

Ethernet Switch – Basic Line

IE-SW-BL05/08 Series

Hardware Installation Guide

Fourth Edition, August 2016

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Please note:

This document and any further product information - if available - can be downloaded at the internet link:

<http://www.weidmueller.com/downloads>

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Weidmüller 

Overview

The IE-SW-BL Series of industrial Ethernet switches are entry-level industrial 5 and 8-port Ethernet switches that support IEEE 802.3, IEEE 802.3u, and IEEE 802.3x with 10/100M, full/half-duplex, and MDI/MDIX auto-sensing.

The IE-SW-BL Series provides 12/24/48 VDC (9.6 to 60VDC)/18 to 30 VAC redundant power inputs that can be connected simultaneously to a live AC/DC power source. The switches are available with a standard operating temperature range from -10 to 60°C, or optional with a wide operating temperature range from -40 to 75°C. The IP30 metal housing makes them rugged enough for any harsh industrial environment.

To provide greater versatility for use with applications from different industries, these devices also allow users to enable or disable broadcast storm protection with DIP switches on the outer panel.

The IE-SW-BL05/08 switches can be easily installed with DIN-Rail mounting as well as distribution boxes. The DIN-rail mounting capability and IP30 metal housing with LED indicators makes these plug-and-play switches reliable and easy to use.

Package Checklist

Your Ethernet Switch is shipped with the following items. If any of these items is missing or damaged, please contact your Weidmüller customer service for assistance.

- Ethernet Switch
- Hardware Installation Guide

Features

High Performance Network Switching Technology

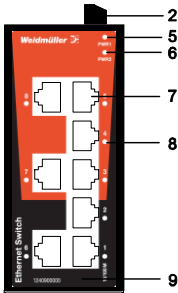
- IE-SW-BL05 series: 10/100BaseT(X) (RJ45), 100 BaseFX (SC/ST connector, multi/single-mode)
- IE-SW-BL08 series: 10/100BaseT(X) (RJ45), 100 BaseFX (SC/ST connector, multi/single-mode)
- 10/100M, Full/Half-Duplex, MDI/MDIX auto-sensing
- IEEE 802.3/802.3u/802.3x
- Store and Forward switching process type, 1024 address entries

Rugged Design

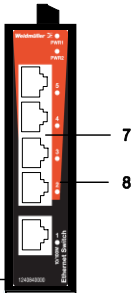
- Redundant dual 12/24/48 VDC (9.6 to 60VDC) or 18 to 30 VAC at 47 to 63 Hz power input
- Standard operating temperature range from -10 to 60°C or extended operating temperature of -40 to 75°C for (-T) models
- IP30 metal housing
- DIN-rail or panel mounting ability

Panel Layout of IE-SW-BL05-5TX / IE-SW-BL08-8TX

IE-SW-BL08
Front Panel View

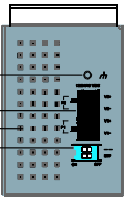


IE-SW-BL05
Front Panel View

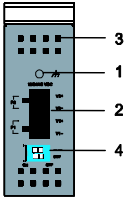


1. Grounding screw
2. Terminal block for power input P1/P2
3. Heat dissipation orifices
4. DIP Switches
5. Power input P1 LED
6. Power input P2 LED
7. 10/100BaseT(X) Port
8. TP port's 10/100 Mbps LED
9. Article Number
10. Screw hole for wall mounting kit
11. DIN-Rail Kit

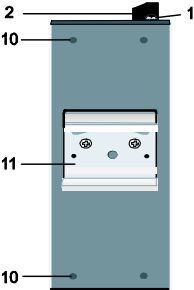
Top Panel View



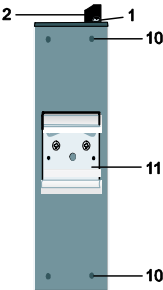
Top Panel View



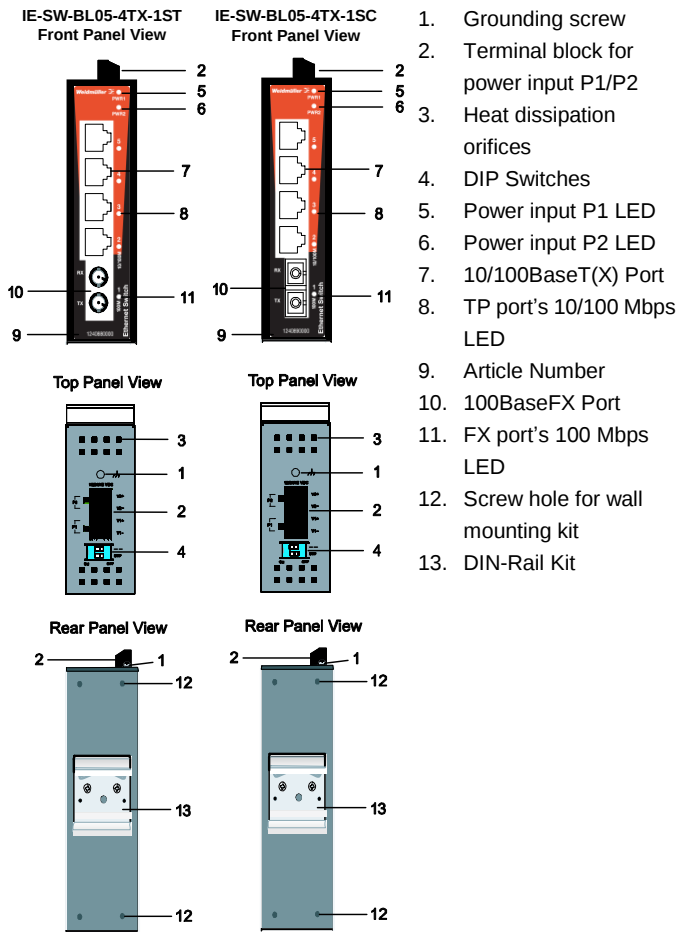
Rear Panel View



Rear Panel View



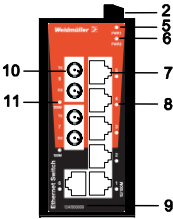
Panel Layout of IE-SW-BL05-4TX-1SC/ST



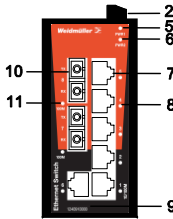
1. Grounding screw
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7. 10/100BaseT(X) Port
8. TP port's 10/100 Mbps LED
9. Article Number
10. 100BaseFX Port
11. FX port's 100 Mbps LED
12. Screw hole for wall mounting kit
13. DIN-Rail Kit

Panel Layout of IE-SW-BL08-6TX-2SC/ST

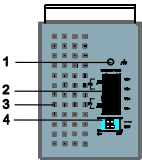
IE-SW-BL08-6TX-2ST
Front Panel View



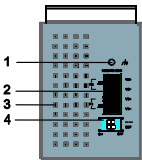
IE-SW-BL08-6TX-2SC
Front Panel View



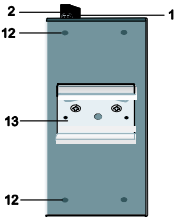
Top Panel View



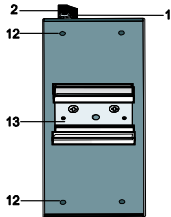
Top Panel View



Rear Panel View

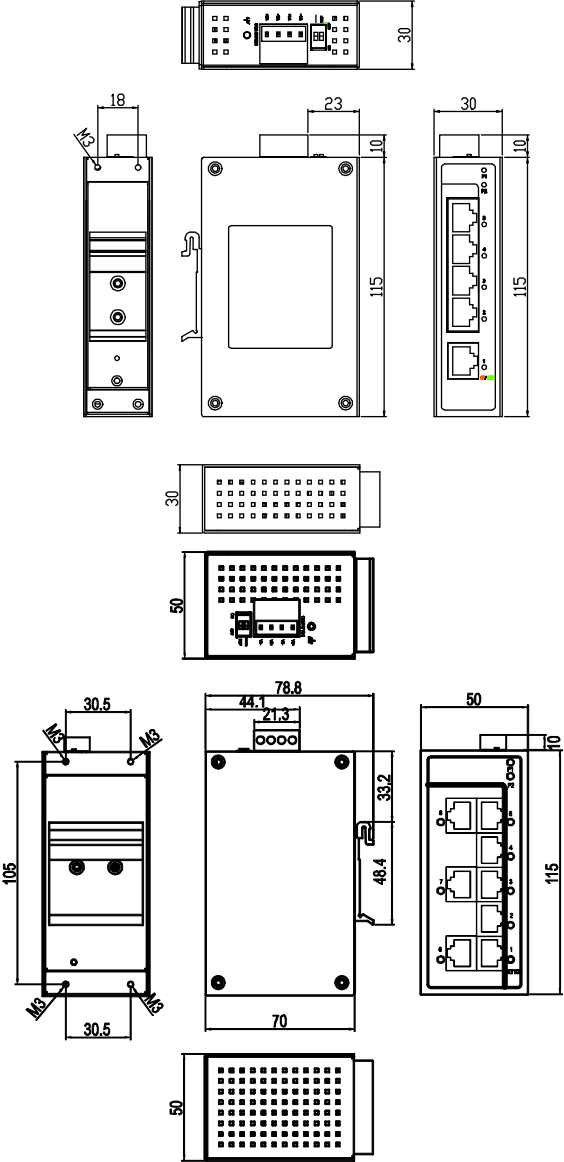


Rear Panel View



1. Grounding screw
2. Terminal block for power input P1/P2
3. Heat dissipation orifices
4. DIP Switches
5. Power input P1 LED
6. Power input P2 LED
7. 10/100BaseT(X) Port
8. TP port's 10/100 Mbps LED
9. Article Number
10. 100BaseFX Port
11. FX port's 100 Mbps LED
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Mounting Dimensions (unit = mm)

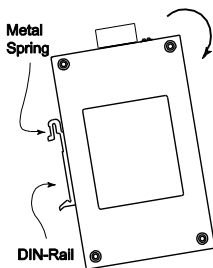


DIN-Rail Mounting

The aluminum DIN-rail attachment plate should already be fixed to the back panel of the Ethernet Switch when you take it out of the box. If you need to reattach the DIN-rail attachment plate, make sure the stiff metal spring is situated towards the top, as shown in the figures below.

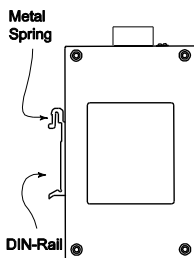
STEP 1:

Insert the top of the DIN-Rail into the slot just below the stiff metal spring.



STEP 2:

The DIN-Rail attachment unit will snap into place as shown below.



To remove the Ethernet Switch from the DIN-Rail, simply reverse Steps 1 and 2 above.



II 3G ATEX Information

1. Certificate number DEMKO 11
ATEX150193X
2. Ambient range ($-40^{\circ}\text{C} \leq T_{\text{amb}} \leq 75^{\circ}\text{C}$)
3. Certification string (Ex nA IIC T4 Gc)
4. Standards covered (EN 60079-0:2012+A11:2013, EN 60079-15:2010)
5. The conditions of safe usage:
 - The Ethernet Communication Devices are to be mounted in an IP54 enclosure and used in an area of not more than pollution degree 2 as defined by IEC60664-1.
 - Use a conductor wire of size 0.2 mm or greater.
 - Conductors suitable for use in an ambient temperature of 100°C must be used for the Power Supply Terminal.
 - Provisions shall be made, either in or external to the apparatus, to prevent the rated voltage from being exceeded by more than 40% due to transients disturbances.



Wiring Requirements



WARNING

Safety First!

Turn the power off before disconnecting modules or wires. The correct power supply voltage is listed on the product label. Check the voltage of your power source to make sure that you are using the correct voltage. **Do NOT use a voltage greater than what is specified on the product label.**

These devices must be supplied by a SELV source as defined in the Low Voltage Directive 2014/35/EU and 2014/30/EU.



WARNING

Safety First!

Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size.

If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

You should also pay attention to the following points:

- Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.
NOTE: Do not run signal or communications wiring and power wiring in the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.
- You can use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring that shares similar electrical characteristics can be bundled together.
- Keep input wiring and output wiring separated.
- It is strongly advised that you label wiring to all devices in the system when necessary.

Grounding the Ethernet Switch

Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the ground screw to the grounding surface prior to connecting devices.

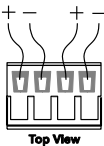


ATTENTION

This product is intended to be mounted to a well-grounded mounting surface such as a metal panel.

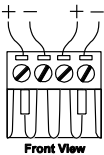
Wiring the Redundant Power Inputs

The top two contacts and the bottom two contacts of the 4-contact terminal block connector on the Ethernet Switch’s top panel are used for the Ethernet Switch’s two AC/DC inputs. Top and front views of one of the terminal block connectors are shown here.



STEP 1: Insert the negative/positive AC/DC wires into the V-/V+ terminals.

STEP 2: To keep the AC/DC wires from pulling loose, use a small flat-blade screwdriver to tighten the wire-clamp screws on the front of the terminal block connector.



STEP 3: Insert the plastic terminal block connector prongs into the terminal block receptor, which is located on Ethernet Switch’s top panel.



ATTENTION

Before connecting the Ethernet Switch to the AC/DC power inputs, make sure the AC/DC power source voltage is stable.

Communication Connections

The IE-SW-BL05 models have 4 or 5 10/100BaseT(X) Ethernet ports, and 1 or 0 (zero) 100 BaseFX multi/single-mode (SC/ST-type connector) fiber ports. The IE-SW-BL08 models have 6, 7 or 8 10/100BaseT(X) Ethernet ports, and 2, 1 or 0 (zero) 100 BaseFX multi/single-mode (SC/ST-type connector) fiber ports.

10/100BaseT(X) Ethernet Port Connection

The 10/100BaseT(X) ports located on the Ethernet Switch’s front panel are used to connect to Ethernet-enabled devices. Below we show pinouts for both MDI (NIC-type) ports and MDI-X (HUB/Switch-type) ports, and also show cable wiring diagrams for straight-through and cross-over Ethernet cables.

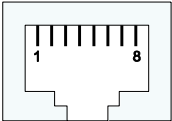
MDI Port Pinouts

Pin	Signal
1	Tx+
2	Tx-
3	Rx+
6	Rx-

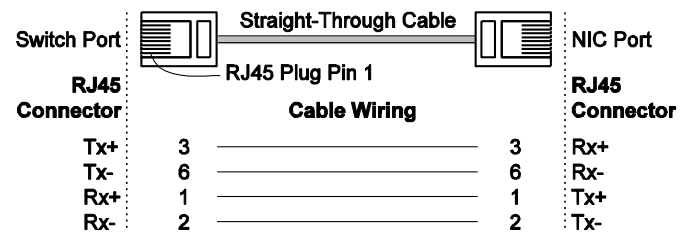
MDI-X Port Pinouts

Pin	Signal
1	Rx+
2	Rx-
3	Tx+
6	Tx-

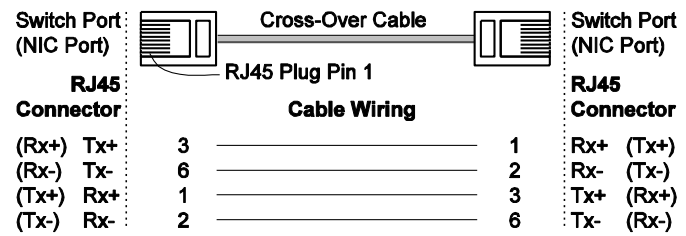
8-pin RJ45



RJ45 (8-pin) to RJ45 (8-pin) Straight-Through Cable Wiring



RJ45 (8-pin) to RJ45 (8-pin) Cross-Over Cable Wiring

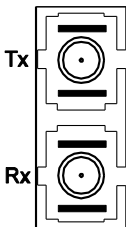


100BaseFX Ethernet Port Connection

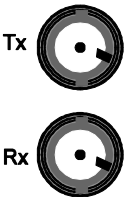
The concept behind the SC/ST port and cable is quite straightforward. Suppose you are connecting devices I and II; contrary to electrical signals, optical signals do not require a circuit in order to transmit data. Consequently, one of the optical lines is used to transmit data from device I to device II, and the other optical line is used transmit data from device II to device I, for full-duplex transmission.

Remember to connect the **Tx (transmit)** port of device I to the **Rx (receive)** port of device II, and the **Rx (receive)** port of device I to the **Tx (transmit)** port of device II.

SC-Port Pinouts



ST-Port Pinouts



ATTENTION

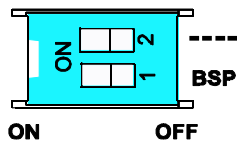
This is a Class 1 Laser/LED product. To avoid causing serious damage to your eyes, do not stare directly into the Laser Beam.

Redundant Power Inputs

Both power inputs can be connected simultaneously to live AC/DC power sources. If one power source fails, the other live source acts as a backup, and automatically supplies all of the Ethernet Switch’s power needs.

DIP Switch Settings

IE-SW-BL05/08 DIP Switches



The default setting for each DIP Switch is OFF. The following table explains the effect of setting the DIP Switches to the ON positions.

DIP Switch	Setting	Description
-----		Serves no function (reserved for future use).
BSP (1)	ON	Enables broadcast storm protection
	OFF	Disables broadcast storm protection



ATTENTION

To actively updated DIP switch settings, power off and then power on the Ethernet Switch.

LED Indicators

The front panel of the Ethernet Switch contains several LED indicators. The function of each LED is described in the table below.

LED	Color	State	Description
P1	AMBER	On	Power is being supplied to power input P1.
		Off	Power is not being supplied to power input P1.
P2	AMBER	On	Power is being supplied to power input P2.
		Off	Power is not being supplied to power input P2.
10M	Yellow	On	TP port’s 10 Mbps link is active.
		Blinking	Data is being transmitted at 10 Mbps.
		Off	TP Port’s 10 Mbps link is inactive
100M	GREEN	On	TP port’s 100 Mbps link is active.
		Blinking	Data is being transmitted at 100 Mbps.
		Off	100Base TP Port’s link is inactive.

Auto MDI/MDI-X Connection

The Auto MDI/MDI-X function allows users to connect the Ethernet Switch's 10/100BaseTX ports to any kind of Ethernet device, without needing to pay attention to the type of Ethernet cable being used for the connection. This means that you can use either a straight-through cable or cross-over cable to connect the Ethernet Switch to Ethernet devices.

Dual Speed Functionality and Switching

The Ethernet Switch's 10/100 Mbps switched RJ45 port auto negotiates with the connected device for the fastest data transmission rate supported by both devices. All models of Ethernet Switch are plug-and-play devices, so that software configuration is not required at installation, or during maintenance. The half/full duplex mode for the switched RJ45 ports is user dependent and changes (by auto-negotiation) to full or half duplex, depending on which transmission speed is supported by the attached device.

Switching, Filtering, and Forwarding

Each time a packet arrives at one of the switched ports, a decision is made to either filter or forward the packet. Packets with source and destination addresses belonging to the same port segment will be filtered, constraining those packets to one port, and relieving the rest of the network from the need to process them. A packet with destination address on another port segment will be forwarded to the appropriate port, and will not be sent to ports where it is not needed. Packets that are used in maintaining the operation of the network (such as the occasional multi-cast packet) are forwarded to all ports. The Ethernet Switch operates in the store-and-forward switching mode, which eliminates bad packets and enables peak performance to be achieved when there is heavy traffic on the network.

Switching and Address Learning

The Ethernet Switch has an address table that can hold up to 1024 addresses, which makes it suitable for use with large networks. The address tables are self-learning, so that as nodes are added or removed, or moved from one segment to another, the Ethernet Switch automatically keeps up with new node locations. An address-aging algorithm causes the least-used addresses to be deleted in favor of newer, more frequently used addresses. To reset the address buffer, power down the unit and then power it back up.

Auto-Negotiation and Speed Sensing

All of the Ethernet Switch's RJ45 Ethernet ports independently support auto-negotiation for speeds in the 10BaseT and 100BaseTX modes, with operation according to the IEEE 802.3u standard. This means that some nodes could be operating at 10 Mbps, while at the same time, other nodes are operating at 100 Mbps. Auto-negotiation takes place when an RJ45 cable connection is made, and then each time a LINK is enabled. The Ethernet Switch advertises its capability for using either 10 Mbps or 100 Mbps transmission speeds, with the device at the other end of the cable expected to advertise in a similar manner. Depending on what type of device is connected, this will result in agreement to operate at a speed of either 10 Mbps or 100 Mbps. If an Ethernet Switch RJ45 Ethernet port is connected to a non-negotiating device, it will default to 10 Mbps speed and half-duplex mode, as required by the IEEE 802.3u standard.

Specifications

Technology

Standards	IEEE 802.3 for 10BaseT, IEEE 802.3u for 100BaseT(X) and 100BaseFX, IEEE 802.3x for Flow Control
Processing Type	Store and Forward
Flow Control	IEEE 802.3x flow control, back pressure flow control

Interface

RJ45 Ports	10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
Fiber Ports	100BaseFX ports (SC/ST connector, multi/single-mode)
LED Indicators	P1, P2 (Power), 10/100M (TP port), and 100M (Fiber port)
DIP Switch	enable/disable broadcast storm protection

Optical Fiber

	100BaseFX	
	Multi-mode	Single-mode
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km ^a	40 km ^c
	4 km ^b	
Saturation	-6 dBm	-3 dBm

- a. using [50/125μm, 800 MHz*km] cable
- b. using [62.5/125μm, 500 MHz*km] cable
- c. using [9/125 μm, 3.5 PS/(nm*km)] cable

Power

Input Voltage	12/24/48 VDC (9.6 to 60 VDC), 18 to 30VAC (47 to 63 Hz)
Input Current	IE-SW-BL05-5TX: 0.1 A @ 24 VDC IE-SW-BL05-SC/ST/SCS: 0.11 A @ 24 VDC IE-SW-BL08-8TX: 0.13 A @ 24 VDC IE-SW-BL08-SC/ST: 0.22 A @ 24 VDC IE-SW-BL08-SCS: 0.17 A @ 24 VDC
Connection	Removable 4-contact terminal block
Overload Current Protection	1.1 A
Reverse Polarity Protection	Present

Physical Characteristics

Housing	IP30 protection, metal case
Dimensions (W x H x D)	IE-SW-BL05-Models: 30 x 115 x 70 mm (1.18 x 4.52 x 2.76 in) IE-SW-BL08-Models: 50 x 115 x 70 mm (1.96 x 4.52 x 2.76 in)
Weight	IE-SW-BL05-Models: 175 g IE-SW-BL08-Models: 275 g
Installation	DIN-Rail Mounting

Environmental Limits

Operating Temperature	-10 to 60°C (14 to 140°F) -40 to 75°C (-40 to 167°F) for -T models
Storage Temperature	-40 to 85°C (-40 to 185°F)
Ambient Relative Humidity	5 to 95% (non-condensing)

Regulatory Approvals

Safety	UL508
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C, and D; ATEX Zone 2: Ex nA IIC T4 Gc
EMI	FCC Part 15, CISPR (EN55022) class A
EMS	EN61000-4-2 (ESD), Level 3 EN61000-4-3 (RS), Level 3 EN61000-4-4 (EFT), Level 3 EN61000-4-5 (Surge), Level 3 EN61000-4-6 (CS), Level 3 EN61000-4-8 EN61000-4-11
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

WARRANTY	5 years
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Weidmüller gives a 5 year warranty on this product in accordance with the warranty terms as described in the general conditions of sale of the Weidmüller company which has sold the products to you. Weidmüller warrants to you that such products the defects of which have already existed at the time when the risk passed will be repaired by Weidmüller free of charge or that Weidmüller will provide a new, functionally equivalent product to replace the defective one. Safe where expressly described otherwise in writing in this catalogue/product description, Weidmüller gives no warranty or guarantee as to the interoperability in specific systems or as to the fitness for any particular purpose. To the extent permitted by law, any claims for damages and reimbursement of expenses, based on whatever legal reason, including contract or tort, shall be excluded. Where not expressly stated otherwise in this warranty, the general conditions of purchase and the expressive liability commitments therein of the respective Weidmüller company which has sold the products to you shall be applicable.

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