

# **Moxa Industrial Media Converter PTC-101-M12 Hardware Installation Guide**

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**P/N: 1802001016020**

## Overview

Moxa Industrial Media Converter, which is specially designed for reliable and stable operation in harsh industrial environments, provides industrial grade media conversion between 10/100BaseT(X) and 100BaseFX. PTC-101-M12's reliable industrial design is excellent for keeping your industrial automation applications running continuously, and comes with a relay output warning alarm to help prevent damages and losses.

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

## Package Checklist

Moxa Industrial Media Converter is shipped with the following items. If any of these items is missing or damaged, please contact your customer service representative for assistance.

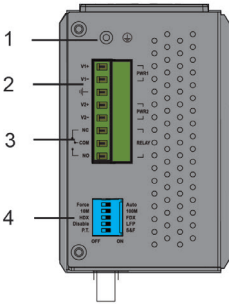
- Moxa Industrial Media Converter
- Hardware Installation Guide
- Moxa Product Warranty booklet

## 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.

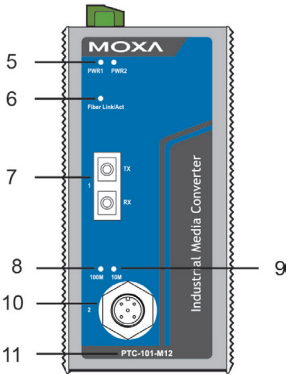
# Panel Layout of PTC-101-M12 Series

**Top Panel View**

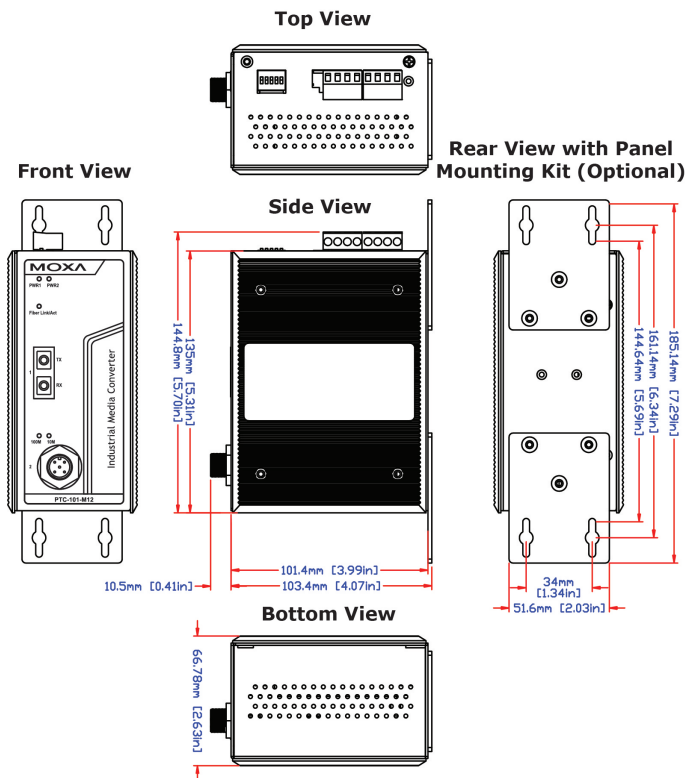


1. Grounding screw
2. Terminal block for power input
3. Relay output
4. DIP switch
5. Power input PWR LED
6. Fiber Link/Active LED
7. 100BaseFX Port (ST/SC connector)
8. TP port 100 Mbps LED
9. TP port 10 Mbps LED
10. 10/100BaseT(X)
11. Model Name

**Front Panel View**



## Dimensions



## Wiring Requirements



### ATTENTION

#### Safety First!

Be sure to disconnect the power cord before installing and/or wiring your Moxa Industrial Media Converter.



### ATTENTION

#### 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 Moxa Industrial Media Converter

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.

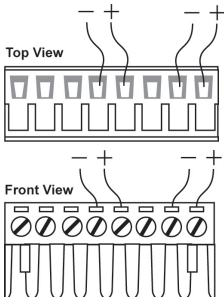


### ATTENTION

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 PTC-101-M12's 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 PTC-101-M12 to the DC power inputs, make sure the DC power source voltage is stable.

## Communication Connections

PTC-101-M12 models have 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 PTC-101-M12's front panel are used to connect to Ethernet-enabled devices.

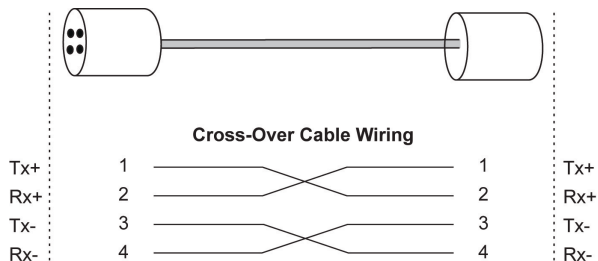
Below we show pinouts for M12 ports, and also show cable wiring diagrams for straight-through and cross-over Ethernet cables.

#### Pinouts for the 10/100BaseT(X) Ports

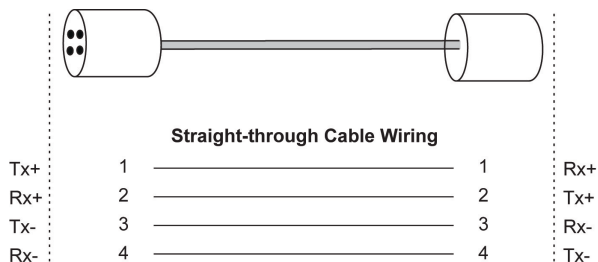
PIN	TX
1	TD+
2	RD+
3	TD-
4	RD-



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



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



### Auto MDI/MDI-X Connection

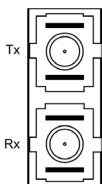
The Auto MDI/MDI-X function allows users to connect PTC-101-M12's 10/100BaseTX ports to any kind of Ethernet device, without needing to pay attention to the type of Ethernet cable being used for the connection. This means that you can use either a straight-through cable or cross-over cable to connect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

## 100BaseFX Ethernet Port Connection

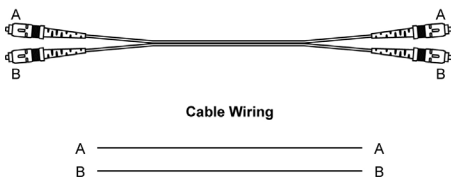
The concept behind the SC port and cable is quite straightforward. Suppose you are connecting devices I and II. Contrary to electrical signals, optical signals do not require a circuit in order to transmit data. Consequently, one of the optical lines is used to transmit data from device I to device II,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

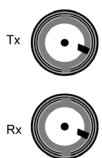
### SC-Port Pinouts



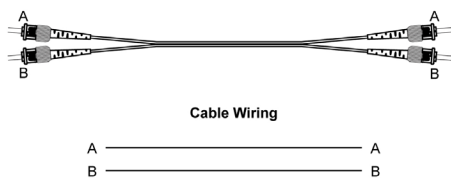
### SC-Port to SC-Port Cable Wiring



### ST-Port Pinouts



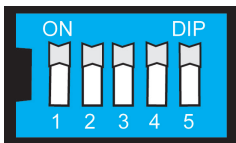
### ST-Port to ST-Port Cable Wiring



## Redundant Power Inputs

For PTC-101-M12 series, 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 Moxa Industrial Media Converter's power needs.

## DIP Switch Setting



DIP No.	Function	ON	OFF
1	Auto Negotiation	Enable	Disable
<p>"ON": Enables "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 "Auto Negotiation" function, the speed and duplex states depend on the manual setting configuration.</p>			
2	Force TP Speed	100Mbps	10Mbps
<p>(Only when Auto Negotiation is disabled)</p> <p>"ON": Forces 100Mbps on Ethernet port.</p> <p>"OFF": Forces 10Mbps on Ethernet port.</p>			
3	Force TP Duplex	Full Duplex	Half Duplex
<p>(Only when Auto Negotiation is disabled)</p> <p>"ON": Forces Full Duplex on Ethernet port.</p> <p>"OFF": Forces Half Duplex on Ethernet port.</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 packet 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 at 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 Moxa Industrial Media Converter contains several LED indicators. The function of each LED is described in the table below.

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

Default DIP settings are all at ON position.

Alarm Contact

One relay output with current carrying capacity of 1 A @ 24 VDC

## Optical Fiber:

	<b>100BaseFX</b>
	<b>Single-mode</b>
<b>Wavelength</b>	1310 nm
<b>Max. TX</b>	0 dBm
<b>Min. TX</b>	-5 dBm
<b>RX Sensitivity</b>	-34 dBm
<b>Link Budget</b>	29 dB
<b>Typical Distance</b>	40 km <sup>a</sup>
<b>Saturation</b>	-3 dBm

a. 9/125 μm, 3.5 PS/(nm\*km) fiber optic cable

### Power Requirements

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

### Physical Characteristics

Housing	Metal
Dimensions (W x H x D)	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)
Operating Humidity	5 to 90%

### Regulatory Approvals

Safety	UL 60950-1
EMI	FCC Part 15, CISPR (EN55022) class A
EMS	EN 61000-4-2 Edition 1.2: 2001-04 (Level 4) EN 61000-4-3: 1995+A1: 2001 <del>IEC 61000-4-3: 2002+A1: 2002 (Level 3)</del> EN 61000-4-4: 2004 (Level 4) EN 61000-4-5: 2001-04 (Level 4) EN 61000-4-6: 2004-11 (Level 3) EN 61000-4-8: 2001-03 (Level 5) EN 61000-4-11: 2004-03 (Criteria B)
Rail Traffic	EN 50121-4 / EN 50155
Vibration	EN 50125-3


### Warranty


5 years  
Details: See [www.moxa.com/warranty](http://www.moxa.com/warranty)

## Technical Support Contact Information [www.moxa.com/support](http://www.moxa.com/support)

### Moxa Americas:

Toll-free: 1-888-669-2872

Tel:  1-714-528-6777

Fax:  1-714-528-6778

### Moxa China (Shanghai office):

Toll-free: 800-820-5036

Tel: +86-21-5258-9955

Fax: +86-21-5258-5505

### Moxa Europe:

Tel: +49-89-3 70 03 99-0

Fax: +49-89-3 70 03 99-99

### Moxa Asia-Pacific:

Tel: +886-2-8919-1230

Fax: +886-2-8919-1231