

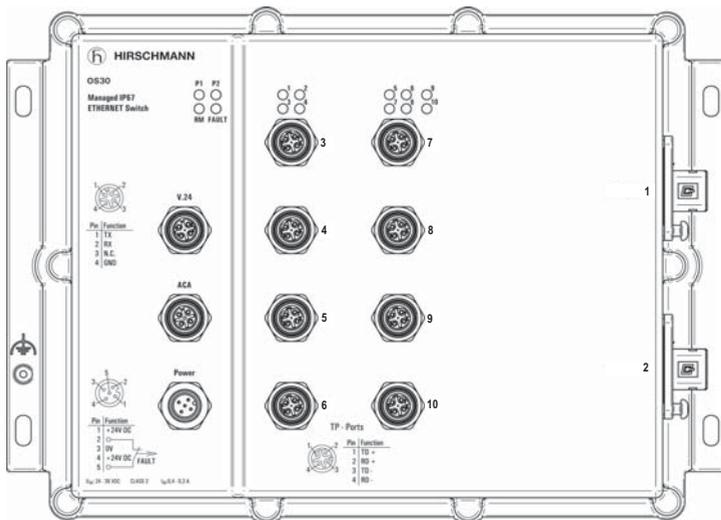
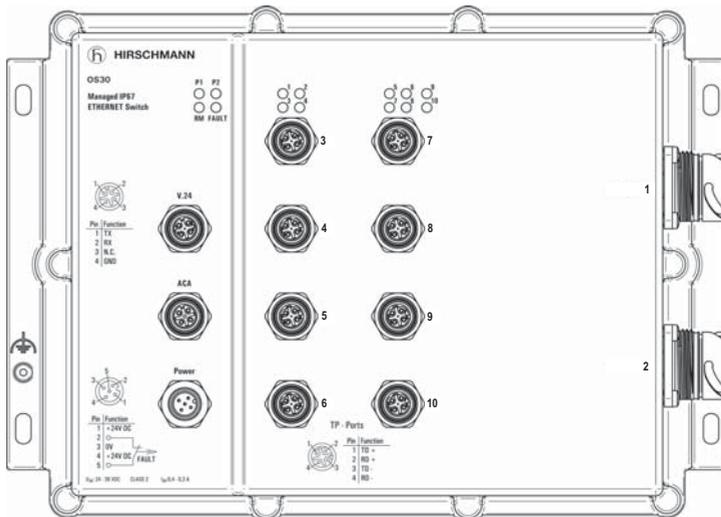


**HIRSCHMANN**

A **BELDEN** BRAND

# User Manual

## Installation IP65/67 Switch OS20 / OS30



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

© 2019 Hirschmann Automation and Control GmbH

Manuals and software are protected by copyright. All rights reserved. The copying, reproduction, translation, conversion into any electronic medium or machine scannable form is not permitted, either in whole or in part. An exception is the preparation of a backup copy of the software for your own use.

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

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

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

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

# Contents

<b>Safety instructions</b>	<b>5</b>
<b>About this Manual</b>	<b>9</b>
<b>Legend</b>	<b>10</b>
<b>1 Description</b>	<b>11</b>
1.1 General device description	11
1.2 Device name and product code	12
1.3 Device views	13
1.3.1 Front view	13
1.3.2 Interfaces	14
1.4 Power supply	15
1.5 Ethernet ports	16
1.5.1 10/100 Mbit/s twisted pair port	16
1.5.2 100 Mbit/s F/O port	16
1.5.3 1000 Mbit/s F/O port	17
1.5.4 Pin assignments	17
1.6 Display elements	18
1.6.1 Device state	19
1.6.2 Port status	19
1.7 Management interfaces	20
1.7.1 V.24 interface (external management)	20
1.7.2 ACA interface (ACA21-M12)	21
1.8 "FAULT" signal contact	22
<b>2 Installation</b>	<b>23</b>
2.1 Checking the package contents	23
2.2 Installing and grounding the device	24
2.2.1 Mounting on a flat surface	24
2.2.2 Grounding the device	24
2.3 Wiring the connectors for supply voltage and signal contact	25
2.4 Operating the device	26
2.5 Connecting data cables	27
2.5.1 Twisted Pair ports	27
2.5.2 Optical fiber ports	27
<b>3 Making basic settings</b>	<b>28</b>

<b>4</b>	<b>Monitoring the ambient air temperature</b>	<b>29</b>
<b>5</b>	<b>Maintenance and service</b>	<b>30</b>
<b>6</b>	<b>Disassembly</b>	<b>31</b>
6.1	Removing the device	31
<b>7</b>	<b>Technical data</b>	<b>32</b>
<b>A</b>	<b>Further support</b>	<b>38</b>

# Safety instructions

## **WARNING**

### **UNCONTROLLED MACHINE ACTIONS**

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

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

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

### ■ **General safety instructions**

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

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

### ■ **Certified usage**

- Use the product only for the application cases described in the Hirschmann product information, including this manual.
- Operate the product only according to the technical specifications. [See “Technical data” on page 32.](#)
- Connect to the product only components suitable for the requirements of the specific application case.

## ■ **Device casing**

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

- Never insert pointed objects (narrow screwdrivers, wires, etc.) into the device or into the connection terminals for electric conductors. Do not touch the connection terminals.
- At ambient temperatures > 140 °F (60 °C):  
The surfaces of the device housing may become hot. Avoid touching the device while it is operating.
- To preserve the suitability of your device for IP65/67, proceed as follows:
  - 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.

## ■ **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.

[See figure 3 on page 14.](#)

- 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 mm<sup>2</sup> (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 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. Connect only SELV circuits with voltage restrictions in line with IEC/EN 60950-1 to the supply voltage connections and signal contacts. The supply voltage is electrically isolated from the housing.

- Use a power supply cable which is suitable for the voltage, the current and the physical load.  
Hirschmann recommends a wire diameter of 0.5 mm<sup>2</sup> to 0.75 mm<sup>2</sup> (AWG20 to AWG18).

Relevant for North America:

The device may only be connected to a Class 2 supply voltage 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).

Relevant for installations under UL conditions:

Supply voltage: 19.2 V DC to 28.8 V DC

## ■ **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

The device can be used in the industrial sector.

▶ Interference immunity: EN 61000-6-2

▶ Emitted interference: EN 55032

You find more information on technical standards here:

[“Technical data” on page 32](#)

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.

### ■ **LED or laser components**

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

CLASS 1 LASER PRODUCT

CLASS 1 LED PRODUCT

### ■ **FCC note:**

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

Appropriate testing has established that this device fulfills the requirements of a class A digital device in line with part 15 of the FCC regulations.

These requirements are designed to provide sufficient protection against interference when the device is being used in a business environment.

The device creates and uses high frequencies and can also radiate these frequencies. If it is not installed and used in accordance with this operating manual, it can cause radio transmission interference. The use of this device in a residential area can also cause interference, and in this case the user is obliged to cover the costs of removing the interference.

### ■ **Recycling note**

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

# About this Manual

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

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

- ▶ General safety instructions
- ▶ Installation user manual
- ▶ Basic Configuration user manual
- ▶ Redundancy Configuration user manual
- ▶ User Manual Industry Protocols
- ▶ Reference manual for the graphical user interface
- ▶ Command Line Interface reference manual

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

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

# Legend

The symbols used in this manual have the following meanings:

▶	Listing
□	Work step
■	Subheading

# 1 Description

## 1.1 General device description

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

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

The OS20-... device variants are IP65/67 Switches without gigabit Ethernet ports and with ten 10/100 Mbit/s Ethernet ports.

The OS30-... device variants are IP65/67 Switches with two gigabit Ethernet ports and eight 10/100 Mbit/s Ethernet ports.

The OS20/OS30 devices are designed for the special requirements of industrial automation. They meet the relevant industry standards, provide very high operational reliability, even under extreme conditions, and also long-term reliability and flexibility.

The devices allow you to set up switched and routed industrial Ethernet networks that conform to the IEEE 802.3 standard.

The devices work without a fan.

You have the option of choosing various media to connect to the terminal devices and other network 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. Administer your devices via:

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

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

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

## 1.2 Device name and product code

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

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

**Note:** For the two uplink ports (product positions 12 to 13 and 14 to 15), choose the same variant (either variant 1 or variant 4).

Position	Characteristic	Characteristic value	Description
1 to 4	Product	OS20	IP65/67 Switch without gigabit ports
		OS30	IP65/67 Switch with gigabit ports
5	- (hyphen)	-	
6 to 7	Number of special ports	00	0 ×
8 to 9	Number of 100 Mbit/s ports	08	8 ×
		10	10 ×
10 to 11	Number of 1000 Mbit/s ports	00	0 ×
		02	2 ×

*Table 1: Combination options for the device variants of OS20/OS30*

Position	Characteristic	Characteristic value	Description
12 to 13	1. Uplink port (medium/connector)	1M	M-FAST SFP-MM / LC / EEC / variant 1
		1S	M-FAST SFP-SM / LC / EEC / variant 1
		1P	M-FAST SFP-SM+ / LC / EEC / variant 1
		1L	M-FAST SFP-LH / LC / EEC / variant 1
		1A	M-SFP-SX / LC / EEC / variant 1
		1B	M-SFP-LX / LC / EEC / variant 1
		1C	M-SFP-LH / LC / EEC / variant 1
		1D	M-SFP-LH+ / LC / EEC / variant 1
		4M	M-FAST SFP-MM / LC / EEC / variant 4
		4S	M-FAST SFP-SM / LC / EEC / variant 4
		4P	M-FAST SFP-SM+ / LC / EEC / variant 4
		4L	M-FAST SFP-LH / LC / EEC / variant 4
		4A	M-SFP-SX / LC / EEC / variant 4
		4B	M-SFP-LX / LC / EEC / variant 4
4C	M-SFP-LH / LC / EEC / variant 4		
4D	M-SFP-LH+ / LC / EEC / variant 4		
14 to 15	2. Uplink port (medium/connector)		See positions 12 to 13
16	Temperature range	T	-40 °F ... +158 °F (-40 °C ... +70 °C)
17	Voltage range incl.max. tolerances	R	16.8 V DC ... 45 V DC
18	Approvals	E	CE, C-Trick, E1, EN 50155, EN 50121-4 (railway, trackside), FCC
19	Software variant	P	Professional

Table 1: Combination options for the device variants of OS20/OS30

## 1.3 Device views

### 1.3.1 Front view

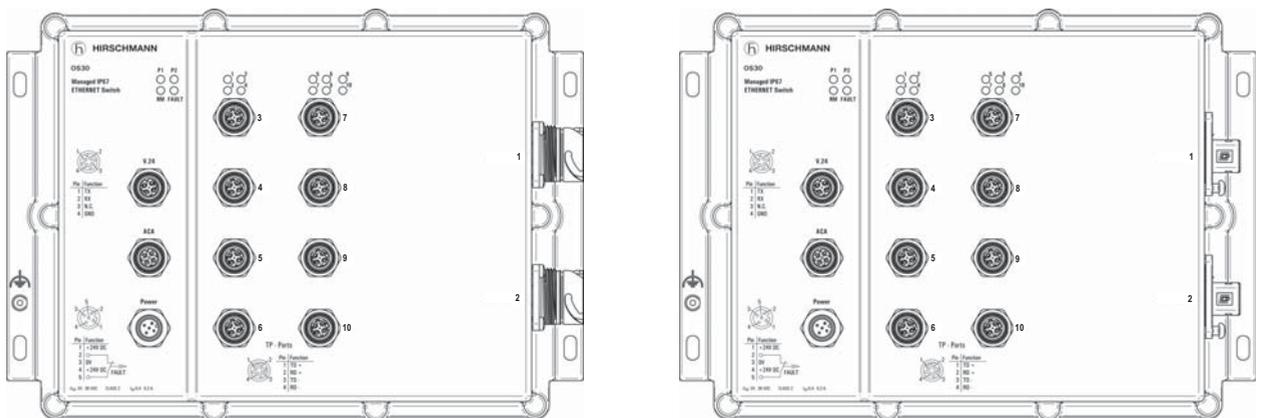


Figure 1: OS20/OS30 with uplink ports, variant 1 (left) and variant 4 (right)

## 1.3.2 Interfaces

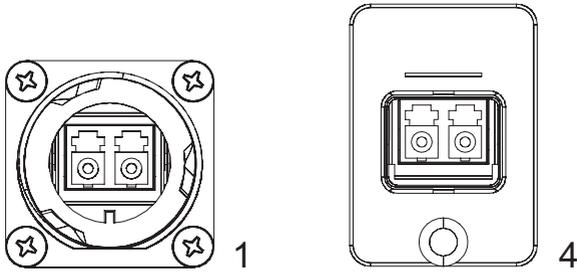


Figure 2: F/O ports on the OS20/OS30  
 1 - Variant 1  
 4 - Variant 4

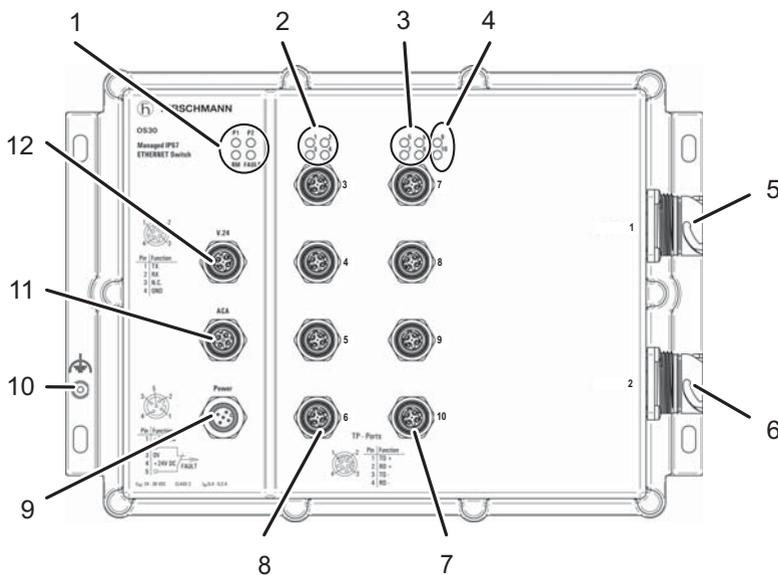


Figure 3: Interfaces of the OS20/OS30

- 1 - LED display elements for the device status
- 2 - LED display elements for the port status of the ports 3 to 6)
- 3 - LED display elements for the port status of the ports 7 to 10)
- 4 - LED display elements for the port status of the ports 1 to 2)
- 5 - Port 1: F/O port (SFP) for 100 Mbit/s (OS20) or 1000 Mbit/s (OS30)
- 6 - Port 2: F/O port (SFP) for 100 Mbit/s (OS20) or 1000 Mbit/s (OS30)
- 7 - Ports 7 to 10: Twisted Pair port (M12) for 10/100 Mbit/s
- 8 - Ports 3 bis 6: Twisted-Pair-Port (M12) for 10/100 Mbit/s
- 9 - Connection for supply voltage and signal contact
- 10 - Grounding nut
- 11 - USB interface for ACA21-M12
- 12 - V.24 interface for external management

## **1.4 Power supply**

A 5-pin M12 socket is available for the power supply to the device.

For more detail see

[“Wiring the connectors for supply voltage and signal contact” on page 25](#)

## 1.5 Ethernet ports

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

The OS20 devices have eight 10BASE-T/100BASE-TX ports (M12 sockets) and two 100 Mbit/s FX ports for connecting network segments or terminal devices (product code items 8+9, see [table 1](#)).

The OS30 devices have eight 10BASE-T/100BASE-TX ports (M12 sockets) and two 1000 Mbit/s FX ports for connecting network segments or terminal devices (product code items 8+9, see [table 1](#)).

The medium and connection types for the 1st and 2nd uplink ports are freely selectable (product code items 12+13 and 14+15, see [table 1](#)).

You find information on pin assignments for making patch cables here: [“Pin assignments” on page 17](#)

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

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

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

This port supports:

- ▶ Autonegotiation
- ▶ Autopolarity
- ▶ Autocrossing (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.

### 1.5.2 100 Mbit/s F/O port

Only OS20 device variants have 100 Mbit/s F/O ports.

This port is an SFP slot.

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

This port supports:

- ▶ Full or half duplex mode

Default setting: Full duplex

### 1.5.3 1000 Mbit/s F/O port

Only OS30 device variants have 1000 Mbit/s F/O ports.

This port is an SFP slot.

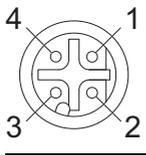
The 1000 Mbit/s F/O port offers you the ability to connect network components according to the IEEE 802.3 100BASE-SX/1000BASE-LX standard.

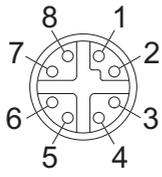
This port supports:

- ▶ Autonegotiation
- ▶ Full duplex mode

Delivery state: Autonegotiation activated

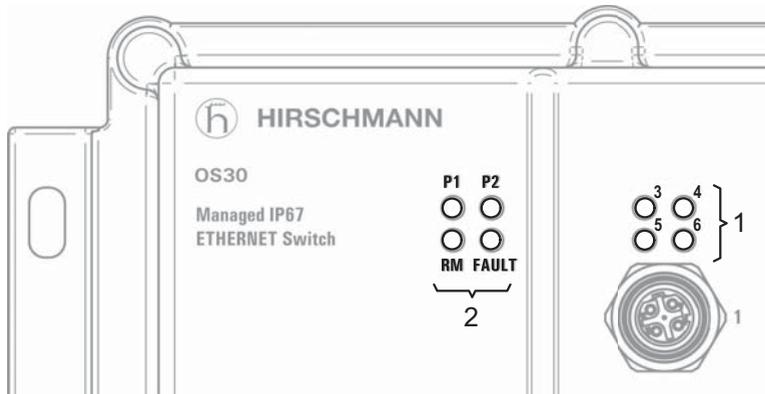
### 1.5.4 Pin assignments

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 50 seconds.



*Figure 4: Display elements*  
1 - Port status LEDs (here: for ports 3 to 6)  
2 - Device status LEDs

## 1.6.1 Device state

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

### P1 - Power 1 (green LED)

Glowing green	Supply voltage 1 is present
Not glowing	Supply voltage 1 is too low

### P2 - Power 2 (green LED)

Glowing green	Supply voltage 2 is present
Not glowing	Supply voltage 2 is too low

### FAULT - detected error, signal contact (red LED)<sup>a</sup>

Glowing red	The signal contact is open, i.e. it is reporting a detected error.
Not glowing	The signal contact is closed, i.e. it is not reporting a detected error.

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

### RM - Ring Manager (green/yellow LED)

Glowing green	RM function active, redundant port disabled
Glowing yellow	RM function active, redundant port enabled
Not glowing	RM function not active
Flashing green	Incorrect configuration of the HIPER-Ring (e.g. the ring is not connected to the ring port).

If the manual adjustment is active on the “FAULT” signal contact, then the detected 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.

### LS - data, link status (one green/yellow LED per port)

Not glowing	No valid connection.
Glowing green	Valid connection.
Flashing green (1 time a period)	Port is switched to stand-by.
Flashing green (3 times a period)	Port is switched off.
Flashing yellow	Data reception

# 1.7 Management interfaces

## 1.7.1 V.24 interface (external management)

At the V.24 connection, a serial interface is provided 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.

VT 100 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. The V.24 interface is not electrically isolated from the supply voltage.

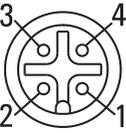
Figure	Pin	Function
	1	TX. Transmit Data
	2	RX Receive Data
	3	N.C. Not used
	4	GND Ground

Table 2: Pin assignment of the V.24 interface (M12 socket)

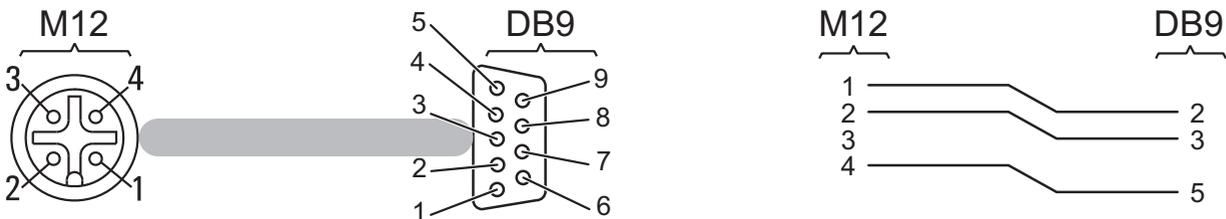


Figure 5: Terminal cable for connecting an external Management Station

The Terminal cable is available as an accessory.

See [“Accessories” on page 36](#).

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 ACA21-M12. 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 OS20/OS30 devices.

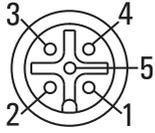
	Pin	Function
	1	U <sub>in</sub> 5 V
	2	N.C. Not used
	3	D- Data -
	4	GND Ground (0 V)
	5	D+ Data +

Table 3: Pin assignment of the USB interface, 5-pin, “A”-coded M12 socket

## 1.8 “FAULT” signal contact

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.
- ▶ Failure of the ring redundancy reserve.
- ▶ Errors detected during the self-diagnostic 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.

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

## 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 connectors for supply voltage and signal contact](#)
- ▶ [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 closed with protection caps or protection screws.
- ▶ 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 36](#).
- Check the individual parts for transport damage.

## 2.2 Installing and grounding the device

### 2.2.1 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 temperature range from  $-40\text{ °F}$  to  $+158\text{ °F}$  ( $-40\text{ °C}$  to  $+70\text{ °C}$ ).
- ▶ Relevant for installations under UL conditions:  
Only connect plugs and other components that fulfill protection classes IP65/67 and that are certified for a temperature range from  $-40\text{ °F}$  to  $+140\text{ °F}$  ( $-40\text{ °C}$  to  $+60\text{ °C}$ ).

Proceed as follows:

- Prepare the drill holes at the installation point.
- Mount the device on a level surface with four M5 screws.
- To preserve the suitability of your device for IP65/67, proceed as follows:
  - 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.

[See “Accessories” on page 36.](#)

### 2.2.2 Grounding the device

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

[See “Device views” on page 13.](#)

The overall shield of a connected shielded twisted-pair cable is connected to 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.

## 2.3 Wiring the connectors for supply voltage and signal contact

The supply voltage and the signal contact are connected by means of 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 General technical data section on page [32](#).

Relevant for installations under UL conditions:

Use an UL approved power supply plug which is suitable for the voltage range, the current and the ambient temperature range of this device, for example the Lumberg RKC series. A pin assignment drawing of the power supply connector is provided in [table 4](#).

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.

- ▶ Use a power supply cable which is suitable for the voltage, the current and the physical load.  
Hirschmann recommends a wire diameter of 0.5 mm<sup>2</sup> to 0.75 mm<sup>2</sup> (AWG20 to AWG18).
- ▶ Use a back-up fuse suitable for the supply network.  
[See “General technical data” on page 32.](#)
- ▶ 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 4: Pin assignment of the 5-pin M12 socket for connecting the 24 V supply voltage and the signal contact*

## 2.4 Operating the device

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

## 2.5 Connecting data cables

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

### 2.5.1 Twisted Pair ports

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

- ▶ Keep the length of the data cables as short as possible.
  - ▶ Use optical data cables for the data transmission between the buildings.
  - ▶ When using copper cables, provide a sufficient separation between the power supply cables and the data cables. Ideally, install the cables in separate cable channels.
  - ▶ Verify that power supply cables and data cables do not run parallel over longer distances, and that ideally they are installed in separate cable channels. If reducing the inductive coupling is necessary, verify that the power supply cables and data cables cross at a 90° angle.
  - ▶ Use SF/UTP cables as per ISO/IEC 11801:2002.
- 
- 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 protection screws.  
[See “Accessories” on page 36.](#)

### 2.5.2 Optical fiber ports

Verify that you connect LH ports only with LH ports, SX ports only with SX ports, and LX ports only with LX ports.

- Connect the data cables according to your requirements.
- Seal all unused ports with the protection caps attached to the device.

### 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 IP addresses:

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

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
- ▶ RSTP (Rapid Spanning Tree) activated

## 4 Monitoring the ambient air temperature

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

See [“General technical data” on page 32](#).

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

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

## 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.
- ▶ Relays are subject to natural wear. This wear depends on the frequency of the switching operations. Check the resistance of the closed relay contacts and the switching function depending on the frequency of the switching operations.
- ▶ Hirschmann is continually working on improving and developing their software. Check regularly whether there is an updated version of the software that provides you with additional benefits. You find information and software downloads on the Hirschmann product pages on the Internet ([www.hirschmann.com](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**

Proceed as follows:

- Disconnect the data cables.
- Disable the supply voltage.
- Disconnect the power supply cables and signal lines.
- Disconnect the grounding.
- Unmount the device.

# 7 Technical data

## ■ General technical data

Dimensions W × H × D	OS20/OS30	See "Dimension drawings" on page 33.
Weight	OS20/OS30	approx. 4.19 lb (1.9 kg)
Power supply	Rated voltage	24 V DC ... 36 V DC
	Supply voltage range	16.8 V DC ... 45 V DC Relevant for North America: NEC Class 2 power source max. 5A
	Connection type	M12 connector, 5-pin
	Tightening torque	5.3 lb-in (0.6 Nm)
	Power loss buffer	> 10 ms at 20.4 V DC
	Overload current protection at input	Non-replaceable fuse
	Back-up fuse	Nominal rating: 3.5 A .... 20 A
		Characteristic: slow blow
	Peak inrush current	4 A
Insulation voltage between supply voltage connections and housing		500 V AC
Meldekontakt „FAULT“	Switching current	max. 1 A, SELV
	Switching voltage	max. 60 V DC or max. 30 V AC, SELV
	Connection type	M12 connector, 5-pin
	Tightening torque	5.3 lb-in (0.6 Nm)
Climatic conditions during operation	Minimum clearance around the device	Top and bottom device side: 3.94 in (10 cm) Left and right device side: 0.79 in (2 cm)
	Ambient air temperature <sup>a</sup>	-40 °F ... +158 °F (-40 °C ... +70 °C)
	Humidity	5 % ... 100 % (also in condensing atmospheres) <sup>b</sup>
	Air pressure	minimum 795 hPa (+6562 ft; +2000 m) maximum 1060 hPa (-1312 ft; -400 m)
Climatic conditions during storage	Ambient air temperature <sup>a</sup>	-40 °F ... +158 °F (-40 °C ... +70 °C)
	Humidity	5 % ... 100 % (also in condensing atmospheres) <sup>c</sup>
	Air pressure	up to 6562 ft (2000 m; 795 hPa), higher altitudes upon request
Protection classes	Laser protection	Class 1 in compliance with IEC 60825-1
	Degree of protection	IP65/67 <sup>d</sup>

- a. Temperature of the ambient air at a distance of 2 in (5 cm) from the device
- b. Remove the provided transport protection caps and the transport protection screws from the device. Seal unused sockets and plugs with your desired type of protection screws which you can order separately.
- c. Remove the provided transport protection caps and the transport protection screws from the device. Seal unused sockets and plugs with your desired type of protection screws which you can order separately.
- d. To preserve the suitability of your device for IP65/67, proceed as follows: Remove all provided transport protection caps and transport protection screws. Seal unused sockets and plugs with your desired type of protection screws which you can order separately.

## ■ Dimension drawings

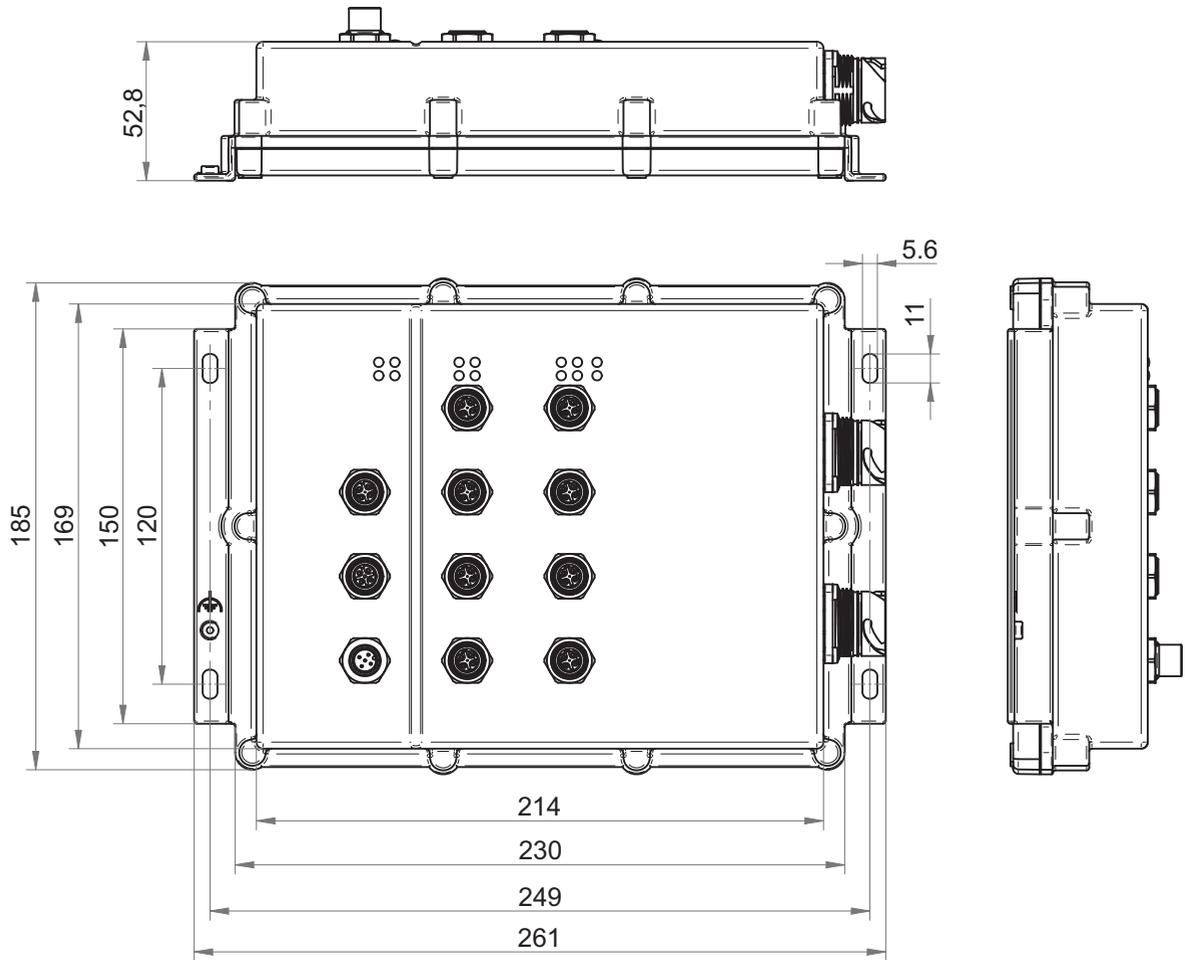


Figure 6: Dimensions of OS20/OS30

## ■ EMC and immunity

### EMC compliance – IEC/EN 61000-6-2:2005 EMI TYPE tests, test acc. to:

IEC/EN 61000-4-2	Electrostatic discharge	
	Contact discharge	6 kV
	Air discharge	8 kV
IEC/EN 61000-4-3	Electromagnetic field	
	80 MHz ... 2700 MHz	20 V/m
IEC/EN 61000-4-4	Fast transients (burst)	
	Power line	2 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
EN 61000-4-9	Pulse magnetic fields	100 A/m

### EMC interference emission

EN 55032	Class A	Yes
FCC 47 CFR Part 15	Class A	Yes
German Lloyd	Classification + Construction Guidelines VI-7-3 Part 1 Ed. 2001	Yes

### Stability

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

## ■ Network range

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

Length of a twisted pair segment                      max. 328 ft (100 m) (for Cat5e cable)

Product code M-FAST-SFP-...	Wave length	Fiber	System attenuation	Example for F/O line length <sup>a</sup>	Fiber attenuation	BLP/ dispersion
-MM/LC...	MM 1310 nm	50/125 μm	0-7 dB	0-4 km	1.0 dB/km	800 MHz×km
-MM/LC...	MM 1310 nm	62.5/125 μm	0-10 dB	0-4 km	1.0 dB/km	500 MHz×km
-SM/LC...	SM 1310 nm	9/125 μm	0-12 dB	0-22.5 km	0.4 dB/km	3.5 ps/(nm×km)
-SM+/LC...	SM 1310 nm	9/125 μm	10-28 dB	25-62.5 km	0.4 dB/km	3.5 ps/(nm×km)
-LH/LC...	SM 1550 nm	9/125 μm	10-28 dB	47-100 km	0.25 dB/km	19 ps/(nm×km)

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

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

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

Product code M-SFP-...	Wave length	Fiber	System attenuation	Example for F/O line length <sup>a</sup>	Fiber attenuation	BLP <sup>b</sup> / dispersion
-SX/LC...	MM 850 nm	50/125 μm	0-6.5 dB	0-550 m	3.0 dB/km	400 MHz×km
-SX/LC...	MM 850 nm	62.5/125 μm	0-6.5 dB	0-275 m	3.2 dB/km	200 MHz×km
-LX/LC...	SM 1310 nm	9/125 μm	0-9.5 dB	0-17.5 km	0.4 dB/km	3.5 ps/(nm×km)
-LH/LC...	LH 1550 nm	9/125 μm	5-21 dB	23-76 km	0.25 dB/km	19 ps/(nm×km)
-LH+/LC...	LH 1550 nm	9/125 μm	15-29 dB	71-104 km	0.25 dB/km	19 ps/(nm×km)

Table 6: Fiber port 1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver)

a. including 3 dB system reserve when compliance with the fiber data is observed  
b. Using the bandwidth length product is inappropriate for expansion calculations.

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

## ■ Power consumption/power output

Name	Maximum power consumption	Power output
OS20-000010-...	9.0 W	30.7 Btu (IT)/h
OS30-000208-...	9.0 W	30.7 Btu (IT)/h

## ■ Scope of delivery

Special connectors with protection classes IP65/67 and an extended temperature range are available on request.

Device	Scope of delivery
OS20/OS30	Device
	Connector ELWIKA 5012 PG7 for supply voltage and signal contact
	General safety instructions

## ■ Order numbers/product description

The order numbers correspond to the product codes of the devices.

## ■ Accessories

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

Name	Order number
AutoConfiguration Adapter ACA21-M12 (EEC)	943 913-003
Terminal cable	943 902-001
Connector ELWIKA 5012 PG7 (5-pin M12 socket for supply voltage 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
Connection cable with M12 connector, "D"-coded	934 497-00x
Transition M12 "D"-coded to RJ45	934 498-001
Network management software Industrial HiVision	943 156-xxx
HiVision Network Management software	943 471-100
OPC Server software HiOPC	943 055-001
Protection screw for M12 socket, metal, IP65/67 (25 pieces)	942 057-001
Protection screw for M12 socket, plastic, IP65/67 (25 pieces)	942 057-002
Protection screw for M12 plug, metal, IP65/67 (10 pieces)	942 115-001

## ■ Underlying technical standards

Name	
UL 60950-1	Information technology equipment – Safety – Part 1: General requirements
EN 50155	Railway applications - Electronic equipment used on rolling stock
EN 55032	Electromagnetic compatibility of multimedia equipment – Emission Requirements
EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
EN 61131-2	Programmable controllers – Part 2: Equipment requirements and tests
FCC 47 CFR Part 15	Code of Federal Regulations
Germanischer Lloyd	Rules for Classification and Construction VI-7-2 – GL
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 only if the approval indicator appears on the device casing.

If your device has a shipping approval according to Germanischer Lloyd, you find the approval mark printed on the device label. You will find out whether your device has other shipping approvals on the Hirschmann website under [www.hirschmann.com](http://www.hirschmann.com) in the product information.

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.

## Hirschmann Competence Center

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

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

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

Internet:

<http://www.hicomcenter.com>





**HIRSCHMANN**

---

A **BELDEN** BRAND