

PTC-101-M12 Hardware Installation Guide

Moxa Industrial Media Converter

Third Edition, May 2014



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P/N: 1802001016021

Overview

The PTC-101-M12 industrial media converter is designed to provide reliable and stable operation in harsh industrial environments. The PTC-101-M12 converts between 10/100BaseT(X) and 100BaseFX. To keep your industrial automation applications running continuously, the PTC-101-M12 comes with a relay output warning alarm to help prevent damage to your equipment.

The PTC-101-M12 has a wide operating temperature range of -40 to 85°C, and is designed to withstand a high degree of vibration and shock. The rugged hardware design makes the PTC-101-M12 perfect for ensuring that your Ethernet equipment can be used with critical industrial applications, such as in hazardous locations. The converter complies with FCC, UL, and CE standards.

Package Checklist

The PTC-101-M12 is shipped with the following items:

- Moxa Industrial Media Converter
- Hardware Installation Guide
- Moxa Product Warranty booklet

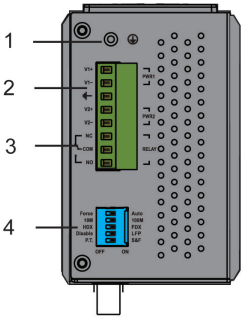
Note: If any of these items are missing or damaged, please contact your customer service representative for assistance.

Features

- Supports 10/100Base-TX auto-negotiation and auto-MDI/MDI-X
- Single mode with SC or ST fiber connector available
- Supports Link Fault Pass-Through
- Power failure by relay output
- Redundant dual VDC power inputs
- -40 to 85°C operating temperature range

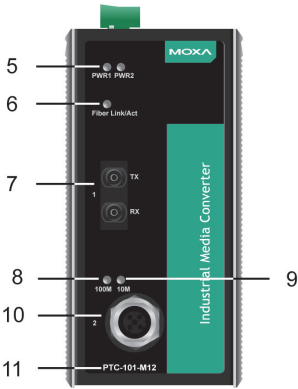
Panel Layouts

Top Panel View

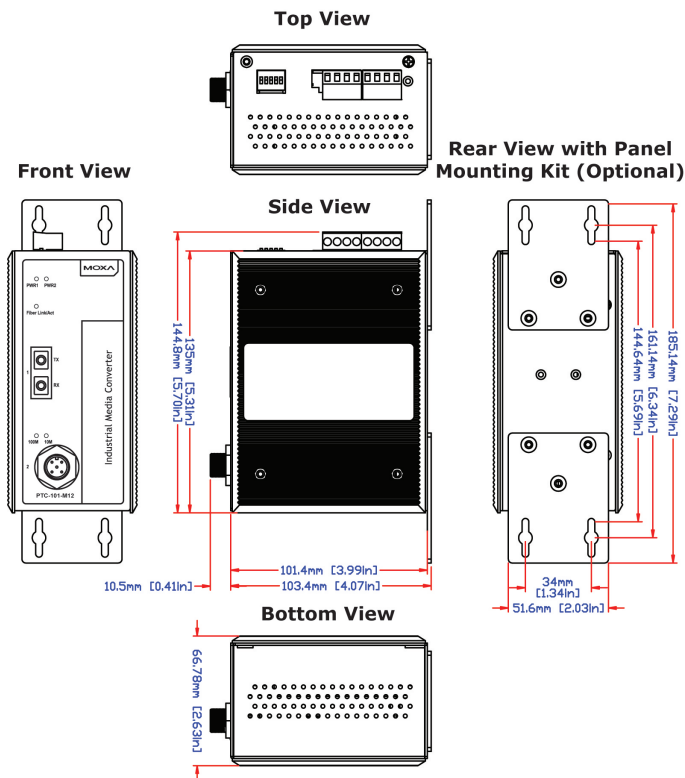


1. Grounding screw
2. Terminal block for power input
3. Normal Open (NO, COM) / Normal Close (NC, COM)
4. DIP switch
5. Power input PWR LED
6. Fiber Link/Active LED
7. 100BaseFX Port (ST/SC connector)
8. TP port 100 Mbps LED
9. TP port 10 Mbps LED
10. 10/100BaseT(X)
11. Model name

Front Panel View



Dimensions



Wiring Requirements



ATTENTION

Safety First!

- Be sure to disconnect the power cord before installing and/or wiring your PTC-101-M12.
- Calculate the maximum possible current in each power wire and common wire, and 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:

- 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 the wiring to all devices in the system.

Grounding the PTC-101-M12

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.

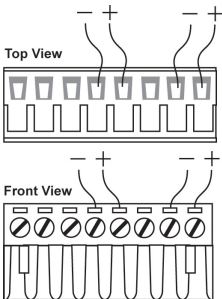


ATTENTION

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 five contacts of the 8-contact terminal block connector on the PTC-101-M12's top panel are used for the two DC inputs. 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.

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 PTC-101-M12's top panel.



ATTENTION

Before connecting the PTC-101-M12 to the DC power inputs, make sure the voltage of the DC power source is stable.

Communication Connections


The PTC-101-M12 has one 10/100BaseT(X) Ethernet port, and one 100BaseFX (SC or ST type connector) fiber port.

10/100BaseT(X) Ethernet Port Connection

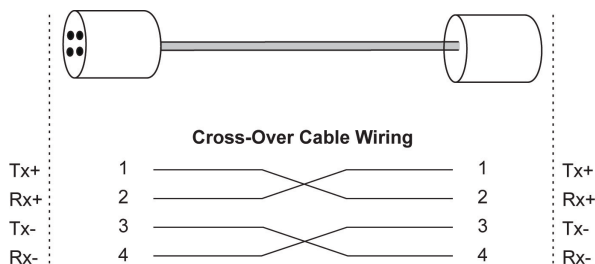
The 10/100BaseT(X) ports located on the PTC-101-M12's front panel are used to connect to Ethernet-enabled devices.

Pinouts for the 10/100BaseT(X) Ports

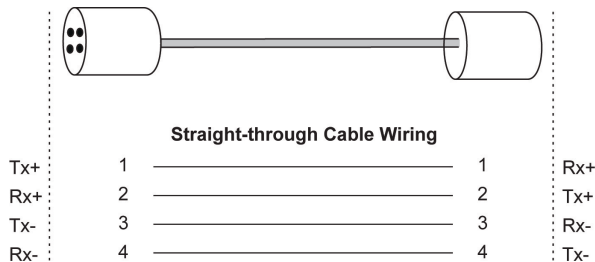
PIN	TX
1	TD+
2	RD+
3	TD-
4	RD-



M12 (4-pin, M) to M12 (4-pin, M) Cross-Over Cable Wiring



M12 (4-pin, M) to M12 (4-pin, M) Straight-Through Cable Wiring



Auto MDI/MDI-X Connection

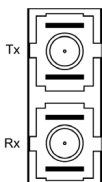
The Auto MDI/MDI-X function allows users to connect PTC-101-M12's 10/100BaseTX ports to any kind of Ethernet device, without needing to pay attention to the type of Ethernet cable being used for the connection. This means that you can use either a straight-through cable or cross-over cable to connect the PTC-101-M12 to Ethernet devices.

100BaseFX Ethernet Port Connection

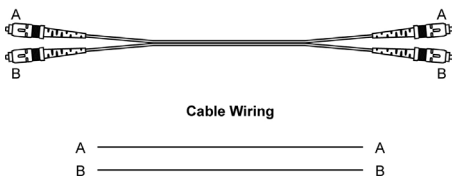
The concept behind the SC port and cable is quite straightforward. Suppose you are connecting devices I and II. Contrary to electrical signals, optical signals do not require a circuit in order to transmit data. Consequently, one of the optical lines is used to transmit data from device I to device II,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

All you need to remember is 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 are making 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).

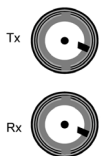
SC-Port Pinouts



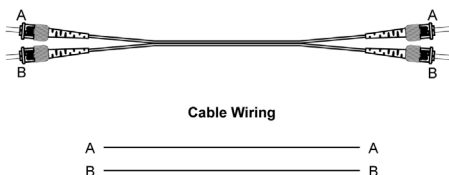
SC-Port to SC-Port Cable Wiring



ST-Port Pinouts



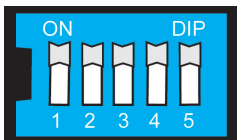
ST-Port to ST-Port Cable Wiring



Redundant Power Inputs

The PTC-101-M12 has two power inputs, which 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 PTC-101-M12's power needs.

DIP Switch Settings



DIP No.	Function	ON	OFF
1	Auto Negotiation	Enable	Disable
<p>"ON": Enables the "Auto Negotiation" function. The speed and duplex states for each port link segment are automatically configured using the highest performance interoperation mode.</p> <p>"OFF": Disables the "Auto Negotiation" function. The speed and duplex states depend on the manual setting configuration.</p>			
2	Force TP Speed	100 Mbps	10 Mbps
<p>(Only when Auto Negotiation is disabled)</p> <p>"ON": Forces the Ethernet port to use 100 Mbps transmission.</p> <p>"OFF": Forces the Ethernet port to use 10 Mbps transmission.</p>			
3	Force TP Duplex	Full Duplex	Half Duplex
<p>(Only when Auto Negotiation is disabled)</p> <p>"ON": Forces the Ethernet port to use Full Duplex.</p> <p>"OFF": Forces the Ethernet port to use Half Duplex.</p>			
4	Link Fault Pass Through	Enable	Disable
<p>"ON": Enables "Link Fault Pass Through." The link status on the TX port will inform the FX port of the same device and vice versa.</p> <p>"OFF": Disables "Link Fault Pass Through." The link status on the TX port will not inform the FX port.</p>			
5	Operating Mode	Store-and-Forward	Pass Through
<p>"ON": Selects "Store-and-Forward" mode. Begins to forward a packets to a destination port after an entire packet is received. The latency depends on the packet length.</p> <p>"OFF": Selects "Pass Through" mode. Operates with the minimum latency. Both transceivers are interconnected via internal MIIs and the internal switch engine and data buffer are not used.</p> <p>Note: With "Pass Through" mode enabled, the Ethernet port and fiber port should transmit at 100 Mbps, which is equivalent to full duplex mode.</p>			

Default DIP settings are all in the ON position.



ATTENTION

After changing the DIP switch setting, you will need to power off and then power on the PTC-101-M12 to activate the new setting.

LED Indicators

The front panel of the PTC-101-M12 has several LED indicators. The function of each LED is described in the table below.

LED	Color	State	Description
PWR1	Green	On	Power is being supplied to power input PWR1.
		Off	Power is not being supplied to power input PWR1.
PWR2	Green	On	Power is being supplied to power input PWR2.
		Off	Power is not being supplied to power input PWR2.
Fiber/ Link/ Act	Green	On	Fiber port is active.
		Blinking	Data is being transmitted or received.
		Off	Fiber is inactive.
10M	Yellow	On	10 Mbps Ethernet port link is active.
		Blinking	Data is being transmitted at 10 Mbps.
		Off	10 Mbps Ethernet port link is inactive.
100M	Green	On	100 Mbps Ethernet port is active.
		Blinking	Data is being transmitted at 100 Mbps.
		Off	100 Mbps Ethernet port link is inactive.

Specifications

Technology			
Standards	IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X), 100BaseFX		
Interface			
M12 (TP) port	10/100BaseT(X)		
Fiber port	100BaseFX (SC/ST connectors)		
LED Indicators	PWR1, PWR2, Fiber Link, 10/100M (TP port)		
Dip Switches			
Dip No.	Function	ON	OFF
1	Auto Negotiation	Enable	Disable
2	Force TP Speed	100 Mbps	10 Mbps
3	Force TP Duplex	Full Duplex	Half Duplex
4	Link Fault Pass Through	Enable	Disable
5	Operating Mode	Store-and-Forward	Pass Through
Note: Default DIP settings are in the ON position.			
Alarm Contact	One relay output with current carrying capacity of 1 A @ 24 VDC		

Optical Fiber: 100BaseFX, Single-mode

Wavelength	1310 nm
Max. TX	0 dBm
Min. TX	-5 dBm
RX Sensitivity	-34 dBm
Link Budget	29 dB
Typical Distance	40 km*
Saturation	-3 dBm

* 9/125 μ m, 3.5 PS/(nm*km) fiber optic cable

Power Requirements

Input Voltage	20 to 72 VDC
Power Consumption	170 mA @ 20 VDC
Fuse Rating	3.15A(T)2
Connection	Removable terminal block
Overload Current Protection	1.6 A (protects against two signals shorted together)
Reverse Polarity Protection	Present

Physical Characteristics

Housing	Metal
Dimensions	112 x 145 x 67 mm (4.40 x 5.70 x 2.63 in)

Environmental Limits

Operating Temperature	-40 to 85°C (-40 to 185°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
Ambient Relative Humidity	5 to 90% (non-condensing)

Regulatory Approvals

Safety	UL 60950-1
EMI	FCC Part 15, CISPR (EN55022) class A
EMS	EN 61000-4-2, Level 4 EN 61000-4-3, Level 3 EN 61000-4-4, Level 4 EN 61000-4-5, Level 4 EN 61000-4-6, Level 3 EN 61000-4-8, Level 5 EN 61000-4-11, Criteria B
Rail Traffic	EN 50155 (essential compliance*), EN 50121-4 *Contact Moxa or a Moxa distributor for details.
Vibration	EN 50125-3

Warranty

Warranty Period	5 years
Details	See www.moxa.com/warranty

Technical Support Contact Information
www.moxa.com/support

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