Ethernet Switch – Premium Line

IE-SW-PL10M Series (Managed)

Hardware Installation Guide

Third Edition, October 2012
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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

Weidmüller

Package Checklist

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

- 1 Ethernet Switch IE-SW-PL10M
- 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)

→ Detailed information in datasheet

Panel Views of IE-SW-PL10M Series

IE-SW-PL10M-3GT-7TX
Front Panel View

1. 1 to 7: 10/100BaseT(X) port
2. G1:
   IE-SW-PL10M-3GT-7TX
     10/100/1000BaseT(X) port
   IE-SW-PL10M-1GT-2GS-7TX
     10/100/1000BaseT(X) port
3. G2:
   IE-SW-PL10M-3GT-7TX
     10/100/1000BaseT(X) port
   IE-SW-PL10M-1GT-2GS-7TX
     1000BaseSX/LX/LHX/ZX port
4. G3:
   IE-SW-PL10M-3GT-7TX
     10/100/1000BaseT(X) port
   IE-SW-PL10M-1GT-2GS-7TX
     1000BaseSX/LX/LHX/ZX port

IE-SW-PL10M-1GT-2GS-7TX
Front Panel View

5. G1, G2, G3: LED indicators for 1000 Mbps ports
6. PWR1: LED for power input 1
7. PWR2: LED for power input 2
8. FAULT: LED indicator
9. MSTR/HEAD: LED indicator
10. CPLR/TAIL: LED indicator
11. Label
12. 100M: LED indicator for TP port
13. 10M: LED indicator for TP port
14. Article Number

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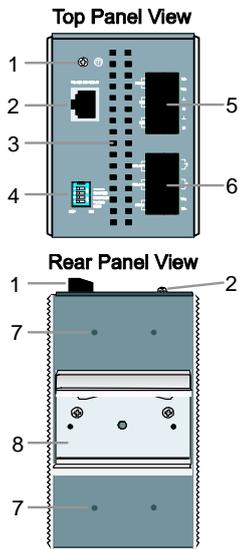
Top Panel:
1. Ground screw
2. RS-232 console port
3. Heat dissipation orifices
4. DIP switches for Ring Master, Ring Coupler, and Turbo Ring
5. 6-pin terminal block for DI 1, DI 2, and PWR 2
6. 6-pin terminal block for PWR1, Relay 1, and Relay 2

Rear Panel View

Rear Panel:
7. Screw holes for Wall Mounting Kit
8. DIN-Rail Kit

Mounting Dimensions (unit = mm)

Side View

Front View

Rear View

DIN-Rail Kit

Wall Mounting Kit
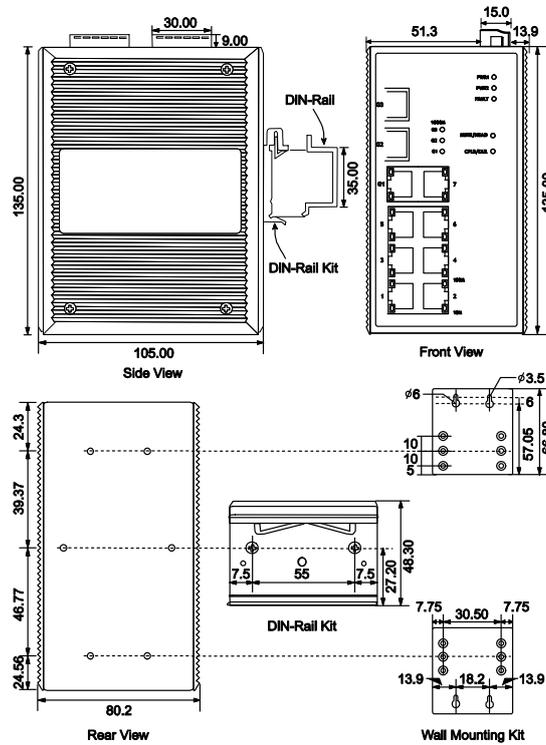
DIN-Rail Mounting

The aluminum DIN-Rail attachment plate should already be fixed to the back panel of the IE-SW-PL10M when you take it out of the box. If you need to reattach the DIN-Rail attachment plate to the IE-SW-PL10M, make sure the stiff metal spring is situated towards the top, as shown by 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.
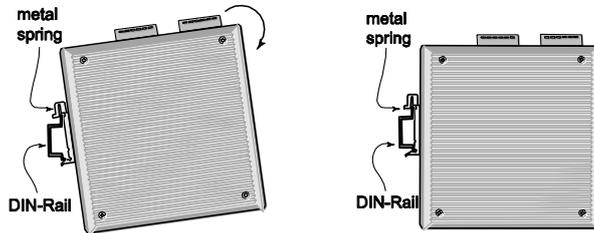
To remove the IE-SW-PL10M switch from the DIN-Rail, simply reverse Steps 1 and 2 above.

II 3G ATEX Information

1. Certificate number DEMKO 11 ATEX 150190X
2. Ambient range (-40°C $\leq$ Tamb $\leq$ 75°C)
3. Certification string (Ex nC nL IIC T4)
4. Standards covered (EN60079-0:2006, EN60079-15:2005)
5. The conditions of safe usage:
   - These products must be mounted in an IP54 enclosure.
   - Install in an area of pollution degree 2 or less.
   - Use a conductor wire of size 0.2 mm² or greater.
   - PROVISIONS SHALL BE MADE, EITHER IN EXTERNAL TO THE APPARATUS, TO PREVENT THE RATED VOLTAGE BEING EXCEEDED BY THE TRANSIENTS DISTURBANCES OF MORE THAN 40 %

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/ 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/EN60950 (or similar regulation).

ATTENTION

Safety First!

Be sure to disconnect the power cord before installing and/or wiring your 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 that shares 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-PL10M

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-PL10M has two sets of relay outputs—relay 1 and relay 2. Each relay contact uses two contacts of the terminal block on the IE-SW-PL10M´s 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.
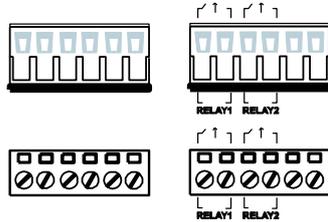

FAULT:

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 IE-SW-PL10M has two sets of power inputs—power input 1 and power input 2. The top two contacts and the bottom two contacts of the 6-pin terminal block connector on the IE-SW-PL10M´s top panel are used for the two digital inputs. The top and front views of one of the terminal block connectors are shown here.
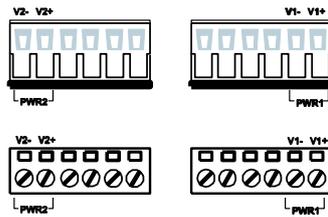
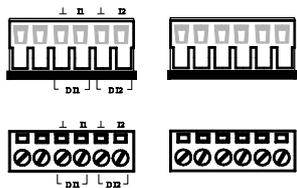**STEP 1**: Insert the negative/positive DC wires into the V-/V+ terminals, respectively.

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 IE-SW-PL10M´s top panel.

Wiring the Digital Inputs

The IE-SW-PL10M 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 IE-SW-PL10M´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 $\perp$/I1 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 IE-SW-PL10M´s top panel.

Communication Connections

Each IE-SW-PL10M switch has 3 types of communication ports:

- 1 RJ45 console port (RS-232 interface)
- 7 10/100BaseTX Ethernet ports
- 3 Gigabit Ethernet ports:
  3 10/100/1000BaseTX ports, or 1 10/100/1000BaseTX and 2 1000BaseSFP (mini-GBIC) ports

In this section, we present two types of diagrams—Pinout Diagrams and Cable Wiring Diagrams—that convey information about the ports and the cables used to connect the IE-SW-PL10M Series to other devices:

Pinouts—The "Pinouts" diagrams display the type of signal passing through each of the port's pins.

Cable Wiring—The "Cable Wiring" diagrams present standard cable wiring schemes for cables used to connect the IE-SW-PL10M Series ports to other devices. These diagrams display three pieces of information:

1. When building your own cable, refer to the "pin-to-pin" cable wiring information displayed between the two vertical dashed lines to see which pin of the connector on the left should be connected to which pin of the connector on the right.

2. The information to the left of the left vertical dashed lines gives the pinouts of the relevant IE-SW-PL10M Series port.

3. The information to the right of the right vertical dashed line gives the pinouts of the opposing device's port.


NOTE 1. The pin numbers for male DB9 connectors and hole numbers for female DB9 connectors are labeled on the connector.

2. The pin numbers for 10-pin RJ45 connectors (and ports) are typically not labeled on the connector (or port). Refer to the following Pinout and Cable Wiring diagrams to see how 10-pin RJ45 pins are numbered


RS-232 Connection

The IE-SW-PL10M Series 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 IE-SW-PL10M console port to your PC's COM port. You may then use a console terminal program, such as Windows Hyper Terminal, to access the IE-SW-PL10M console configuration utility.

RJ45 (10-pin) Console Port Pinouts

Pin	Description
1	------
2	DSR
3	------
4	GND
5	TxD
6	RxD
7	GND
8	------
9	DTR
10	------
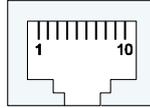
RJ45 (10-pin) to DB9 (F) Cable Wiring
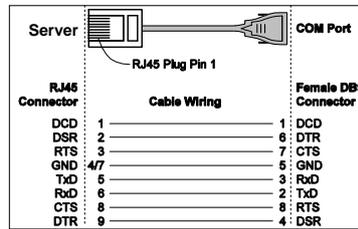
10/100BaseT(X) Ethernet Port Connection

The 10/100BaseT(X) ports located on the IE-SW-PL10M Series front panel are used to connect to Ethernet-enabled devices. Most users 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.
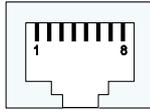
RJ45 (8-pin, MDI) Port Pinouts

Pin	Signal

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

RJ45 (8-pin, MDI-X) Port Pinouts

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

RJ45 (8-pin) to RJ45 (8-pin) Straight-through Cable Wiring
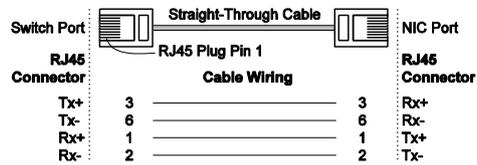
RJ45 (8-pin) to RJ45 (8-pin) Cross-over Cable Wiring
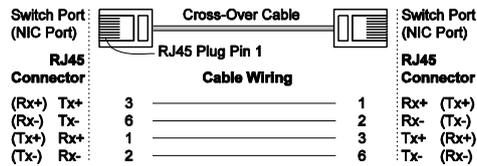
1000BaseT Ethernet Port Connection

1000BaseT data is transmitted on differential TRD+/- signal pairs over copper wires.

MDI/MDI-X Port Pinouts

Pin	Signal
1	TRD(0)+
2	TRD(0)-
3	TRD(1)+
4	TRD(2)+
5	TRD(2)-
6	TRD(1)-
7	TRD(3)+
8	TRD(3)-

1000BaseSFP (mini-GBIC) Fiber Port

The gigabit Ethernet ports on the IE-SW-PL10M-1GT-2GS-7TX are 1000BaseSFP Fiber ports, which require using the gigabit mini-GBIC fiber transceivers to work properly. Weidmüller provides completed transceiver models for different distance requirement. Please refer to Specifications section for more optical fiber information.

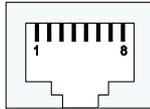The concept behind the LC port and cable is quite straightforward. Suppose that you are connecting devices I and II; contrary to electrical signals, optical signals do not require a circuit in order to transmit data. Consequently, one of the optical lines is used to transmit data from device I to device 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.

LC-Port Pinouts
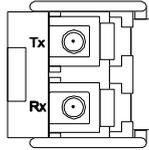
⚠	**ATTENTION**
	This is a Class 1 Laser/LED product. To avoid causing serious damage to your eyes, do not stare directly into the Laser Beam.

Turbo Ring DIP Switch Settings

IE-SW-PL10M models are plug-and-play managed redundant Ethernet switches. The proprietary Turbo Ring protocol was developed by Weidmüller to provide better network reliability and faster recovery time. 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-PL10M switch 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 User's Manual for more detail information about the settings and usage of *Turbo Ring* and *Turbo Ring V2*.

IE-SW-PL10M-Series DIP Switches
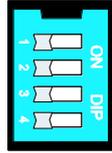
 The default setting for each DIP Switch is OFF. The following table explains the effect of setting the DIP Switch to the ON position.

"Turbo Ring" DIP Switch Settings

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

"Turbo Ring V2" DIP Switch Settings

DIP 1	DIP 2	DIP 3	DIP 4
ON: Enables the default "Ring Coupling (backup)" port.	ON: Enables this Ethernet Switch as the Ring Master.	ON: Enables the default "Ring Coupling" port.	ON: Activates DIP switches 1, 2, 3 to configure "Turbo Ring V2" settings.
OFF: Enables the default "Ring Coupling (primary)" port.	OFF: This Ethernet Switch will not be the Ring Master.	OFF: Do not use this Ethernet Switch as a ring coupler.	OFF: 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 IE-SW-PL10M 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 Weidmüller IE-SW-PL10M Series 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, or is set as the Member of the Turbo Chain.
10M (TP)	GREEN	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 (TP)	GREEN	On	TP port's 100 Mbps link is active.
		Blinking	Data is being transmitted at 100 Mbps.
		Off	TP port's 100 Mbps link is inactive.
1000M (TP/SFP)	GREEN	On	TP/SFP port's 1000 Mbps link is active.
		Blinking	Data is being transmitted at 1000 Mbps.
		Off	TP/SFP 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, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, Syslog, DHCP Option 66/67/82, SSH, SNMP Inform, Modbus/TCP, 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

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, 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 • For state "1": +13 to +30V • For state "0": -30 to +3V • Max. input current: 8 mA

Optical Fiber—1000BaseSX/LX/LHX/ZX

	SX	LX	LHX
Wavelength	850 nm	1310 nm	1310 nm
Max. Tx	-4 dBm	-3 dBm	1 dBm
Min. Tx	-9.5 dBm	-9.5 dBm	-4 dBm
Rx Sensitivity	-18 dBm	-20 dBm	-24 dBm
Link Budget	8.5 dB	10.5 dB	20 dB
Typical Distance	550m (a) 275m (b)	1100m (c) 550m (d) 10km (e)	40km (e)
Saturation	0 dBm	-3 dBm	-3 dBm
a. [50/125 μm, 400 MHz*km] cable **b.** [62.5/125 μm, 200 MHz*km] cable **c.** [50/125 μm, 800 MHz*km] cable **d.** [62.5/125 μm, 500 MHz*km] cable **e.** [9/125 μm, 3.5 PS/(nm*km)] cable			

	10A	10B	20A	20B
Wavelength	TX: 1310nm RX: 1550nm	TX: 1550nm RX: 1310nm	TX: 1310nm RX: 1550nm	TX: 1550nm RX: 1310nm
Max. Tx	-3 dBm	-3 dBm	-2 dBm	-2 dBm
Min. Tx	-9 dBm	-9 dBm	-8 dBm	-8 dBm
Rx Sensitivity	-21 dBm	-21 dBm	-23 dBm	-23 dBm
Link Budget	12 dB	12 dB	15 dB	15 dB
Typical Distance	10 km	10 km	20 km	20 km
Saturation	-1 dBm	-1 dBm	-1 dBm	-1 dBm

a. [50/125 μm, 400 MHz*km] cable b. [62.5/125 μm, 200 MHz*km] cable
c. [50/125 μm, 800 MHz*km] cable d. [62.5/125 μm, 500 MHz*km] cable
e. [9/125 μm, 3.5 PS/(nm*km)] cable

Power

Input Voltage	24 VDC (12 to 45 VDC), redundant inputs
Input Current (@24V)	IE-SW-PL10M-3GT-7TX: 0.65A IE-SW-PL10M-1GT-2GS-7TX: 0.44A
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)	80.5 × 135 × 105 mm (3.17 × 5.31 × 4.13 in)
Weight	1.17 kg
Installation	DIN-Rail, Wall Mounting

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	UL60950-1, UL 508, CSA C22.2 No. 60950-1, EN60950-1
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C, and D, ATEX Class I, Zone 2, EEx nC IIC
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 2 EN61000-4-5 (Surge), Level 3 EN61000-4-6 (CS), Level 3 EN61000-4-8 EN61000-4-11 EN61000-4-12

Shock	IEC60068-2-27
Freefall	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

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