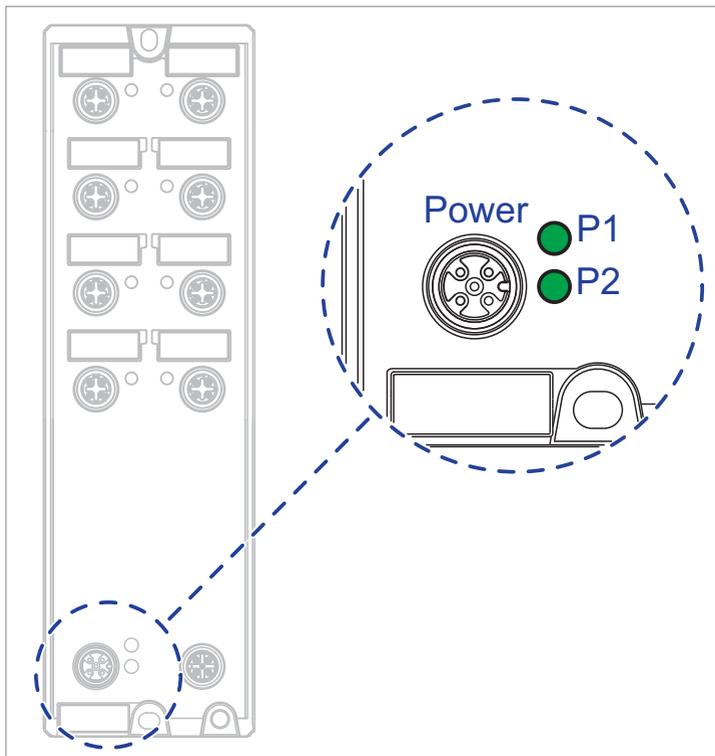
Figure 1: Display elements device status OCTOPUS 8TX-EEC

LED	Display	Color	Activity	Meaning
P1	Supply voltage 1	green	lights up	Supply voltage is on
			none	Supply voltage is too low

LED	Display	Color	Activity	Meaning
P2	Supply voltage 2	green	lights up	Supply voltage is on
			none	Supply voltage is too low
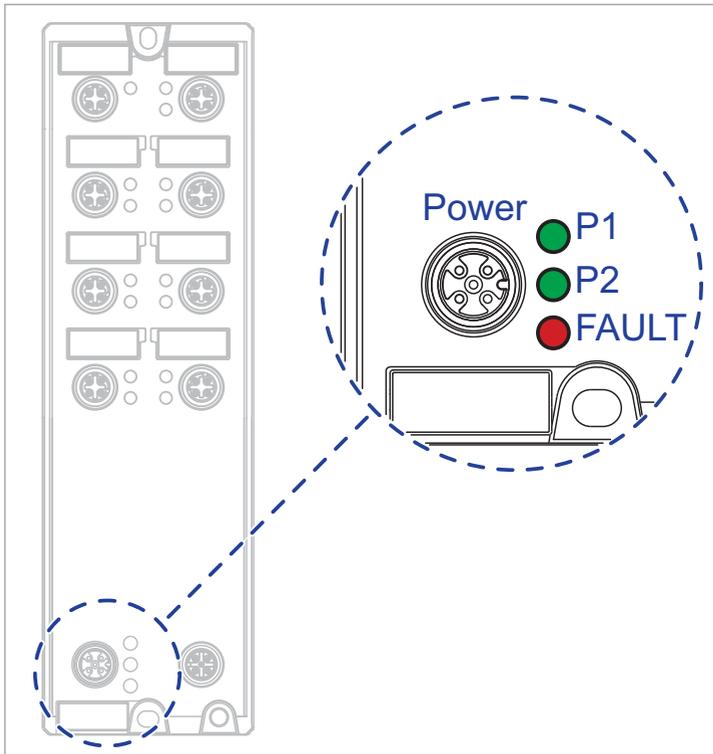
Figure 2: Display elements device status OCTOPUS 8TX PoE-EEC

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	PoE status	red	lights up	The combined power output on the PoE ports exceeds the maximum total power output.
			none	The total PoE output is sufficient.

1.5.2   Port Status

These LEDs provide port-related information.
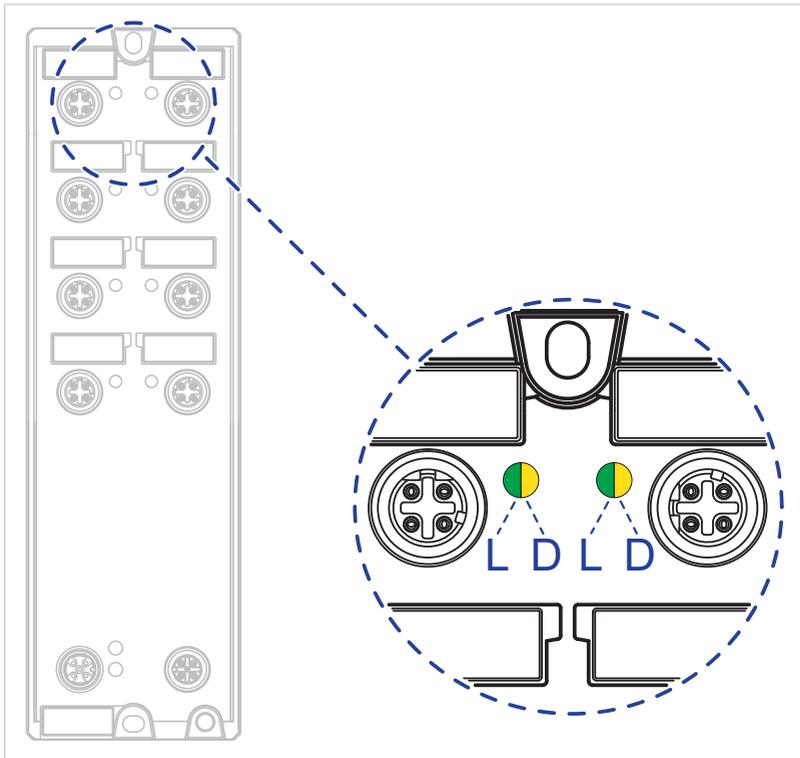
Figure 3:   Display elements port status OCTOPUS 8TX-EEC

LED	Display	Color	Activity	Meaning
L/D	Link state/ data traffic	—	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
		green/ yellow	flashing alternately	Update of the configuration via the M12 interface

Figure 4: Display elements port status OCTOPUS 8TX PoE-EEC

LED	Display	Color	Activity	Meaning
L/D	Link state/ data traffic	—	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
		green/ yellow	flashing alternately	Update of the configuration via the M12 interface
PoE		—	none	No powered device connected
		green	lights up	Powered device is supplied with power
			flashes 1 time a period	no power supply of the Powered Device - due to the device configuration the power output required by the Powered Device cannot be provided on this port
			flashes 3 times a period	No power supply to the powered device, as PoE is deactivated in the device management

1.6 Configuration interface

1.6.1 ACA-M12 interface

This interface is a 5-pin, "A"-coded M12 socket with shielding.
This interface allows you to connect the ACA21-M12 (EEC) or ACA22-M12 (EEC) storage medium.

Pin	Function	
1	U_{in}	5 V
2	N. C.	Not used
3	D-	Data -
4	GND	Ground (0 V)
5	D+	Data +
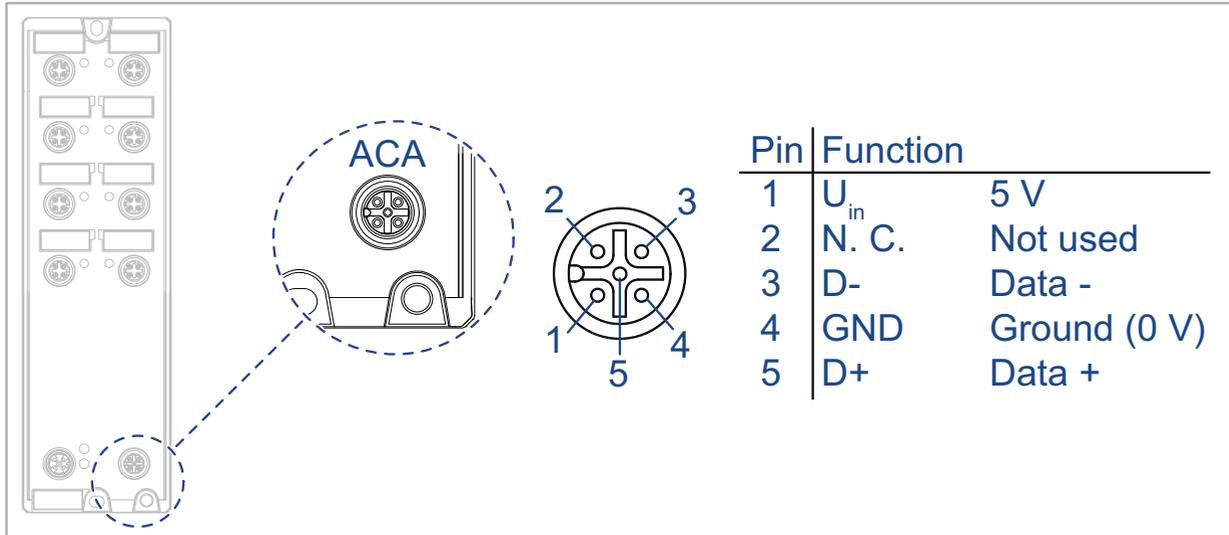
Figure 5: ACA M12 interface

Note: The USB connector is for temporary connection only.

2 Installation

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

Perform the following steps to install and configure the device:
- ▶ Checking the package contents
- ▶ Installing and grounding the device
- ▶ Wiring the connector for the supply voltage
- ▶ Operating the device
- ▶ Connecting data cables
- ▶ Configuration (optional)

2.1 Checking the package contents

- ☐ Check whether the package includes all items named in the section "Scope of delivery" on page 42.
- ☐ Check the individual parts for transport damage.

2.2 Installing and grounding the device

2.2.1 Mounting on a flat surface

Requirements:
- ☐ Select the installation site so that the climatic threshold values listed in the technical data are observed. See "Technical data" on page 36.
- ☐ To protect the exposed uninstalled contacts of the components from dirt, connect the individual system components in a dry and clean working area.
- ☐ To sustain the IP65/67 suitability for your device, seal all unused connections and ports with the provided plastic protection screws. See "Scope of delivery" on page 42. See "Accessories" on page 43 in case of an additional demand.
- ☐ To sustain the IP65/67 suitability for your device, exclusively connect components with degree of protection IP65/67.

Note: The torque for tightening the plastic protection screws on the device is 5.3 lb-in (0.6 Nm).

Proceed as follows:
- ☐ Prepare the drill holes at the installation point.
  See "Dimension drawings" on page 38.
- ☐ Mount the device on a level surface with two M4 screws.

2.2.2 Grounding the device

Requirements:
- ☐ Use a suitable wire diameter for the functional grounding. Hirschmann recommends a wire diameter of 0.5 mm² (AWG20).
- ☐ Use toothed washers to ensure good electrical conductivity at the connection.
- ☐ Ground the device via an M4 screw.
- ☐ Note the maximum screw-in depth of 0.295 in (7.5 mm) for OCTOPUS 8TX PoE-EEC devices.

Note: The grounding screw is not included in the scope of delivery.
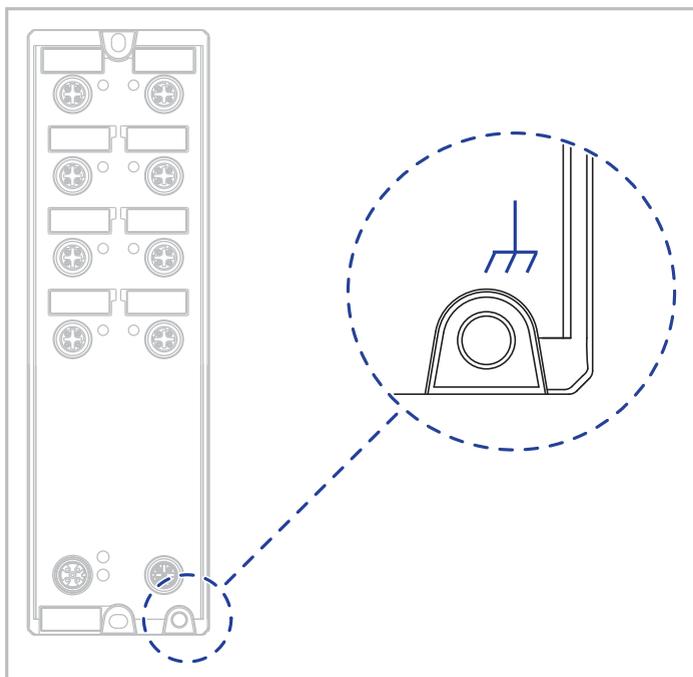
Figure 6: Functional ground on the device

Proceed as follows:
- ☐ Grounding the device is by means of a separate ground connection on the device.
  For the position of the ground connection on the device see figure 6.
- ☐ Ground the device before connecting any other cables.
- ☐ Disconnect the grounding only after disconnecting all other cables.

2.3 Wiring the connector for the supply voltage

Requirements:

▶ The power supply cable 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 up to AWG18).

▶ The permitted cable diameter for connector ELWIKA 5012 PG7 is 0.15 in (4 mm) to 0.23 in (6 mm). To ensure the watertightness of the OCTOPUS 8TX-EEC device, only use voltage supply cables with a diameter within the specified range.

▶ Make sure that the disconnecting device is easily accessible for disconnecting the device from the mains voltage.

Note: The supply voltage can be connected redundantly. Both plus connections 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. PoE devices have no PoE buffering.

Proceed as follows:

☐ Mount the connector for the supply voltage.

2.3.1 Pin assignment OCTOPUS 8TX-EEC
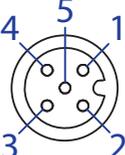
M12 5-pin ("A"- coded)	Pin	Function
	1	Power supply (1): + 12/24/36 V DC (1)
	2	Not used
	3	0 V
	4	Power supply (2): + 12/24/36 V DC (2)
	5	Not used

2.3.2 Pin assignment OCTOPUS 8TX PoE-EEC
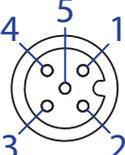
M12 5-pin ("A"- coded)	Pin	Function
	1	Power supply (1): +24 V DC (1)
	2	Not used
	3	0 V
	4	Power supply (2): +24 V DC (2)
	5	Not used

2.4 Operating the device

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

2.5 Connecting data cables

Requirements:
☐ Use a shielded CAT5e cable or better.
☐ Use SF/UTP cables as per ISO/IEC 11801:2002.
☐ Use shielded M12 connectors.
☐ Keep the length of the data cables as short as possible.
☐ When using copper cables, provide a sufficient separation between the power supply cables and the data cables.
☐ 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.
☐ Seal all unused connections and ports with the provided plastic protection screws. See "Scope of delivery" on page 42. See "Accessories" on page 43 in case of an additional demand.

Note: The torque for tightening the plastic protection screws on the device is 5.3 lb-in (0.6 Nm).

Proceed as follows:
☐ Connect the data cables according to your requirements.
☐ Make sure the cable shielding is connected to the M12 plug thread.

2.6   Configuration (optional)

The device is immediately ready for operation with its default settings, from the factory.

You have the option to change the settings according to your requirements using the ACA M12 interface.

You can find the configuration parameters described in a separate overview. See table 1 on page 30.

Requirements:

▶ **Switch Programming Tool**
   You can download the software for free on the Internet from the Hirschmann product pages:
   www.hirschmann.com/en/QR/Switch-Programing-Tool

▶ **M12 USB Adapter**
   You can connect the storage medium ACA21-M12 (EEC) or ACA22-M12 (EEC) to your PC using the M12 USB Adapter.
   The M12 USB Adapter is available as an accessory.
   See "Accessories" on page 43.

▶ **ACA21-M12 (EEC)** or **ACA22-M12 (EEC)**
   You have the option to transfer configuration data to your device or read out the configuration using a storage medium.
   The storage medium is available as an accessory.
   See "Accessories" on page 43.

Proceed as follows:

☐ Connect the storage medium to the device.
☐ Start the Switch Programming Tool.
☐ Select your device variant from the drop-down list "Device Type".
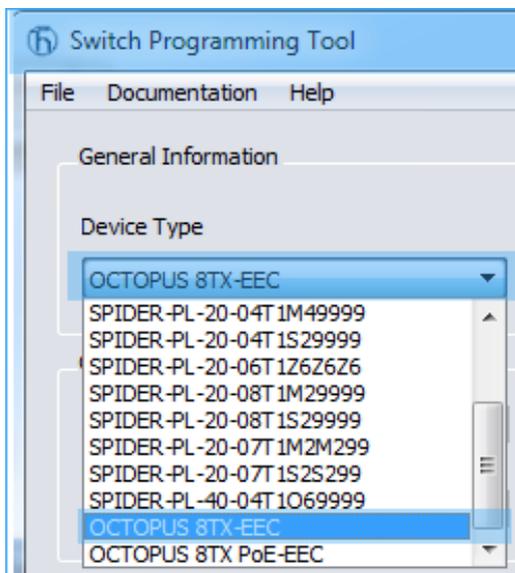
☐ Modify the parameters in the highlighted areas according to your requirements.

General Information

Device Type	OCTOPUS 8TX PoE-EEC
Serial Number	9421S1001
Contact	
Location	

Global Parameters

Power Supply 1 Alarm	Enable
Power Supply 2 Alarm	Enable
Aging Time (s)	300
QoS Trust Mode	trustDot1p
QoS 802.1 D/p Mapping	Configure
IP DSCP Mapping	Configure

Port Parameters

Port State	On
Link Alarm	Off
Auto Negotiation	On
Speed	-
Duplex Mode	FDX
Auto Crossing	On
MDI State	MDIX
Flow Control	Off
Broadcast Mode	Off
Broadcast Threshold (%)	100
Multicast Mode	Off
Multicast Threshold (%)	100
Jumbo Frames	Off
Port Priority	0
Energy Efficient Ethernet	Off
PoE State	On
PoE Priority	Low
PoE Classes	0,1,2,3,4

Select All TP Port   Deselect All TP Port

Active/Configured Port Settings

Port	Port State	Link Alarm	Auto Negotiation	Speed	Duplex Mode	Auto Crossing	MDI State	Flow Control	Broadcast Mode	Broadcast Threshold	Multicast Mode	Multicast Threshold	Jumbo Frames	QoS Trust Mode	Port Priority	Energy Efficient Ethernet	PoE State	PoE Priority	PoE Classes
Port 1	On	Off	On	-	FDX	On	MDIX	Off	Off	100	Off	100	Off	trustDot1p	0	Off	On	Low	0,1,2,3,4
Port 2	On	Off	On	-	FDX	On	MDIX	Off	Off	100	Off	100	Off	trustDot1p	0	Off	On	Low	0,1,2,3,4
Port 3	On	Off	On	-	FDX	On	MDIX	Off	Off	100	Off	100	Off	trustDot1p	0	Off	On	Low	0,1,2,3,4
Port 4	On	Off	On	-	FDX	On	MDIX	Off	Off	100	Off	100	Off	trustDot1p	0	Off	On	Low	0,1,2,3,4
Port 5	On	Off	On	-	FDX	On	MDIX	Off	Off	100	Off	100	Off	trustDot1p	0	Off	On	Low	0,1,2,3,4
Port 6	On	Off	On	-	FDX	On	MDIX	Off	Off	100	Off	100	Off	trustDot1p	0	Off	On	Low	0,1,2,3,4
Port 7	On	Off	On	-	FDX	On	MDIX	Off	Off	100	Off	100	Off	trustDot1p	0	Off	On	Low	0,1,2,3,4
Port 8	On	Off	On	-	FDX	On	MDIX	Off	Off	100	Off	100	Off	trustDot1p	0	Off	On	Low	0,1,2,3,4

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☐ Save the configuration file to the storage medium.
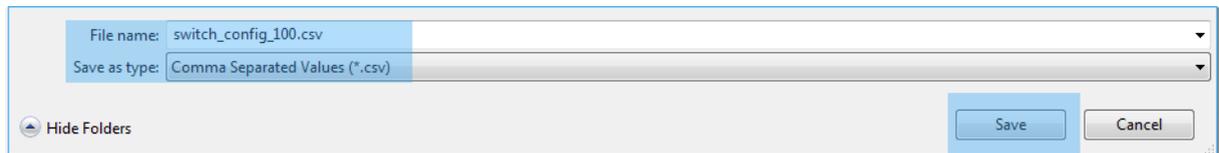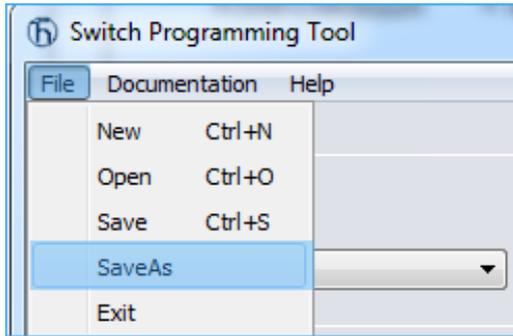
☐ Disconnect the M12 USB Adapter from your PC.
☐ Disconnect the storage medium from the M12 USB Adapter.

▶ Transfer the configuration data to your device by following these steps:
☐ Verify that the device is switched off.
☐ Connect the storage medium to the device.
☐ Switch on the device.
▶ The device reads the csv file on the storage medium and adopts the settings. During this time, the LEDs **"L/D"** flash alternately in **yellow/ green**.

	Parameter	Values	Default values		Comment
global	Aging time	Aging time in s	300 s		Value range 0 ... 1048575
	QoS 802.1p mapping	VLAN Priority 0 ... 7 Traffic Class 0 ... 3	VLAN Priority 0 1 2 3 4 5 6 7	Traffic Class 1 0 0 1 2 2 3 3	
	QoS DSCP mapping	DSCP value 0 ... 63 Traffic Class 0 ... 3	See table 2 on page 31.		
	QoS Trust Mode	untrusted, trustDot1p, trustIpDscp	trustDot1p		This also includes VLAN 0 mode for Profinet applications.
per port	Flow control	enabled / disabled	disabled		
	Port admin state	enabled / disabled	enabled		
	Jumbo frames	enabled / disabled	disabled		Globally enabled if at least one port is enabled
	Broadcast storm protection	enabled / disabled	disabled		Ingress rate limiter
	Broadcast storm threshold	0% ... 100%	100%		
	Multicast storm protection	enabled / disabled	disabled		Ingress rate limiter
	Multicast storm threshold	0% ... 100%	100%		
	Link alarm	enabled / disabled	disabled		
per TP port	Autonegotiation	enabled / disabled	enabled		
	Speed	100 Mbit/s, 10 Mbit/s	100 Mbit/s		Only if autonegotiation is disabled
	Duplex mode	FDX / HDX	FDX		Only if autonegotiation is disabled
	Autocrossing	enabled / disabled	enabled		Only if autonegotiation is disabled
	MDI state	MDI, MDI-X	MDI-X		Only if autonegotiation and autocrossing is disabled

Table 1:   Configuration parameters

	Parameter	Values	Default values	Comment
per PoE port	PoE enable	enabled / disabled	enabled	
	PoE priority	low, high, critical	low	critical is highest
	(PoE allowed classes)	class 0, 1, 2, 3, 4	class 0, 1, 2, 3, 4	all combinations configurable

Table 1:   Configuration parameters

d2/d1	0	1	2	3	4	5	6
0:	1	0	0	1	2	3	3
1:	1	0	0	1	2	3	3
2:	1	0	0	2	2	3	3
3:	1	0	0	2	2	3	3
4:	1	0	1	2	2	3	
5:	1	0	1	2	2	3	
6:	1	0	1	2	2	3	
7:	1	0	1	2	2	3	
8:	0	0	1	2	3	3	
9:	0	0	1	2	3	3	

Table 2:   DSCP mapping table

2.6.1 Configuration readout

Perform the following steps to start up the device:

☐ Connect the storage medium to your PC using the M12 USB Adapter.
☐ Create a text file in the root directory of the storage medium.
☐ Rename the text file to "**ShowRunningConfiguration.txt**".
☐ Disconnect the storage medium from the M12 USB Adapter.
☐ Connect the storage medium to the device.
☐ Restart the device by disconnecting the power supply for a moment.

▶ When the text file "**ShowRunningConfiguration.txt**" in the root directory of the device is found, the device creates a file with the current configuration.
▶ You will find this file in the root directory of the storage medium under the name "**Running_Config.txt**".

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, for example the distance from other devices or other objects, and the output of neighboring devices.

4   Maintenance and service

The device does not require service or maintenance.

Note: Check regularly whether a new version of the Switch Programming Tool is available. You will find information and software downloads on the Hirschmann product pages on the Internet
http://belden.catalog.belden.com/en/OCTOPUS

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

5 Disassembly

Proceed as follows:

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

6   Technical data

6.1   General technical data

Dimensions W × D × H	OCTOPUS 8TX-EEC	2.40 in × 1.22 in × 7.91 in (61 mm × 31 mm × 201 mm)
	OCTOPUS 8TX PoE-EEC	2.40 in × 1.81 in × 7.91 in (61 mm × 46 mm × 201 mm)
Weight	OCTOPUS 8TX-EEC	approx. 16.58 oz (470 g)
	OCTOPUS 8TX PoE-EEC	approx. 32.1 oz (910 g)
Power supply OCTOPUS 8TX-EEC	Safety extra-low voltage (SELV) Relevant for North America: NEC Class 2 power source max. 2 A.	
	Rated voltage DC:	12/24/36 V DC
	Voltage range DC incl. maximum tolerances:	9.6 V DC ... 45 V DC
	Connection type	5-pin, "A"-coded M12 connector
	Power loss buffer	> 10 ms
	Back-up fuse for each voltage input when supplied via 1 input	Nominal rating: 1 A ... 4 A Characteristic: slow blow
	Back-up fuse for each voltage input when supply is via 2 inputs	Nominal rating: 1 A ... 2 A Characteristic: slow blow
	Peak inrush current	<1.4 A (1ms)
	Current integral I²t	0.15 A^2s
Power supply OCTOPUS 8TX PoE-EEC	Rated voltage DC:	24 V DC
	Voltage range DC incl. maximum tolerances:	16.8 V DC ... 32 V DC
	Connection type	5-pin, "A"-coded M12 connector
	Power loss buffer	> 10 ms during data transmission; no power loss buffer for PoE
	Back-up fuse for each voltage input when supplied via 1 input	Nominal rating: 3.5 A ... 4 A Characteristic: slow blow
	Back-up fuse for each voltage input when supply is via 2 inputs	Nominal rating: 3.5 A ... 4 A Characteristic: slow blow
	Peak inrush current	<5 A (1 ms)
	Current integral I²t	0,22 A^2s
Climatic conditions during operation	Ambient air temperature[a]	−40 °F ... +158 °F (−40 °C ... +70 °C)
	Humidity	5 % ... 100 % (also in condensing atmospheres)
	Air pressure	min. 700 hPa (+9842 ft; +3000 m) max. 1060 hPa (−1312 ft; −400 m)

Climatic conditions during storage	Ambient air temperature[a]	−40 °F ... +185 °F (−40 °C ... +85 °C)
	Humidity	5 % ... 100 % (also in condensing atmospheres)
	Air pressure	min. 700 hPa (+9842 ft; +3000 m) max. 1060 hPa (−1312 ft; −400 m)
Protection classes	Degree of protection	IP65/67
Pollution degree		4
Boot time		ca. 5 s
Switching data	Data rate	8 × 10/100 Mbit/s
	Switching fabric	1.6 Gbit/s
	Packet buffer	1.5 Mbit/s
	MAC address tabel	16 k
	QoS (Queues / Port)	4

a. Temperature of the ambient air at a distance of 2 in (5 cm) from the device

6.2   Dimension drawings
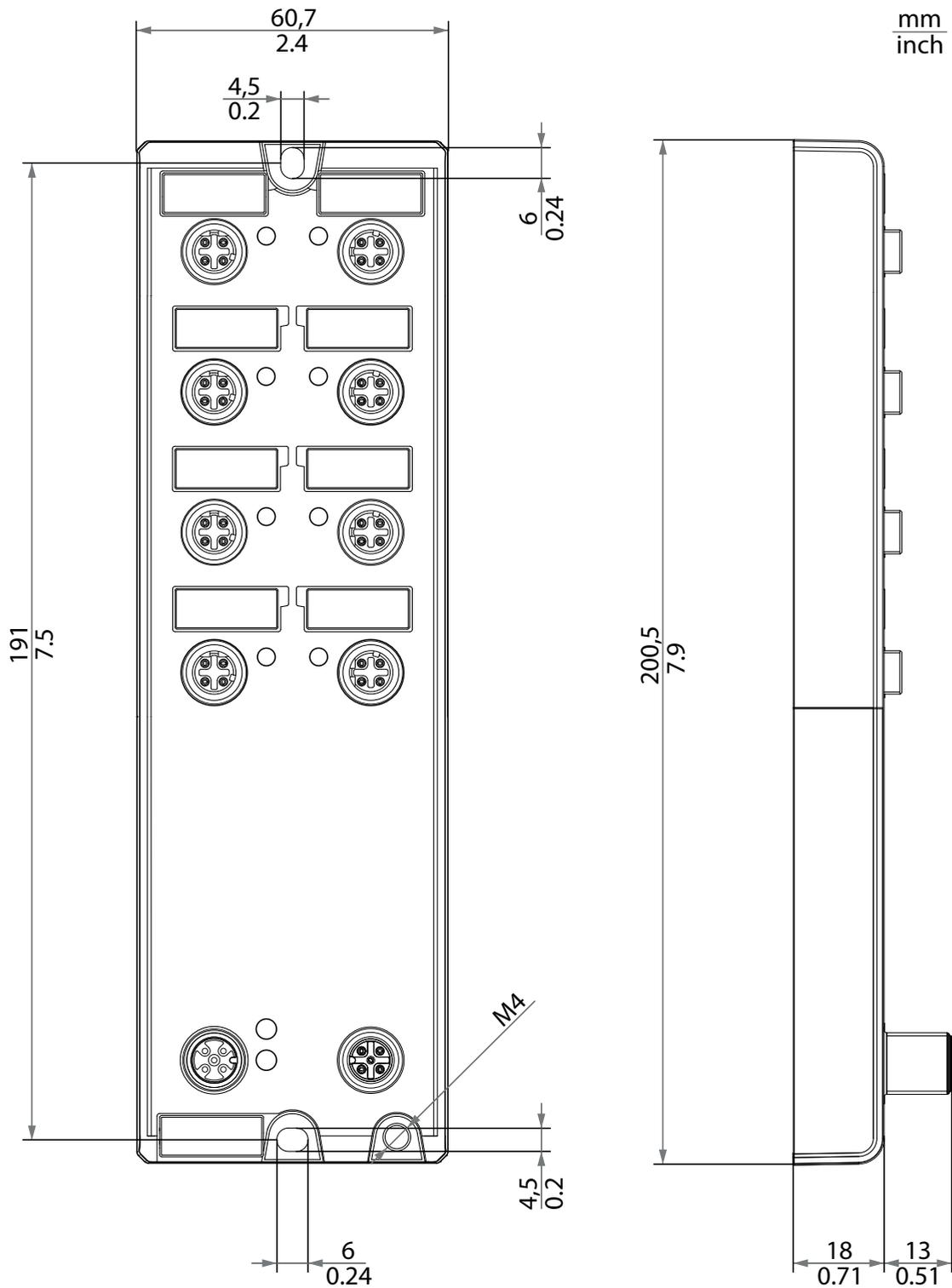
Figure 7:   OCTOPUS 8TX-EEC
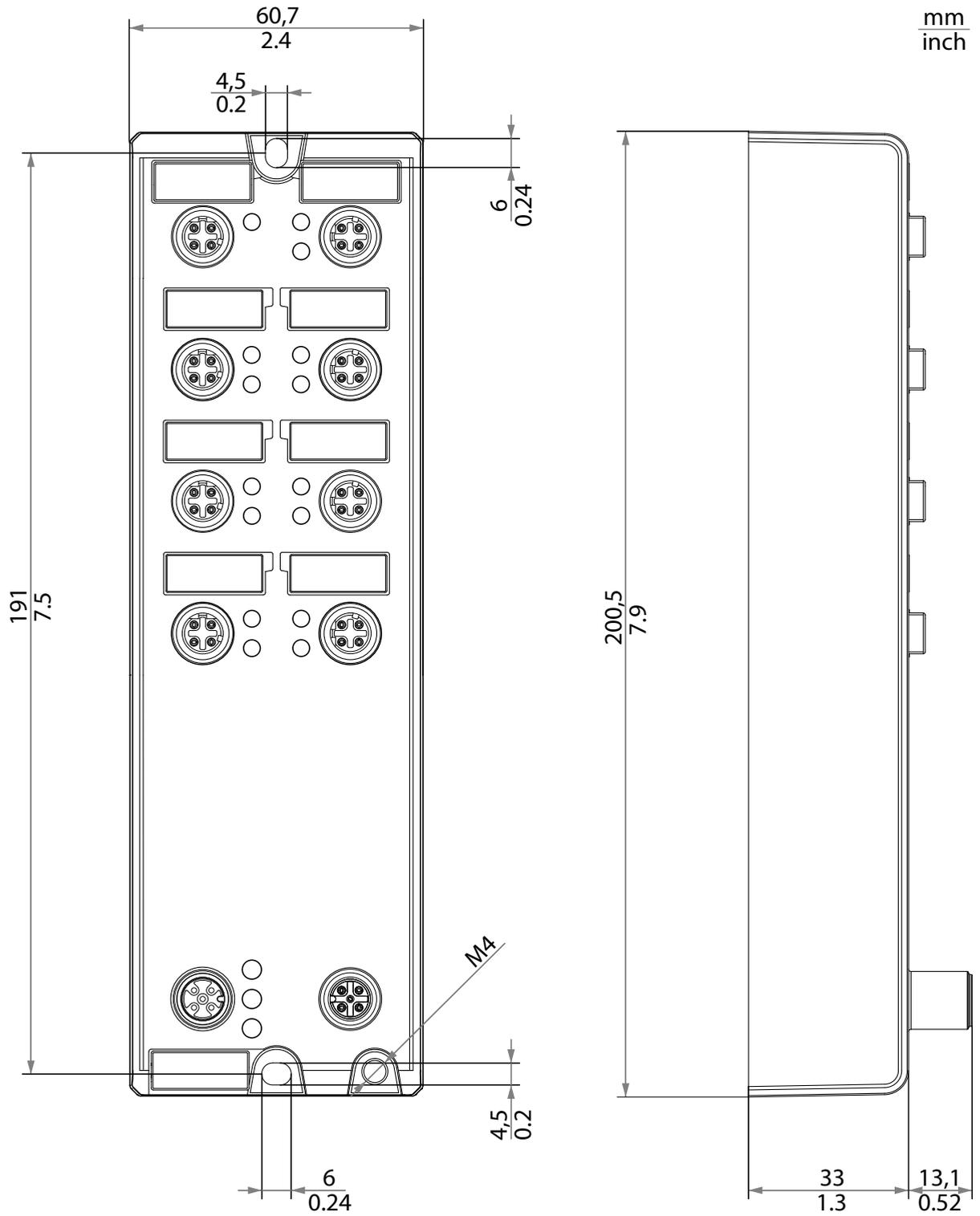
Figure 8: OCTOPUS 8TX PoE-EEC

6.3 EMC and immunity

EMC interference emission		
Radiated emission		
EN 55032		Class A
FCC 47 CFR Part 15		Class A
EN 61000-6-4		Fulfilled
Conducted emission		
EN 55032	Supply connection	Class A
FCC 47 CFR Part 15	Supply connection	Class A
EN 61000-6-4	Supply connection	Fulfilled
EN 55032	Telecommunication connections	Class A
EN 61000-6-4	Telecommunication connections	Fulfilled

EMC interference immunity		
Electrostatic discharge		
EN 61000-4-2 IEEE C37.90.3	Contact discharge	±6 kV
EN 61000-4-2 IEEE C37.90.3	Air discharge	±8 kV
Electromagnetic field		
EN 61000-4-3		20 V/m
Fast transients (burst)		
EN 61000-4-4	Supply connection	±2 kV
EN 61000-4-4	Data line	±4 kV
Voltage surges - DC supply connection		
EN 61000-4-5	line/ground	±2 kV
EN 61000-4-5	line/line	±1 kV
Voltage surges - data line		
EN 61000-4-5	line/ground	±2 kV
Conducted disturbances		
EN 61000-4-6	150 kHz ... 80 MHz	10 V
Pulse magnetic field		
EN 61000-4-9		300 A/m

Stability		
IEC 60068-2-6, test Fc	Vibration	5 Hz ... 8.4 Hz with 0.14 in. (3.5 mm) amplitude 8.4 Hz ... 150 Hz with 1 g
IEC 60068-2-27, test Ea	Shock	15 g at 11 ms

6.4   Network range

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

Table 3:   Network range: 10/100/1000 Mbit/s twisted pair port

6.5   Power consumption/power output

Name	Maximum power consumption	Power output
OCTOPUS 8TX-EEC	4.2 W	12.3 Btu (IT)/h
OCTOPUS 8TX PoE-EEC	44 W	150.1 Btu (IT)/h

7 Scope of delivery, order numbers and accessories

■ Scope of delivery

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.
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 8TX-EEC OCTOPUS 8TX PoE-EEC	▶ Device ▶ 1 × Transport protection cap for supply voltage connection ▶ 7 × Protection screws for M12 socket, plastic ▶ 15 × Indicator plates ▶ ELWIKA 5012 PG7 connector (5-pin M12 socket for power supply) ▶ General safety instructions

■ Order number

Device	Order number
OCTOPUS 8TX-EEC	942 150-001
OCTOPUS 8TX PoE-EEC	942 151-001

■ 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 IP67, the IP of the overall system is reduced to IP20.

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

Name	Order number
AutoConfiguration Adapter ACA21-M12 (EEC)	943 913-003
AutoConfiguration Adapter ACA22-M12 (EEC)	942 125-001
M12 connector, 4-pin, "D"-coded	934 445-001
M12 USB Adapter	942 199-001
Protection screw for M12 socket, plastic, IP65/67 (25 pieces)	942 057-002
Protection screw for M12 socket, metal, IP65/67 (25 pieces)	942 057-001
Connector ELWIKA 5012 PG7 (5-pin M12 socket for voltage supply)	933 175-100
Transition M12 "D"-coded to RJ45	934 498-001
Connection cable with M12 connectors, 4-pin, "D"-coded Length 2 m Length 5 m Length 10 m	934 578-001 934 578-002 934 578-003

8 Underlying technical standards

Name	
FCC 47 CFR Part 15	Code of Federal Regulations
UL/IEC 61010-2-201	Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-201: Particular requirements for control equipment.
ISA-12.12.01	Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations.
RCM	Australian Regulatory Compliance Mark (RCM) Australian Radiocommunications Standard 2008, Radiocommunications Act 1992
ECE Regulation No. 10, Amendment No. 05, suppl. 01	E type approval for use in vehicles
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 – Emission and immunity of the signaling and telecommunications apparatus (Rail Trackside)
EN 50155	Railway applications - Electronic equipment used on rolling stock
EN 55032	Electromagnetic compatibility of multimedia equipment – Emission Requirements
EN 60950-1	Information technology equipment – Safety – Part 1: General requirements
EN 61131-2	Programmable controllers – Part 2: Equipment requirements and tests
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 802.3	Ethernet

The device has an approval based on a specific standard only if the approval indicator appears on the device casing.
The device generally fulfills the technical standards named in their current versions.

A Further support

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FatFs - FAT file system module R0.09
(C)ChaN, 2011

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7.2 Without prejudice to any of its other rights if you are in breach of any of the terms and conditions of this Licence then ARM may terminate this Licence immediately upon giving written notice to you. You may terminate this Licence at any time.

7.3 This Licence shall immediately terminate and shall be unavailable to you if you or any party affiliated to you asserts any patents against ARM, ARM affiliates, third parties who have a valid licence from ARM for the ARM Deliverables, or any customers or distributors of any of them based upon a claim that your (or your affiliate) patent is Necessary to implement the CMSIS Specification or DSP Library Specification. In this Licence; (i) "affiliate" means any entity controlling, controlled by or under common control with a party (in fact or in law, via voting securities, management control or otherwise) and "affiliated" shall be construed accordingly; (ii) "assert" means to allege infringement in legal or administrative proceedings, or proceedings before any other competent trade, arbitral or international authority; (iii) "Necessary" means with respect to any claims of any patent, those claims which, without the appropriate permission of the patent owner, will be infringed when implementing the CMSIS Specification or DSP Library Specification because no alternative, commercially reasonable, noninfringing way of implementing the CMSIS Specification or DSP Library Specification is known.

7.4 Upon termination of this Licence, you shall stop using the ARM Deliverables and destroy all copies of the ARM Deliverables in your possession. The provisions of clauses 5, 6, 7, and 8 shall survive termination of this Licence.

8. GENERAL.
This Licence is governed by English Law. Except where ARM agrees otherwise in a written contract signed by you and ARM, this is the only agreement between you and ARM relating to the ARM Deliverables and it may onlybe modified by written agreement between you and ARM. Except as expressly agreed in writing, this Licence may not be modified by purchase orders, advertising or other representation by any person. If any clause orsentence in this Licence is held by a court of law to be illegal or unenforceable the remaining provisions of this Licence shall not be affected thereby. The failure by ARM to enforce any of the provisions of this Licence, unlesswaived in writing, shall not constitute a waiver of ARM's rights to enforce such provision or any other provision of this Licence in the future. This Licence may not be assigned without the prior written consent of ARM.
ARM contract reference LEC-PRE-00489-V6.0
06 December, 2010