

Ethernet Switch – Premium Line

IE-SW-PL09M-5GC-4GT

Hardware Installation Guide

Third Edition, October 2012
1243420000/02/10.12

Please note:

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

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

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Weidmüller 

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.

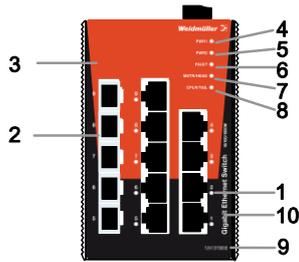
- 1 Ethernet Switch IE-SW-PL09M-5GC-4GT
- Hardware Installation Guide
- CD-ROM with User's Manual and Windows Utility (option)
→ **Please download CD-ROM from Internet page**
<http://www.weidmueller.com/downloads>
- RJ45 to DB9 console port cable
- Protective caps for unused ports

Optional Accessories

- **SFP-Transceiver** (Fast Ethernet and Gigabit Ethernet modules for different transmission lengths)
- **EBR-Module RS232** (Automatic Backup Configurator via RS-232 Console Port)
- **RM-KIT (19" rack mounting kit)**

Panel Views IE-SW-PL09M-5GC-4GT

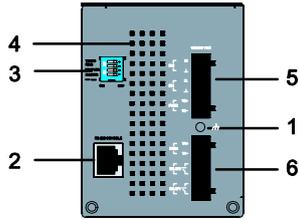
Front Panel View



Front Panel:

1. 1 to 4: 10/100/1000 BaseT(X) port
2. 5 to 9: 10/100/1000 BaseT(X) or 100/1000Base SFP slot combo ports
3. Label
4. PWR1: LED for power input 1
5. PWR2: LED for power input 2
6. FAULT: LED indicator
7. MSTR/HEAD LED
8. CPLR/TAIL LED
9. Article Number
10. 10/100/1000BaseT(X) LED indicator (Amber: 10/100M Green: 1000M)

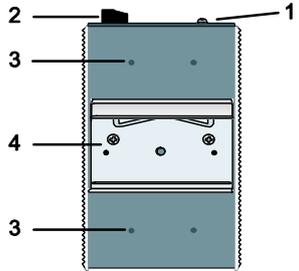
Top Panel View



Top Panel:

1. Grounding screw
2. RS-232 console port
3. DIP switches for Ring Master, Ring Coupler, and Turbo Ring
4. Heat dissipation orifices
5. 6-pin terminal block for DI 1, DI 2, and PWR 2
6. 6-pin terminal block for PWR1, Relay 1, and Relay 2

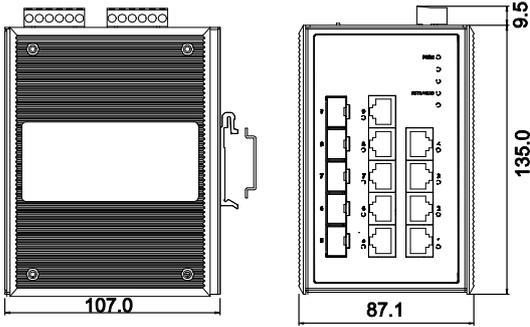
Rear Panel View



Rear Panel:

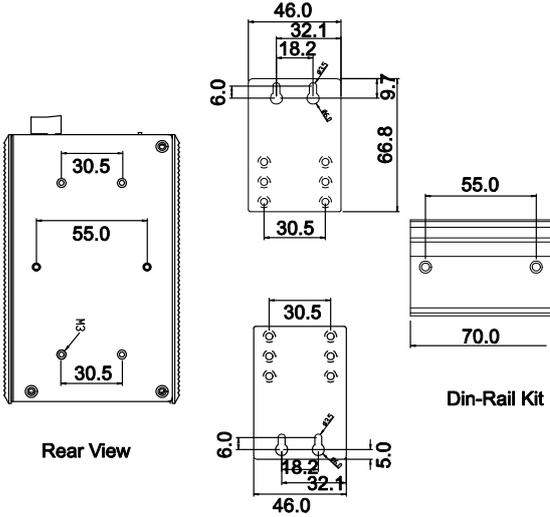
1. Grounding screw
2. Terminal block
3. Screw holes for Wall Mounting Kit
4. DIN-Rail kit

Mounting Dimensions (unit = mm)



Side View

Front View



Rear View

Wall Mounting Kit

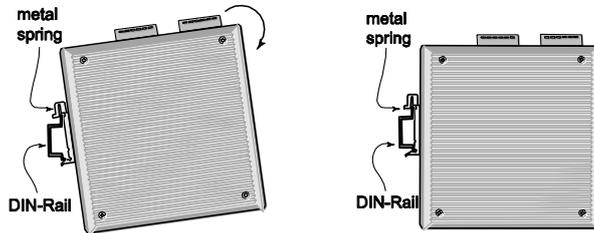
Din-Rail Kit

DIN-Rail Mounting

The aluminum DIN-Rail attachment plate should already be fixed to the back panel of the IE-SW-PL09M-5GC-4GT when you take it out of the box. If you need to reattach the DIN-Rail attachment plate to the switch, make sure the stiff metal spring is situated towards the top, as shown in the following figures.

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 in the following illustration.



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

Wiring Requirements



WARNING

Do not disconnect modules or wires unless power has been switched off or the area is known to be non-hazardous. The devices may only be connected to the supply voltage shown on the type plate. The devices are designed for operation with a Safety Extra-Low Voltage. Thus, they may only be connected to the supply voltage connections and to the signal contact with the Safety Extra-Low Voltages (SELV) in compliance with IEC950/EN60950-1/ VDE0805.



ATTENTION

This unit is a built-in type. When the unit is installed in another piece of equipment, the equipment enclosing the unit must comply with fire enclosure regulation IEC 60950-1/EN60950-1 (or similar regulation).



ATTENTION

Safety First!

Be sure to disconnect the power cord before installing and/or wiring your Weidmüller Ethernet Switch.

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.

Please read and follow these guidelines:

- 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 through 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 sharing similar electrical characteristics can be bundled together
- You should separate input wiring from output wiring
- We advise that you label the wiring to all devices in the system.

Grounding the IE-SW-PL09M-5GC-4GT

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.



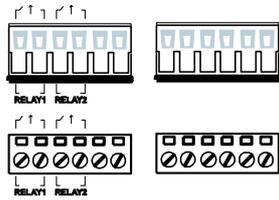
ATTENTION

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

Wiring the Relay Contact

The IE-SW-PL09M-5GC-4GT has two sets of relay outputs—relay 1 and relay 2. Each relay contact uses two contacts of the terminal block on the top panel. Refer to the next section for detailed instructions on how to connect the wires to the terminal block connector, and how to attach the terminal block connector to the terminal block receptor.

In this section, we illustrate the meaning of the two contacts used to connect the relay contact.

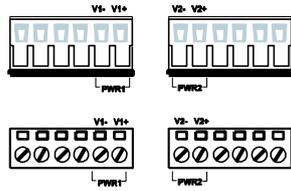


FAULT:

The two sets of relay contacts of the 6-pin terminal block connector are used to detect user-configured events. The two wires attached to the fault contacts form an open circuit when a user-configured event is triggered. If a user-configured event does not occur, the fault circuit remains closed.

Wiring the Redundant Power Inputs

The switch IE-SW-PL09M-5GC-4GT has two sets of power inputs - power input 1 and power input 2 – located on the 6-pin terminal block connector on the top panel of the device. See sketch below how to connect.



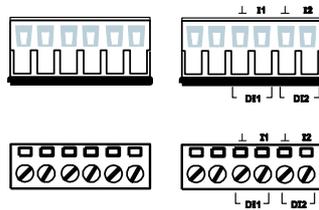
STEP 1: Insert the negative/positive DC wires into the V-/V+ terminals, respectively.

STEP 2: To keep the 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 the device's top panel.

Wiring the Digital Inputs

The IE-SW-PL09M-5GC-4GT has two sets of digital inputs, DI 1 and DI 2. Each DI consists of two contacts of the 6-pin terminal block connector on the device's top panel, which are used for the two DC inputs. The top and front views of one of the terminal block connectors are shown here.



STEP 1: Insert the negative (ground)/positive DI wires into the \perp /DI terminals, respectively.

STEP 2: To keep the DI 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 the device's top panel.

Communication Connections

The Ethernet switch has 3 types of communication port:

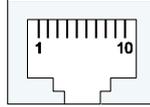
- 1 RJ45 console port (RS-232 interface)
- 4 10/100/1000BaseTX Ethernet ports
- 5 combination 10/100/1000T(X)/1000BaseSFP ports

RS-232 Connection

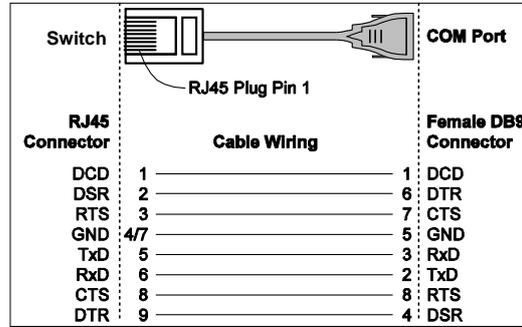
The Switch has one RS-232 (10-pin RJ45) console port, located on the top panel. Use either an RJ45-to-DB9 (see the cable following wiring diagrams) to connect the console port to your PC's COM port. You may then use a console terminal software, such as Windows Hyper Terminal, to access the IE-SW-PL09M-5GC-4GT's serial console. (Baudrate: 115200 bps, no parity, 8 data bit, 1 stop bit)

RJ45 (10-pin) Console Port Pinouts

Pin	Description
1	-----
2	DSR
3	RTS
4	-----
5	TxD
6	RxD
7	GND
8	CTS
9	DTR
10	-----



RJ45 (10-pin) to DB9 (F) Cable Wiring



10/100/1000BaseT(X) Ethernet Port Connection

The 10/100/1000BaseT(X) ports located on the front panel are used to connect to Ethernet-enabled devices. Most users will choose to configure these ports for Auto MDI/MDI-X mode, in which case the port's pinouts are adjusted automatically depending on the type of Ethernet cable used (straight-through or cross-over), and the type of device (NIC-type or HUB/Switch-type) connected to the port.

In what follows, we give pinouts for both MDI (NIC-type) ports and MDI-X (HUB/Switch-type) ports. We also give cable wiring diagrams for straight-through and cross-over Ethernet cables.

10/100Base T(x) RJ45 Pinouts

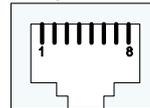
MDI Port Pinouts

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

MDI-X Port Pinouts

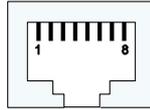
Pin	Signal
1	Rx+
2	Rx-
3	Tx+
6	Tx-

8-pin RJ45

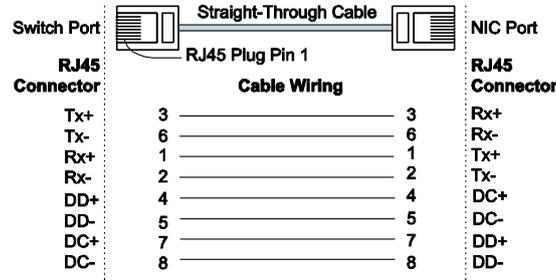


1000BaseT RJ45 Pinouts

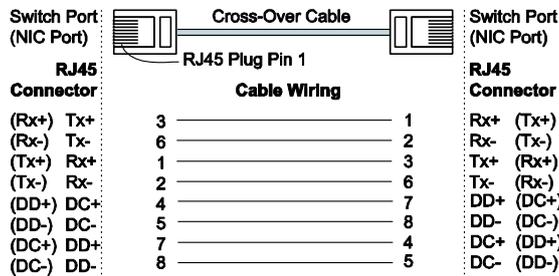
Pin	MDI	MDI-X
1	BI_DA+	BI_DB+
2	BI_DA-	BI_DB-
3	BI_DB+	BI_DA+
4	BI_DC+	BI_DD+
5	BI_DC-	BI_DD-
6	BI_DB-	BI_DA-
7	BI_DD+	BI_DC+
8	BI_DD-	BI_DC-



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



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



100 BaseFX or 1000BaseSFP Fiber Port

The Gigabit Ethernet ports on the IE-SW-PL09M-5GC-4GT are SFP slots, which require 100BaseFX SFP or Gigabit mini-GBIC fiber transceivers to work properly. Weidmüller provides transceiver models for various distance requirements.

Multi mode:

1000BaseSX	0 to 550 m, 850 nm (50/125µm, 400MHz*km) 0 to 275 m, 850 nm (62.5/125µm, 200MHz*km)
1000BaseLX	0 to 1100 m, 1310 nm (50/125µm, 800MHz*km) 0 to 550 m, 1310 nm (62.5/125µm, 500MHz*km)

Single mode:

1000BaseLH	0 to 10 km, 1310 nm (9/125µm, 3.5 PS/(nm*km))
1000BaseLHX	0 to 40 km, 1310 nm (9/125µm, 3.5 PS/(nm*km))

Multi mode:

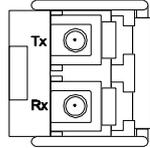
100BaseFX 0 to 5 km, 1300 nm (50/125µm, 800MHz*km)
 0 to 4 km, 1300 nm (62.5/125µm, 500MHz*km)

Single mode:

100BaseFX 0 to 40 km, 1310 nm (9/125µm, 3.5 PS/(nm*km))

The concept behind the LC port and cable is quite straightforward. Suppose you are connecting devices I and II. Unlike 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 to 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.

LC-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.

Turbo Ring DIP Switch Settings

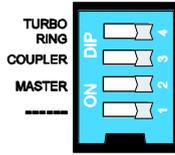
The IE-SW-PL09M-5GC-4GT is a plug-and-play managed redundant Ethernet switch. The proprietary Turbo Ring protocol was developed by Weidmüller to provide better network reliability and faster recovery time. Weidmüller Turbo Ring's recovery time is less than 300 ms (**Turbo Ring**) or 20 ms (**Turbo Ring V2**)—compared to a 3- to 5-minute recovery time for commercial switches—decreasing the possible loss caused by network failures in an industrial setting.

There are 4 Hardware DIP Switches for Turbo Ring on the top panel of IE-SW-PL09M-5GC-4GT that can help setup the Turbo Ring easily within seconds. If you do not want to use a hardware DIP switch to setup the Turbo Ring, you can use a web browser, telnet, or console to disable this function.

NOTE

Please refer to the *Turbo Ring DIP Switch* section and *Using Communication Redundancy* section in the User's Manual for more detail information about the settings and usage of *Turbo Ring* and *Turbo Ring V2*.

IE-SW-PL09M-5GC-4GT DIP Switches



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

“Turbo Ring” DIP Switch Settings

DIP 1	DIP 2	DIP 3	DIP 4
Reserved for future use.	<u>ON</u> : Enables this Ethernet Switch as the Ring Master.	<u>ON</u> : Enables the default “Ring Coupling” ports.	<u>ON</u> : Activates DIP switches 1, 2, 3 to configure “Turbo Ring” settings.
	<u>OFF</u> : This Ethernet Switch will not be the Ring Master.	<u>OFF</u> : Do not use this Ethernet Switch as the ring coupler.	<u>OFF</u> : DIP switches 1, 2, 3 will be disabled.

“Turbo Ring V2” DIP Switch Settings

DIP 1	DIP 2	DIP 3	DIP 4
<u>ON</u> : Enables the default “Ring Coupling (backup)” port.	<u>ON</u> : Enables this Ethernet Switch as the Ring Master.	<u>ON</u> : Enables the default “Ring Coupling” port.	<u>ON</u> : Activates DIP switches 1, 2, 3 to configure “Turbo Ring V2” settings.
<u>OFF</u> : Enables the default “Ring Coupling (primary)” port.	<u>OFF</u> : This Ethernet Switch will not be the Ring Master.	<u>OFF</u> : Do not use this Ethernet Switch as a ring coupler.	<u>OFF</u> : DIP switches 1, 2, 3 will be disabled.

NOTE You must enable the Turbo Ring function first before using the DIP switch to activate the Master and Coupler functions.

NOTE If you do not enable any of the DIP switches to be the Ring Master, the Turbo Ring protocol will automatically choose the switch with the smallest MAC address range to be the Ring Master. If you accidentally enable more than one switch to be the Ring Master, these switches will auto-negotiate to determine which one will be the Ring Master.

LED Indicators

The front panel of the IE-SW-PL09M-5GC-4GT switch contains several LED indicators. The function of each LED is described in the following table:

LED	Color	State	Description
PWR1	AMBER	On	Power is being supplied to power input P1.
		Off	Power is not being supplied to power input P1.
PWR2	AMBER	On	Power is being supplied to power input P2.
		Off	Power is not being supplied to power input P2.
FAULT	RED	On	When the corresponding PORT alarm is enabled, and a user-configured event is triggered.
		Off	When the corresponding PORT alarm is enabled and a user-configured event is not triggered, or when the corresponding PORT alarm is disabled.
MSTR/HEAD	GREEN	On	When the switch is set as the Master of the Turbo Ring, or as the Head of the Turbo Chain.
		Blinking	The switch has become the Ring Master of the Turbo Ring, or the Head of the Turbo Chain, after the Turbo Ring or the Turbo Chain is down.
		Off	When the switch is not the Master of this Turbo Ring or is set as the Member of the Turbo Chain.
CPLR/TAIL	GREEN	On	When the switch coupling function is enabled to form a back-up path, or when it's set as the Tail of the Turbo Chain.
		Blinking	When the Turbo Chain is down.
		Off	When the switch disables the coupling function.
10/100/1000M	AMBER	On	TP port's 10/100 Mbps link is active.
		Blinking	Data is being transmitted at 10/100 Mbps.
		Off	TP port's 10/100 Mbps link is inactive.
	GREEN	On	TP port's 1000 Mbps link is active.
		Blinking	Data is being transmitted at 1000 Mbps.
		Off	TP port's 1000 Mbps link is inactive.

Specifications

Technology

Standards	IEEE802.3, 802.3u, 802.3x, 802.1D, 802.1w, 802.1Q, 802.1p, 802.1X, 802.3ad, 802.3z
Protocols	IGMPv1/v2, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, DHCP Option 66/67/82, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, SSH, Syslog, Modbus/TCP, SNMP Inform, LLDP, IEEE 1588 PTP, IPv6
MIB	MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1,2,3,9
Flow Control	IEEE802.3x flow control/back pressure

Interface

RJ45 Ports	10/100/1000BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
Fiber Ports	1000BaseSX/LX/LHX/ZX (LC connector)
Console Port	RS-232 (10-pin RJ45)
LED Indicators	PWR1, PWR2, FAULT, 10/100M (TP port), 1000M, MSTR/HEAD and CPLR/TAIL
Alarm Contact	Two relay outputs with current carrying capacity of 1A @ 24 VDC
Digital Input	Two inputs with the same ground, but electrically isolated from the electronics <ul style="list-style-type: none"> • For state "1": +13 to +30 V • For state "0": -30 to +3 V • Max. input current: 8 mA

Optical Fiber—100 or 1000Base SFP modules

	Gigabit Ethernet			
	SFP-SX	SFP-LSX	SFP-LX	SFP-LHX
Wave-length	850 nm	1310 nm	1310 nm	1310 nm
Max. Tx	-4 dBm	-1 dBm	-3 dBm	1 dBm
Min. Tx	-9.5 dBm	-9 dBm	-9.5 dBm	-4 dBm
Rx Sensitivity	-18 dBm	-19 dBm	-20 dBm	-24 dBm
Link Budget	8.5 dB	10 dB	10.5 dB	20 dB
Typical Distance	550 m ^a	2 km ^b	10 km ^c	40 km ^c
Saturation	0 dBm	-3 dBm	-3 dBm	-3 dBm
a. 50/125 μm, 400 MHz * km or 62.5/125 μm, 500 MHz * km @ 850 nm multi-mode fiber optic cable b. 62.5/125 μm, 750 MHz * km @ 1310 nm multi-mode fiber optic cable c. 9/125 μm single-mode fiber optic cable				

	Fast Ethernet		
	SFP-M	SFP-S	SFP-L
Wavelength	1300 nm	1310 nm	1550 nm
Max. Tx	-18 dBm	0 dBm	0 dBm
Min. Tx	-8 dBm	-5 dBm	-5 dBm
Rx Sensitivity	-34 dBm	-34 dBm	-34 dBm
Link Budget	26 dB	29 dB	29 dB
Typical Distance	4 km ^a	40 km ^b	80 km ^b
Saturation	0 dBm	-3 dBm	-3 dBm
a. 50/125 μm or 62.5/125 μm, 800 MHz * km @ 1300 nm multi-mode fiber optic cable b. 9/125 μm single-mode fiber optic cable			

Power

Input Voltage	12/24/48 VDC, 18 to 30VAC (47 to 63 Hz), redundant inputs
Input Current (@24V)	0.92A
Connection	Two removable 6-pin terminal blocks
Overload Current Protection	Present
Reverse Polarity Protection	Present

Mechanical

Casing	IP30 protection, metal case
Dimensions (W × H × D)	87.1 × 135 × 107 mm (3.43 × 5.31 × 4.21 in)
Weight	1.41 kg
Installation	DIN-Rail, Wall Mounting Kit

Environment

Operating Temperature	0 to 60°C (32 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	UL 508
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C, and D; ATEX Class I, Zone 2, Ex nC nL IIC T4 (Pending)
EMI	FCC Part 15, EN55022; class A
EMS	EN55024 EN61000-4-2 (ESD), Level 3 EN61000-4-3 (RS), Level 3 EN61000-4-4 (EFT), Level 2 EN61000-4-5 (Surge), Level 3 EN61000-4-6 (CS), Level 3 EN61000-4-8 EN61000-4-11

Shock	IEC60068-2-27
Free Fall	IEC60068-2-32
Vibration	IEC60068-2-6

WARRANTY 5 years

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.

Contact Information

Weidmüller Interface GmbH & Co. KG
Postfach 3030
32760 Detmold
Klingenbergstraße 16
32758 Detmold
Germany

Phone +49 (0) 5231 14-0
Fax +49 (0) 5231 14-2083
E-Mail info@weidmueller.com
Internet www.weidmueller.com