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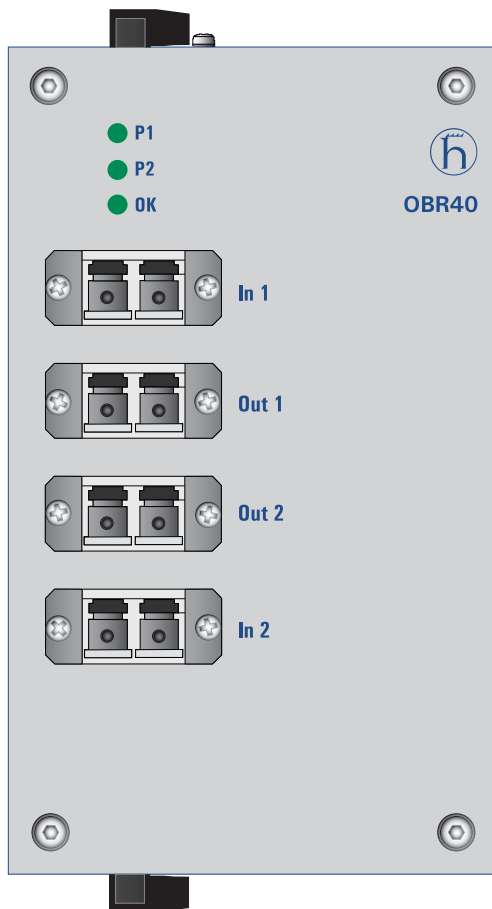
A **BELDEN** BRAND

User Manual

Installation

Optical Bypass Relay

OBR40



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

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Safety instructions

■ Certified usage

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

■ Supply voltage

- Only connect a supply voltage as described in the data plate of your device.
- Ground the device before connecting the power supply.
- Make sure that the electrical installation meets locally or nationally applicable safety regulations.
- For the supply voltage to be connected, make sure the following requirements are met:
 - ▶ The power supply conforms to overvoltage category I or II.
 - ▶ The voltage supply has an easily accessible disconnecting device (e.g. a switch or a plug). This disconnecting device is clearly identified so that in the case of an emergency, it is clear which disconnecting device belongs to which line.
 - ▶ The lines to be connected are voltage-free.
 - ▶ A fuse suitable for DC voltage is located in the plus conductor of the power supply. A fuse is also located in the minus conductor, if this is not grounded.
Regarding the properties of this fuse: [See “General technical data” on page 23.](#)
 - ▶ The cross-section of the functional earth connection is the same size as or bigger than the cross-section of the voltage supply cables.
 - ▶ The connection cables used are permitted for the specified temperature range.
 - ▶ Relevant for North America:
The power supply lines are made up of copper wire (75 °C).

- Use undamaged parts.
- The device does not contain any service components. Internal fuses are only triggered if there is a fault in the device. If the device is not functioning correctly, or if it is damaged, switch off the voltage supply and return the device to the plant for inspection.
- Only switch on the supply voltage for the device when the following prerequisites are fulfilled:
 - ▶ The housing is closed
 - ▶ The terminal blocks are wired correctly
 - ▶ The terminal blocks for the voltage supply are connected
- Only operate the device in switch cabinets which comply with the fire enclosure specifications described in EN 60950-1.

■ **Housing**

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

- Never insert sharp objects (small screwdrivers, wires, etc.) into the inside of the device.
- Never insert sharp objects (small screwdrivers, wires, etc.) into the connection terminals for the supply voltage or the signal contact, and do not touch the terminals!

■ **Qualification requirements for personnel**

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

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

■ **General safety instructions**

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

[See “Technical data” on page 23.](#)

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

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

■ **National and international safety regulations**

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

■ **CE marking**

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

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.

2004/108/EG (EMV)

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:

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The product can be used in the industrial sector.

- ▶ Interference immunity: EN 61000-6-2
- ▶ Emitted interference: EN 55022

You will find more information on norms and standards here:
[“Technical data” on page 23](#)

■ **Recycling note**




After usage, this product 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” document contains a device description, safety instructions, a display description and other information that you require to install the device before starting with the configuration of the device.

Key

The symbols used in this manual have the following meanings:

	Listing
	Work step
	Subheading

1 Description

1.1 General device description

The OBR40 devices are designed for the special requirements of industrial automation. They meet the relevant industry standards, provide very high operational reliability, even under extreme conditions, and also provide long-term reliability and flexibility.

The devices work without a fan.

The devices are mounted very quickly by snapping them onto the DIN rail.

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

- ▶ multimode F/O
- ▶ singlemode F/O

The device is manufacturer- and protocol-independent, and therefore integrates itself into a wide range of networks, e.g. with a line or ring structure.

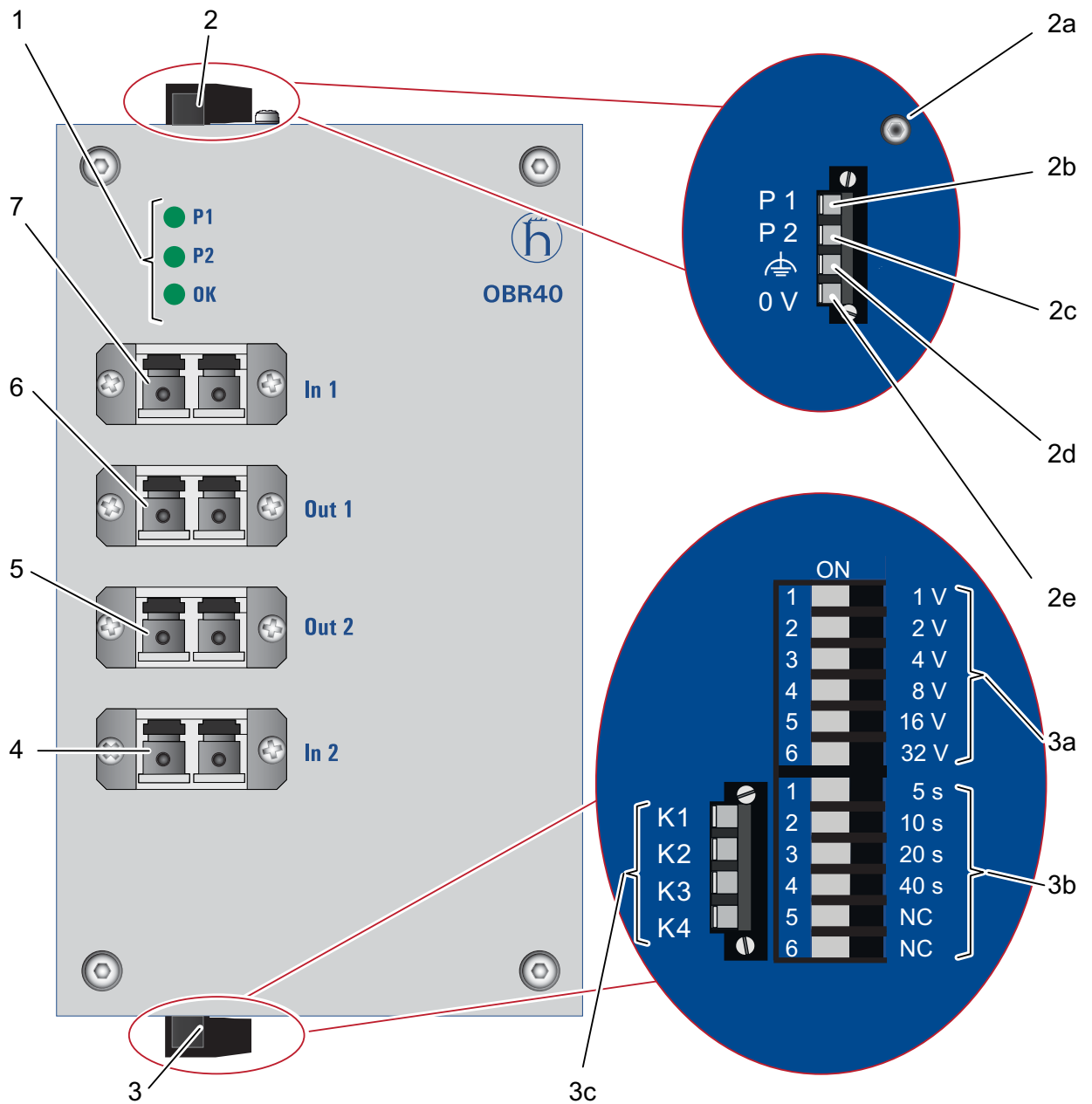
The device allows you to maintain the communications in a network when a disturbance is detected for a network subscriber. The device optically bridges the network subscriber that is down.

If supply voltage 1 and supply voltage 2 fall below a set value, the device activates the “bypass” operation mode.

The device also allows you to activate the “bypass” operation mode via a signal input, e.g. in a service or error situation.

When the detected disturbance has been removed for the bridged subscriber, the device reactivates the “normal” operation mode again after a time delay. The device allows you to set this reactivation delay. This time delay allows the bridged subscriber to complete its boot process.

1.2 Device view



1	LED display elements for device status
2	Connections for the supply voltage and the functional ground
2a	Grounding screw
2b	Connection for supply voltage 1
2c	Connection for supply voltage 2
2d	Functional ground
2e	Supply voltage 0 V

Table 1: Device view

3	DIP-switch, signal contact
3a	Upper DIP-switch (switch threshold)
3b	Lower DIP-switch (reactivation delay)
3c	Signal contact
4	Connection for the data lines: Input 2
5	Connection for the data lines: Output 2
6	Connection for the data lines: Output 1
7	Connection for the data lines: Input 1

Table 1: Device view

1.3 Power supply

A 4-pin terminal block is available for the redundant supply to the device. You will find further information under [“Supply voltage” on page 17](#).

1.4 Display elements

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	The connected supply voltage is bigger than the value set with the DIP-switch.
			flashing	The connected supply voltage is smaller than the value set with the DIP-switch.
P2	Supply voltage 2	Green	Lights up	The connected supply voltage is bigger than the value set with the DIP-switch.
			flashing	The connected supply voltage is smaller than the value set with the DIP-switch.
OK	Operational Mode	Green	Lights up	The “normal” operation mode is activated.
			off	The “bypass” operation mode is activated.

1.5 Signal contact

1.5.1 Functions

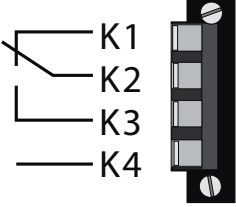
Figure	Terminal	Function
	K1-K3	Potential-free error relay contact
	K2	Shared connection of the error relay
	K4	Positive connection of the signal voltage for the specific activation of the bypass function
		The negative connection of the signal voltage for the specific activation of the bypass function is at the connection for the supply voltage 0 V. See "Device view" on page 11.

Table 2: Functions of the signal contact

1.5.2 Statuses

Terminal	Status	Meaning
K2-K1	Closed	The device has activated the "normal" operation mode.
K2-K3	Closed	One of the following cases has occurred: <ul style="list-style-type: none"> ▶ The supply voltages connected to P1 and P2 are below the value set with the DIP-switch. The device has activated the "bypass" operation mode. ▶ The device has activated the "bypass" operation mode via the signal input.

Table 3: Statuses of the signal contact

1.6 DIP-switch

1.6.1 View

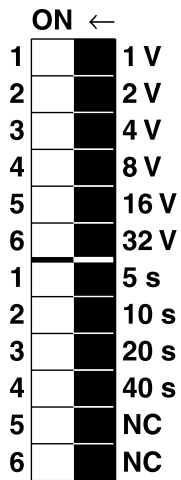


Figure 1: DIP-switch

Item	DIP switch	Function
1 ... 6	Upper DIP-switch	Setting the switch threshold
1 ... 4	Lower DIP-switch	Setting the reactivation delay
5	Lower DIP-switch	Not used
6	Lower DIP-switch	Not used

1.6.2 Making settings

The DIP-switches allow combinations between 0 V DC and 63 V DC for setting the switch threshold. Because the voltage range, including the maximum tolerances of the device, is 10 V DC to 60 V DC, values > 10 V DC and < 60 V DC should be set.

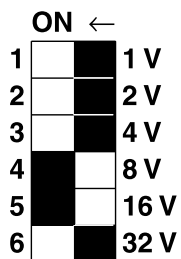


Figure 2: Example: Switch threshold of 24 V DC

Explanation: DIP 4 and DIP 5 set to ON = 8 V DC + 16 V DC

You can set the reactivation delay to between 0 s and 75 s.

ON ←

1	■	□	5 s
2	■	□	10 s
3	□	■	20 s
4	□	■	40 s
5	□	■	NC
6	□	■	NC

Figure 3: Example: Reactivation delay of 15 s
Explanation: DIP 1 and DIP 2 set to ON = 5 s + 10 s

2 Installation

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

On delivery, the device is ready for operation.

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

- ▶ [Unpacking and checking](#)
- ▶ [Grounding](#)
- ▶ [Mounting and connecting the terminal blocks](#)
- ▶ [Mounting on the DIN rail](#)
- ▶ [Connecting the data lines](#)
- ▶ [Switching on the supply voltage](#)

2.1 Unpacking and checking

- Check whether the package includes all items named in section [“Scope of delivery” on page 26](#).
- Check the individual parts for transport damage.

2.2 Grounding

There is a separate ground screw and a functional grounding connection on the terminal block for the functional grounding.

The location at the device is described on [“Device view” on page 11](#).

- Connect the grounding to the grounding screw or the functional grounding connection on the terminal block of the device.

2.3 Mounting and connecting the terminal blocks

2.3.1 Supply voltage

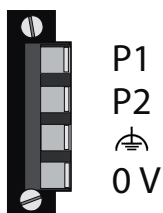


Figure 4: Operating voltage: 4-pin terminal block


Type of the voltages that can be connected	Size of the supply voltage	Connections
DC voltage	Nominal voltage range DC: 24 V ... 48 V Voltage range DC incl. maximum tolerances: 10 V ... 60 V	P1 Plus terminal of supply voltage 1
		P2 Plus terminal of supply voltage 2
		 Functional ground connection
		0 V Minus terminal of the supply voltage

Table 4: Operating voltage: type and specification of the supply voltage, connections

- Use screws to secure the connectors to the device.
- Connect the protective conductor to the protective conductor terminal.
- Connect the supply voltage lines.

2.3.2 Signal contact

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

- ▶ The lines to be connected are voltage-free.
- ▶ The connected voltage is limited by a current limitation device or a fuse. Observe the electrical threshold values for the signal contact
[See “General technical data” on page 23.](#)
- Use screws to secure the connectors to the device.
- Connect the signal contact lines to the terminal block.

2.4 Mounting on the DIN rail

Note: Mount the device on a 35 mm DIN rail in accordance with DIN EN 60175.

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

- Insert the upper snap-in guide of the device into the DIN rail and press the device down against the DIN rail until it snaps into place.

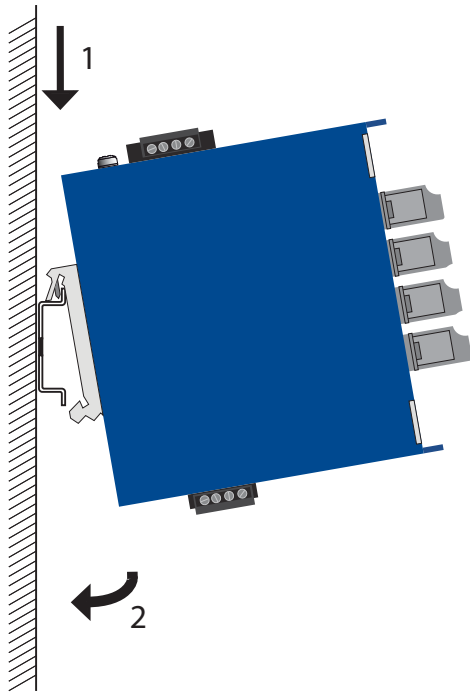


Figure 5: Mounting on the DIN rail

2.5 Connecting the data lines



WARNING

Do not look into the optical connections. The concentrated, invisible light can damage the eyes.

Note: To protect the connections for data lines from dirt or dust when they are not being used, use the sealing caps provided for the optical connections.

Operational Mode	Standard	Bidirectional.
Normal		
Bypass		

Table 5: Operating modes

- Install the data lines according to your requirements.

2.6 Switching on the supply voltage

- Ground the device before connecting the power supply.
- Switch on the supply voltage.

3 Maintenance and service

- ▶ When designing this device, Hirschmann was largely able to forego using parts that are subject to wear and tear. The parts subject to wear are designed to last longer than the lifetime of the product when it is operated properly. Operate this device according to the specifications (see “[Technical data](#)”).
- ▶ Relays are subject to natural wear. This wear depends on the frequency of the switching operations. Check the resistance of the closed relay contacts and the switching function depending on the frequency of the switching operations.

Note: You will find information about the complaints and returns procedures in the Internet under <http://www.beldensolutions.com/en/Service/Repairs/index.phtml> .

4 Disassembly

- Disconnect the data lines.
- Switch off the supply voltage.
- To remove the device from the DIN rail, press the device downwards and pull it out from under the DIN rail.

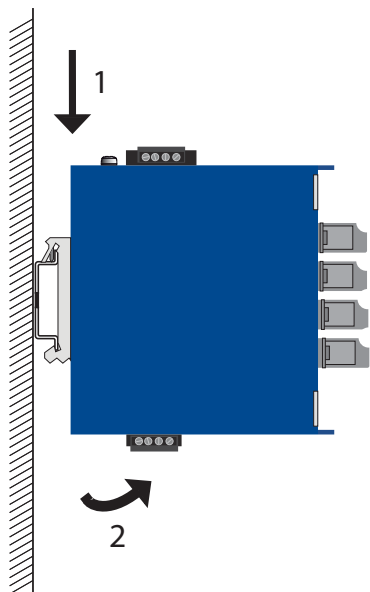


Figure 6: Removal from the DIN rail

- Disconnect the terminal blocks.
- Disconnect the grounding.

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

5 Technical data

■ General technical data

Dimensions W × H × D	See "Dimension drawings" on page 24.	
Weight	500 g	
Power supply	Nominal voltage DC	24 V ... 48 V
	Voltage range DC incl. maximum tolerances:	10 V ... 60 V
Insertion loss	Multimode	1.7 dB (850 nm / 1310 nm, ±40 nm), plus connection plugs
	Singlemode	1.4 dB (1310 nm / 1550 nm, ±40 nm)
Feedback attenuation	≥ 55 dB	
Crosstalk attenuation	≥ 55 dB	
Switching speed	typically 4 ms, max. 15 ms	
Reactivation delay	0 s, 5 s, 10 s, 20 s and/or 40 s with DIP-switch	
Switching threshold for power supply	1 V, 2 V, 4 V, 8 V, 16 V and/or 32 V in the range from 10 V to 60 V with DIP-switch	
Switching threshold for signal input	10 V DC	
Error relay contact	25 V DC (1 A) / 60 V DC (0.3 A)	
Power consumption	2.5 W	
Back-up fuse	Nominal rating:	6.3 A
	Characteristic:	slow blow
Operating temperature	Multimode	-30 °C ... +70 °C
	Singlemode	-40 °C ... +70 °C
Storage temperature	-40 °F ... +185 °F (-40 °C ... +85 °C)	
Relative humidity	10% ... 95% (non-condensing)	
MTBF	30 years	
Degree of protection	IP30	
Housing material	Stainless steel, powder-coated	

■ Dimension drawings

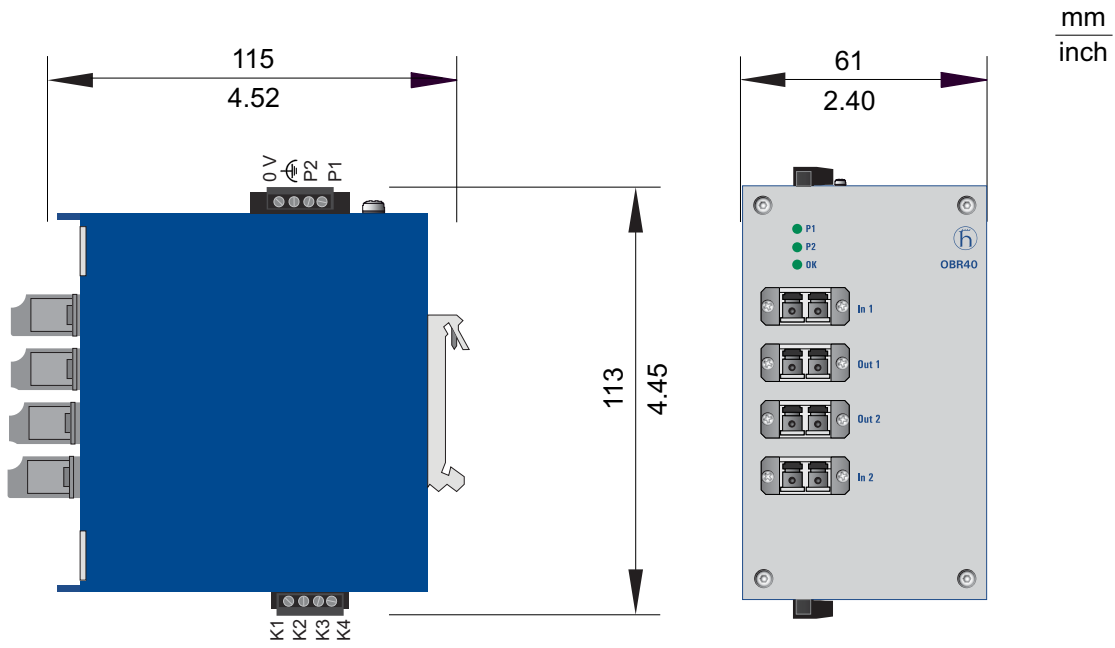


Figure 7: Dimensions

■ EMC

EMC interference emission		Standard applications
Radiated emission		
EN 55022		Class B
Conducted emission		
EN 55022		Class B
EMC interference immunity		Standard applications
Electrostatic discharge		
EN 61000-4-2	Contact discharge	± 4 kV
	Air discharge	± 8 kV
Electromagnetic field		
EN 61000-4-3	80 MHz ... 1000 MHz	10 V/m
	1.4 GHz ... 2 GHz	3 V/m
	2 GHz ... 2.7 GHz	1 V/m
Fast transients (burst)		
EN 61000-4-4	DC supply connection	± 2 kV
	Data line	± 1 kV
Voltage surges - DC supply connection		
EN 61000-4-5	line/ground	± 0.5 kV
	line/line	± 0.5 kV
Conducted disturbances		
EN 61000-4-6	150 kHz ... 80 MHz	10 V

■ Device variants, order numbers

Device name	Order number	F/O connection	Fiber
OBR40-9-LC	942-088-001	LC	Singlemode9/125 µm
OBR40-50-LC	942-088-101	LC	Multimode50/125 µm
OBR40-62,5-LC	942-088-201	LC	Multimode62.5/125 µm

■ Scope of delivery

Number	Article
1 x	Device
1 x	4-pin terminal block for signal contact
1 x	4-pin terminal block for the supply voltage and the functional ground connection
8 x	Sealing caps for optical connections
1 x	Installation user manual

■ Underlying norms and standards

Designation	
EN 61000-6-2	Generic norm – immunity in industrial environments
EN 55022	IT equipment – radio interference characteristics

Table 6: *List of norms and standards*

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

The device has a certification based on a specific standard only if the certification indicator appears on the housing.

A Further Support

■ Technical Questions

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

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

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

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- ▶ Tel.: +65 6854 9860
- ▶ E-mail: inet-ap@belden.com

■ Hirschmann Competence Center

The Hirschmann Competence Center is ahead of its competitors:

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- ▶ Training offers you an introduction to the basics, product briefing and user training with certification.

The current technology and product training courses can be found at <http://www.hicomcenter.com>

- ▶ Support ranges from the first installation through the standby service to maintenance concepts.

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