IMC-101G Series
Quick Installation Guide

Moxa Industrial Media Converter

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Overview

Moxa's IMC-101G industrial gigabit media converter is designed for reliable and stable operations in harsh industrial environments, and it provides industrial-grade media conversion between 10/100/1000BaseT(X) and 1000BaseSX/LSX/LX/LH/LHX/ZX/EZX (SFP Slot) connections. The IMC-101G's reliable industrial design is excellent for keeping your industrial automation applications running continuously, and it comes with an alarm that activates a relay output to help prevent damage.

This product has a wide operating temperature range of -40 to 75°C and is designed to withstand a high degree of vibration and shock. The rugged hardware design makes the IMC-101G perfect for ensuring that your Ethernet equipment can withstand a variety of application environments, such as hazardous locations (Class 1 Division 2/Zone 2, IECEx), and complies with CE, FCC, and UL Standards

Package Checklist

The IMC-101G industrial media converter is shipped with the items listed below. If any of these items is missing or damaged, please contact your customer service representative for assistance.

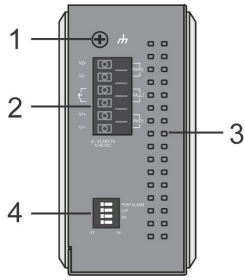
- Moxa industrial media converter
- Quick installation guide (printed)
- Warranty card

Features

- Supports 10/100/1000BaseT(X) auto-negotiation, auto-MDI/MDI-X, with 1000BaseSX/LSX/LX/LH/LHX/ZX/EZX SFP available
- Supports Link Fault Pass-through
- Relay Output alarm for when a port breaks or the power fails
- Redundant 12 to 45 VDC power inputs
- DIN rail and panel mountable
- Standard operating temperature range of 0 to 60°C, or extended operating temperature range of -40 to 75°C for -T models

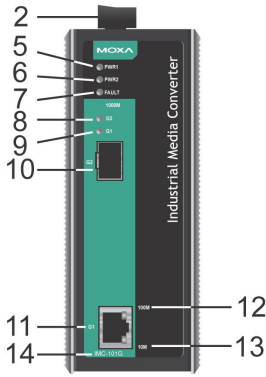
Panel Layouts of the IMC-101G Series

Top Panel View

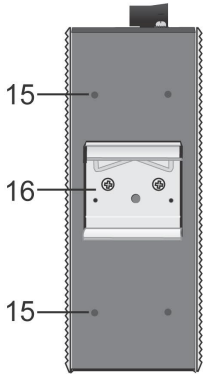


1. Grounding screw
2. Terminal block for power inputs (PWR1/PWR2) and relay output
3. Heat dissipation vents
4. Dip switches
5. Power input PWR1 LED
6. Power input PWR2 LED
7. Fault LED
8. SFP port's 1000 Mpbs G2 LED
9. TP port's 1000 Mpbs G1 LED
10. 1000BaseSFP fiber port
11. 10/100/1000BaseT(X) port
12. TP port's 100 Mbps LED
13. TP port's 10 Mbps LED
14. Model name
15. Screw hole for wall-mounting kit
16. DIN-rail mounting kit

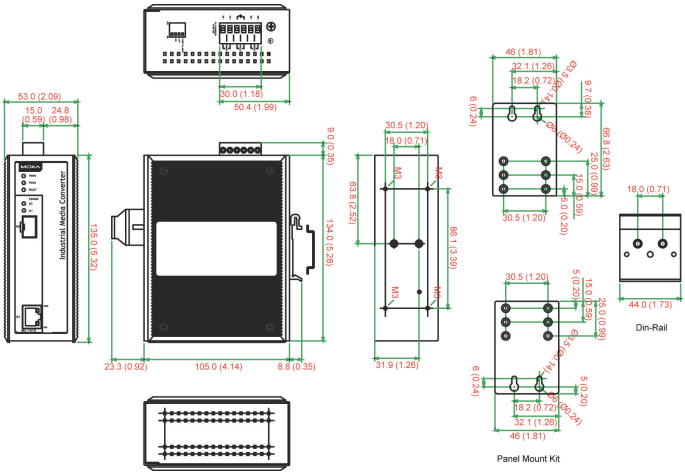
Front Panel View



Rear Panel View



Dimensions; unit = mm (inch)

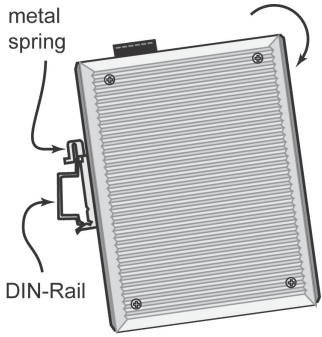


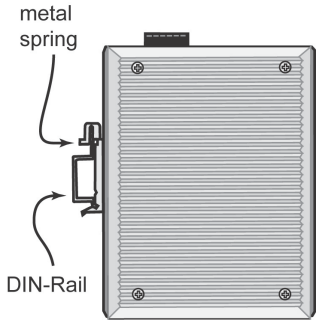
DIN-Rail Mounting

The aluminum DIN-rail attachment plate should be fixed to the back panel of the IMC-101G when you take it out of the box. If you need to reattach the DIN-rail attachment plate to the IMC-101G, 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.





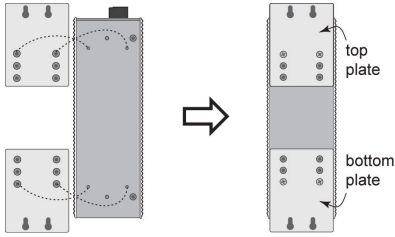
To remove the IMC-101G from the DIN rail, reverse steps 1 and 2 above.

Wall Mounting (Optional)

For some applications, you will find it convenient to mount the IMC-101G on the wall, as illustrated below.

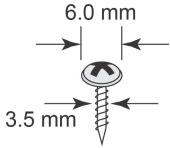
STEP 1:

Remove the aluminum DIN-rail attachment plate from the IMC-101G and then attach the wall-mount plates, as shown in the diagrams below.



STEP 2:

Mounting the IMC-101G on the wall requires four screws. Use the IMC-101G, with wall-mount plates attached, as a guide to mark the correct locations of the four screws. The heads of the screws should be less than 6.0 mm in diameter, and the shafts should be less than 3.5 mm in diameter, as shown in the figure on the right.

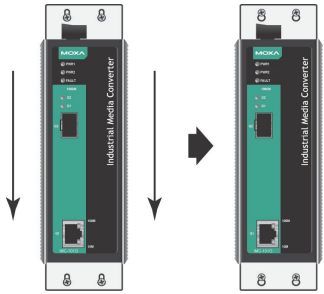


NOTE Test the screw head and shank size by inserting the screw into one of the keyhole-shaped apertures of the wall-mounting plates, before it is screwed into the wall.

Do not screw the screws in all the way—leave a space of about 2 mm to allow room for sliding the wall-mount panel between the wall and the screws.

STEP 3:

Once the screws are fixed in the wall, insert the four screw heads through the large parts of the keyhole-shaped apertures and then slide the IMC-101G downwards, as indicated in the diagram. Tighten the four screws for added stability.



ATEX and IECEx Information

1. Certification number
   DEMKO 09 ATEX0812123X
   IECEx: IECEx UL 13.0046X
2. Ambient range:
   (-40°C ≤ T_{amb} ≤ 75°C)
3. Certification string
   ATEX: Ex nA nC IIC T4 Gc
   IECEx: Ex nA nC IIC T4 Gc
4. Standards covered:
   EN 60079-0: 2012:+A11:2013/
   IEC 60079-0:Ed 6.0
   EN 60079-15: 2010/
   IEC 60079-15:Ed 4.0

II 3G
DEMKO
09 ATEX 0812123X
Ex nA nC IIC T4 Gc
Ambient Range:
-40°C ≦ T_{amb} ≦ +75°C
Rated Cable Temp ≧ 93°C
Fl.4, No.135, Lane 235, Baoqiao Rd. Xindian Diist., New Taipei City, Taiwan

5. Conditions of safe usage:
   The Ethernet Communication Devices are only to be mounted in an ATEX/ IECEx-certified tool-accessible IP54 enclosure and used in an area of not more than pollution degree 2 as defined by IEC/EN 60664-1.
   Provisions shall be made, either in the equipment or external to the equipment, to provide the transient protection device to be set at a level not exceeding 140% of the peak rated voltage.
6. Additional use guide:
   The conductor used for grounding is the same size as power conductors. The temperature rating of input conductors shall be higher than 92°C.The Terminal Block is suitable for 12-28 AWG (3.31–0.08 mm²), torque value 4.5 lb-in.

Wiring Requirements

WARNING

Do not disconnect modules or wires unless the power has been switched off or the area is known to be nonhazardous. The devices may only be connected to the supply voltage shown on the type plate.

These devices must be supplied by a SELV source as defined in the Low Voltage Directive 2006/95/EC.

ATTENTION

This unit is a built-in type. It must comply with fire enclosure stipulations of IEC60950-1/EN60950-1, or similar statements, when installed in certain end equipment.

ATTENTION

Safety First!

Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum allowed current for each wire size. If the current goes above the allowed maximum, 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 point of intersection.
  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 separate.
- It is strongly advised that you label wiring to all devices in the system when necessary.

Grounding the IMC-101G

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

ATTENTION

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

WARNING

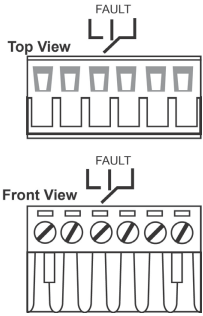
HOT SURFACE, DO NOT TOUCH!! Before touching the surface, make sure it has cooled sufficiently so as not to damage your skin, or wear gloves designed to protect against heat.

This equipment is intended to be used in a Restricted Access Location that is only accessible by SERVICE PERSONNEL or by USERS who have been instructed that the metal chassis of the equipment is so hot that appropriate precautions should be taken before touching it. The Restricted Access Location should only be accessible through the use of a key or security identity system.

Wiring the Alarm Contact

The Alarm Contact is made up of the two middle contacts of the terminal block on the IMC-101G'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 explain the meaning of the two contacts used to connect the alarm contact.



FAULT: The two middle contacts of the 6-contact terminal block connector are used to detect both power faults and port faults. The two wires attached to the fault contacts form an open circuit when:

1. The IMC-101G has lost power from one of the DC power inputs.

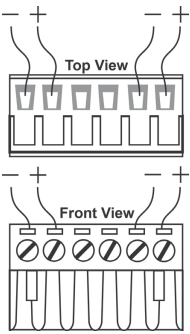
   OR

2. One of the ports for which the corresponding PORT ALARM DIP Switch is set to ON is not properly connected.

If neither of these two conditions is met, the fault circuit will be closed.

Wiring the Redundant Power Inputs

The top two contacts and the bottom two contacts of the 6-contact terminal block connector on the IMC-101G's top panel are used for the IMC-101G's two DC 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 IMC-101G's top panel.

NOTE Use copper conductors only; 12-28 AWG gauge, 4.5 in-lb torque.

ATTENTION

Before connecting the IMC-101G to the DC power inputs, make sure the DC power source voltage is stable.

Communication Connections

All IMC-101G models have one 10/100/1000BaseT(X) Ethernet port and one 1000Base SFP fiber port.

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

The 10/100/1000BaseT(X) ports located on the IMC-101G'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 crossover Ethernet cables.

10/100Base T(x) RJ45 Pinouts

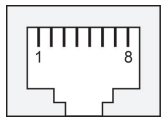
MDI Port Pinouts

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

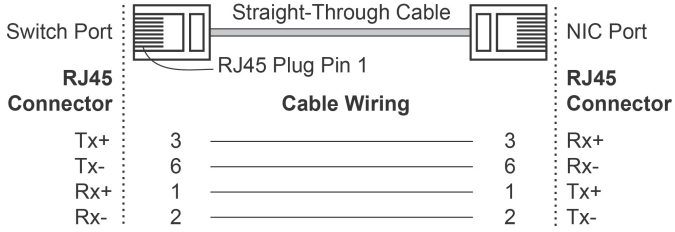
MDI-X Port Pinouts

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

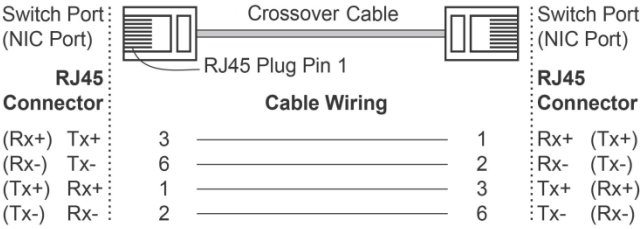
8-pin RJ45



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



RJ45 (8-pin) to RJ45 (8-pin) Crossover Cable Wiring

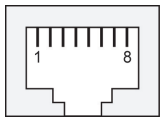


1000BaseT(X) Ethernet Port Connection

1000BaseT(X) 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) -



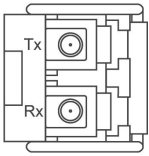
1000BaseSFP Fiber Port

The gigabit Ethernet ports on the IMC-101G are 1000BaseSFP fiber ports, which require using gigabit mini-GBIC fiber transceivers to work properly.

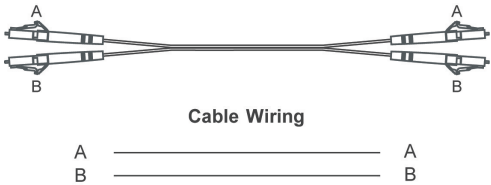
The concept behind the LC port and cable is quite straightforward. Suppose you are connecting devices I and II: Contrary to electrical signals, optical signals do not require a circuit in order to transmit data. Consequently, one of the optical lines is used to transmit data from device I to device II, and the other optical line is used 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. If you make your own cable, we suggest labeling the two sides of the same line with the same letter (A-to-A and B-to-B, as shown below, or A1-to-A2 and B1-to-B2).

LC-Port Pinouts



LC-Port to LC-Port Cable Wiring



Optical transceivers installed in the field should be UL certified, Class I category, with a clearly visible CDRH certification marking on the transceiver equivalent to: “Complies with 21CFR 1040.10 and 1040.11”.

Redundant Power Inputs

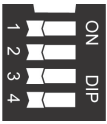
Both power inputs can be connected simultaneously to live DC power sources. If one power source fails, the other live source acts as a backup and automatically supplies all of the IMC-101G’s power needs.

Alarm Contact

The IMC-101G has one alarm contact located on the top panel. For detailed instructions on how to connect the alarm contact power wires to the two middle contacts of the 6-contact terminal block connector, see the “Wiring the Alarm Contact” section above. A typical scenario would be to connect the fault circuit to a warning light located in the control room. The light can be configured to switch on when a fault is detected.

The alarm contact has two terminals that form a fault circuit for connecting to an alarm system. The two wires attached to the fault contacts form an open circuit when (1) the IMC-101G has lost power from one of the DC power inputs, or (2) one of the TP/SFP ports for which the corresponding PORT ALARM DIP Switch is set to ON is not properly connected. If neither of these two conditions occurs, the fault circuit will be closed.

IMC-101G DIP Switch Setting



PORT ALARM
LFP
AN

NOTE To activate updated DIP switch settings, power off and then power on the IMC-101G.

Dip Switch 1 (Default: Off)	On:	Enables the PORT ALARM. If the product experiences a power failure, or the Ethernet port link fails, the relay will form an open circuit and the fault LED will light up.
	Off:	Disables the corresponding PORT ALARM. The relay will form a closed circuit and the fault LED will never light up.
Dip Switch 2 (Default: On)	On:	Enables LFP (Link Fault Pass-through). To enable the IMC-101 for LFP, set the SFP port to Auto mode.
	Off:	Disables LFP (Link Fault Pass-through)
Dip Switch 3 (Default: On)	On:	SFP port in Auto (auto-negotiation) mode
	Off:	Forces SFP port to 1000M
Dip Switch 4	Reserved for future use	

ATTENTION

When Force mode is used, the LFP function will be disabled.

LED Indicators

The front panel of the IMC-101G has several LED indicators. The function of each LED is described in the table below.

LED	Color	State	Description
PWR1	Amber	On	Power is being supplied to power input PWR1
		Off	Power is **not** being supplied to power input PWR1
PWR2	Amber	On	Power is being supplied to power input PWR2
		Off	Power is **not** being supplied to power input PWR2
FAULT	Red	On	When the corresponding PORT alarm is enabled and the port's link is inactive.
		Off	When the corresponding PORT alarm is enabled and the port's link is active, or when the corresponding PORT alarm is disabled.
G2	Green	On	SFP port's 1000 Mbps link is active.
		Blinking	Data is being transmitted at 1000 Mbps.
		Off	SFP port's 1000 Mbps link is inactive.
G1	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
10M	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	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

Auto MDI/MDI-X Connection

The Auto MDI/MDI-X function allows users to connect the IMC-101G's 10/100/1000BaseT(X) ports to any kind of Ethernet device, without paying attention to the type of Ethernet cable being used for the connection. This means that you can use either a straight-through cable or crossover cable to connect the IMC-101G to Ethernet devices.

Dual-Speed Functionality and Switching

The IMC-101G's 10/100/1000 Mbps RJ45 switched port auto negotiates with the connected device for the fastest data transmission rate supported by both devices. All models of the IMC-101G are plug-and-play devices, so that software configuration is not required at installation, or during maintenance. The half-duplex or full-duplex mode for the RJ45 switched ports is user dependent and changes (by auto-negotiation) to full-duplex or half-duplex, depending on which transmission speed is supported by the attached device.

Auto-Negotiation and Speed Sensing

All of the IMC-101G's RJ45 Ethernet ports independently support auto-negotiation for transmission speeds of 10 Mbps, 100 Mbps , and 1000 Mbps, 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 or 1000 Mbps.

Auto-negotiation takes place when an RJ45 cable connection is made. Each time a LINK is enabled, the IMC-101G advertises its capability for using 10 Mbps, 100 Mbps, or 1000 Mbps transmission speeds, with the device at the other end of the cable expected to advertise similarly. Depending on what type of device is connected, this will result in agreement to operate at a speed of 10 Mbps, 100 Mbps, or 1000 Mbps.

If an IMC-101G's 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	IEEE802.3, 802.3u, 802.3x, 802.3z/ab, Link Fault Pass-through
Interface	
RJ45 Ports	10/100/1000BaseT(X) auto-negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
SFP Ports	1000Base SFP slot
LED Indicators	PWR1, PWR2, FAULT, 10/100M(TP port), 1000M (TP and SFP port)
DIP Switches	Port break alarm mask, Link Fault Pass-through, SFP AN/Force
Alarm Contact	One relay output with current-carrying capacity of 1 A @ 24 VDC, resistive

Optical Fiber: 1000BaseSX/LSX/LX/LH/LHX/ZX/EZX

(Supports SFP-1G Series module only)

		Wavelength	Max Tx (dBm)	Min Tx (dBm)	Rx Sensitivity (dBm)	Link Budget (dB)	Typical Distance	Saturation (dBm)
Gigabit Ethernet	**SFP-SX**	850 nm	-4	-9.5	-18	8.5	550 m[a]	0
	SFP-LSX	1310 nm	-1	-9	-19	10	2 km[b]	-3
	SFP-LX	1310 nm	-3	-9.5	-20	10.5	10 km[c]	-3
	SFP-LH	1310 nm	-2	-8	-23	15	30 km[c]	-3
	SFP-LHX	1310 nm	1	-4	-24	20	40 km[c]	-3
	SFP-ZX	1550 nm	5	0	-24	24	80 km[c]	-3
	SFP-EZX	1550 nm	5	0	-30	30	110 km[c]	-3
	SFP-EZX-120	1550 nm	3	-2	-33	31	120 km[c]	-8
	SFP-10A	TX 1310 nm, RX 1550 nm	-3	-9	-21	12	10 km[c]	-1
	SFP-10B	TX 1550 nm, RX 1310 nm						
	SFP-20A	TX 1310 nm, RX 1550 nm	-2	-8	-23	15	20 km[c]	-1
	SFP-20B	TX 1550 nm, RX 1310 nm						
	SFP-40A	TX 1310 nm, RX 1550 nm	2	-3	-23	20	40 km[c]	-1
	SFP-40B	TX 1550 nm, RX 1310 nm						

a. 50/125 μm, 400 MHz * km or 62.5/125 μm, 500 MHz * km @ 850 nm multimode 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

NOTE The actual communication distance depends on many factors, including connector loss, cable deployment, and the age of the cabling system. We recommend doing a link budget analysis and reserving a 3 dB margin for such factors.

NOTE Please refer to the SFP-1G Series datasheet for more detailed SFP module specifications.

Power	
Input Voltage	12 to 48 VDC, Class 2, redundant inputs
Input Current	0.229 to 0.068 A
Connection	Removable Terminal Block
Overload Current Protection	2.5 A @ 25°C
Reverse Polarity Protection	Supported
Mechanical	
Casing	Metal, IP30 protection
Dimensions (W x H x D)	53 x 135 x 105 mm (2.1 x 5.3 x 4.1 in)
Weight	630 g
Installation	DIN-rail or wall mounting (optional kit)
Environmental Limits	
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 (can be used in Pollution Degree 2 Environments)
EMI	FCC Part 15, CISPR 32 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 2 EN61000-4-6 (CS), Level 3
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
WARRANTY	5 years