

EDS-305 Series Quick Installation Guide

Moxa EtherDevice Switch

Version 10.2, December 2024

Technical Support Contact Information

www.moxa.com/support



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P/N: 1802003050034



Overview

Moxa's EtherDevice™ EDS-305 are smart Ethernet switches that provide an economical solution for your Ethernet connections. Additionally, the built-in smart alarm function helps system maintainers monitor the health of your Ethernet network.

The EDS-305 Series features models with 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 all models perfect for ensuring that your Ethernet equipment is suitable for critical industrial applications, and complies with FCC and CE Standards.

NOTE Throughout this Quick Installation Guide, we use **EDS** as an abbreviation for Moxa EtherDevice Switch:

EDS = Moxa EtherDevice Switch

Package Checklist

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

- Moxa EtherDevice™ Switch
- Protective caps for unused ports
- Quick installation guide (printed)
- Warranty card

Features

High-performance Network Switching Technology

- 10/100BaseT(X) (RJ45), 100BaseFX (SC/ST-type, Multi/Single mode)
- IEEE 802.3/802.3u/802.3x
- Store and Forward switching
- 10/100M, Full/Half-duplex, MDI/MDIX auto-sensing

Industrial-grade Reliability

- Power failure, port break alarm by relay output
- Redundant dual DC power inputs

Rugged Design

- Operating temperature range from -10 to 60°C, or extended operating temperature from -40 to 75°C for "-T" models
- IP30, rugged high-strength case
- DIN-rail or panel mounting support

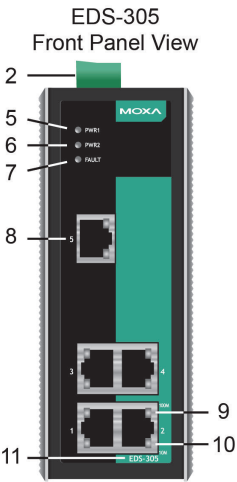


WARNING

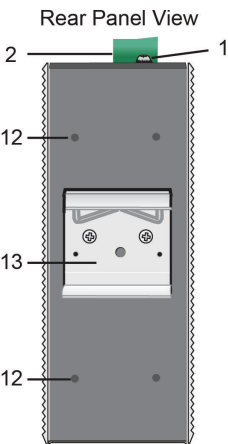
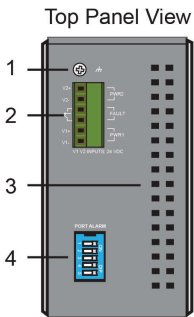
Use a certified power supply with SELV output or with double insulation in accordance with the UL 61010-2-201 standard. This product is intended to be supplied by an UL/IEC certified power supply or DC source suitable for use at minimum Tma 60/75°C whose output meets SELV or ES1 and is rated 12 to 48 VDC, 0.2 A min. If you need further assistance, contact Moxa for further information.

The product should not be disassembled by operators or service people.

Panel Layout

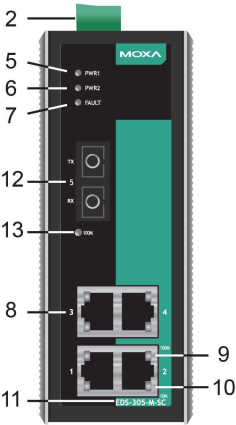


- 1. Grounding screw
- 2. Terminal block for power inputs PWR1/PWR2 and relay output
- 3. Heat dissipation orifices
- 4. DIP switches
- 5. Power input PWR1 LED
- 6. Power input PWR2 LED
- 7. Fault LED
- 8. 10/100BaseT(X) Port
- 9. TP port's 100 Mbps LED
- 10. TP port's 10 Mbps LED
- 11. Model name
- 12. Screw holes for wall-mounting kit
- 13. DIN-rail Kit



Panel Layout (SC Models)

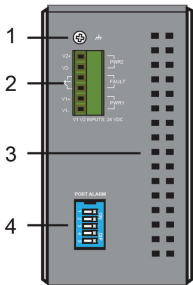
EDS-305-M-SC
Front Panel View



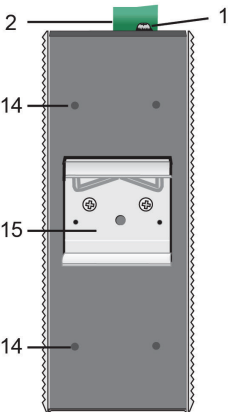
NOTE: The appearance of the EDS-305-S-SC and EDS-305-M-SC is identical.

- 1. Grounding screw
- 2. Terminal block for power inputs PWR1/PWR2 and relay output
- 3. Heat dissipation orifices
- 4. DIP switches
- 5. Power input PWR1 LED
- 6. Power input PWR2 LED
- 7. Fault LED
- 8. 10/100BaseT(X) Port
- 9. TP port's 100 Mbps LED
- 10. TP port's 10 Mbps LED
- 11. Model name
- 12. 100BaseFX Port
- 13. FX port's 100 Mbps LED
- 14. Screw holes for wall-mounting kit
- 15. DIN-rail Kit

Top Panel View

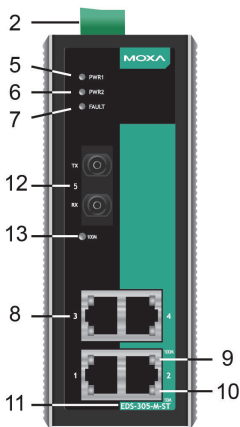


Rear Panel View



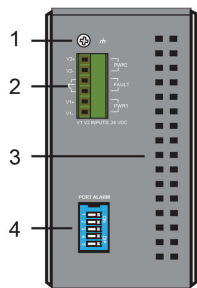
Panel Layout (ST Models)

EDS-305-M-ST
Front Panel View

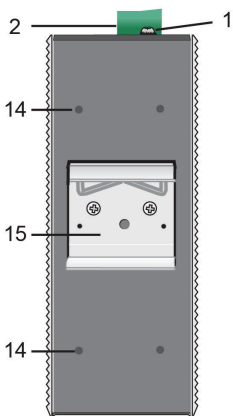


- 1. Grounding screw
- 2. Terminal block for power input PWR1/PWR2 and relay output
- 3. Heat dissipation orifices
- 4. DIP switches
- 5. Power input PWR1 LED
- 6. Power input PWR2 LED
- 7. Fault LED
- 8. 10/100BaseT(X) Port
- 9. TP port's 100 Mbps LED
- 10. TP port's 10 Mbps LED
- 11. Model name
- 12. 100BaseFX Port
- 13. 100 Mbps LED for FX port
- 14. Screw hole for wall-mounting kit
- 15. DIN-rail Kit

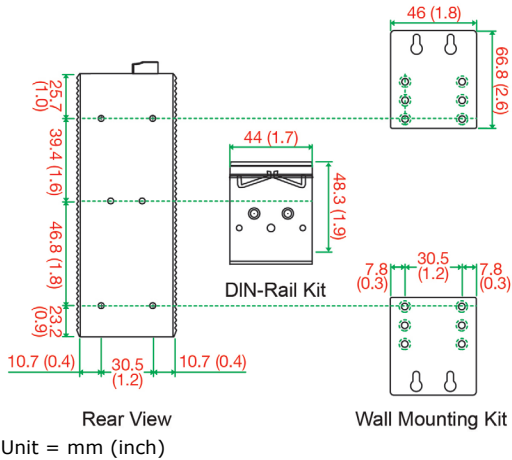
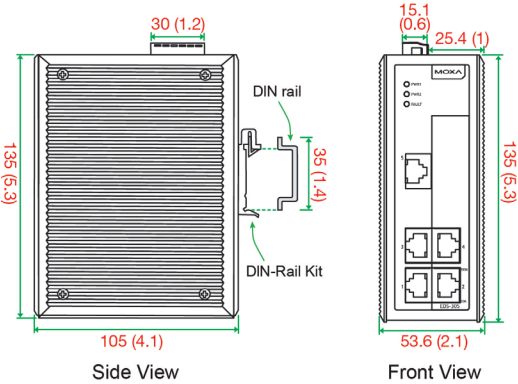
Top Panel View



Rear Panel View



Mounting Dimensions

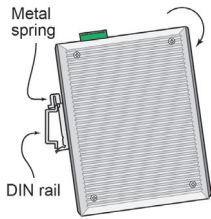


DIN-rail Mounting

The aluminum DIN-rail attachment plate which adheres to the EN 60715 standard is already fixed to the back panel of the EDS when you take it out of the box. If you need to reattach the DIN-rail attachment plate, make sure the stiff metal spring is situated towards the top, as shown in the figures below.

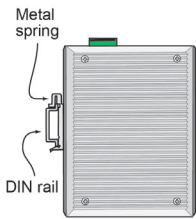
STEP 1:

Insert the top of the DIN-rail into the slot just below the stiff metal spring.



STEP 2:

Push the EDS down and towards the rail until it snaps into place.



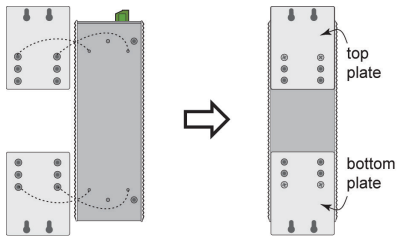
To remove the EDS from the DIN rail, push the device down and pull it backwards to release the bottom clamp. Next, pull the switch upwards to remove it from the DIN rail.

Wall Mounting (Optional)

For some applications, it might be more convenient to mount the EDS onto a wall. The wall mounting kit is not included and is sold separately.

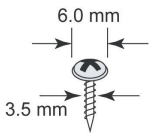
STEP 1:

Remove the aluminum DIN-rail attachment plate from the EDS's rear panel, and then attach the wall mount plates, as shown in the diagram on the right.



STEP 2:

Mounting the EDS on the wall requires 4 screws. Use the switch with the wall mount plates attached as a guide to mark the location of the 4 screws. The head of the screws should be less than 6.0 mm in diameter, and the shaft should be less than 3.5 mm in diameter, as shown in the figure on the right.

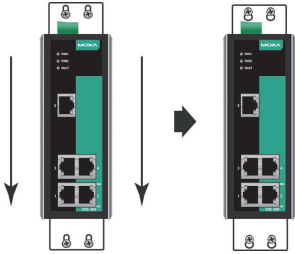


NOTE Before tightening screws into the wall, make sure the screw head and shank size are suitable by inserting the screw into one of the keyhole-shaped apertures of the wall mounting plates.

Do not screw the screws in all the way—leave 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. Next, slide the EDS downwards. Tighten the four screws for added stability.



Wiring Requirements



WARNING

Do not disconnect modules or wires unless the power supply 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 product is intended to be supplied by a UL/IEC/EN listed power adapter or DC power source whose output meets ES1, PS2 or LPS in compliance with UL 62368-1, IEC 62368-1, EN 62368-1.



WARNING

Substitution of components may impair suitability for Class I, Division 2, and Zone 2. These devices must be supplied by an SELV source as defined in Low Voltage Directive 73/23/EEC and 93/68/EEC.



WARNING

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 UL 62368-1, IEC 62368-1, EN 62368-1 (or similar regulation).



WARNING

Safety First!

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

You should also pay attention to the following items:

- 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 the EtherDevice Switch

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.



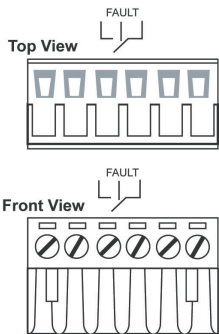
ATTENTION

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

NOTE 4 mm² conductor wire must be used when connecting the device’s external grounding screw to ground.

Wiring the Alarm Contact

The Alarm Contact comprises the two middle contacts of the terminal block on the EDS’s top panel. You may 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:

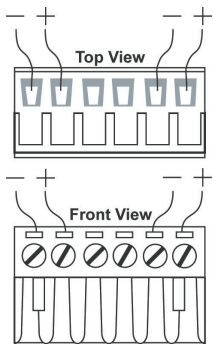
1. The EDS has lost power from one of the DC power inputs.
- OR
2. One of the ports for which the corresponding PORT ALARM DIP Switch is set to ON is not properly connected.

If neither of these two conditions is satisfied, the Fault circuit will be closed.

NOTE The alarm relay requires both DC inputs to be connected to function correctly.

Wiring the Redundant Power Inputs

The top two contacts and the bottom two contacts of the 6-contact terminal block connector on the EDS’s top panel are used for the switch’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 EDS’s top panel.

**ATTENTION**

Before connecting the EDS to the DC power inputs, make sure the DC power source voltage is stable.
When using a Class I power supply, make sure to connect the power cord to a socket-outlet with earthing connection.

Communication Connections

EDS-305 models have 4 or 5 10/100BaseT(X) Ethernet ports, and up to 1 100 BaseFX fiber port (SC/ST-type connector).

10/100BaseT(X) Ethernet Port Connection

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

Below are the pinouts for both MDI (NIC-type) ports and MDI-X (HUB/Switch-type) ports, as well as cable wiring diagrams for straight-through and cross-over Ethernet cables.

10/100Base T(x) RJ45 Pinouts

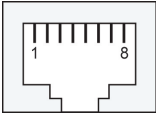
MDI Port Pinouts

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

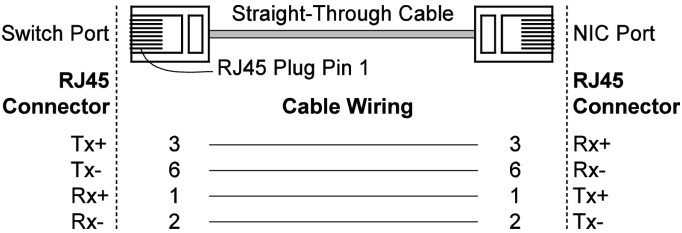
MDI-X Port Pinouts

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

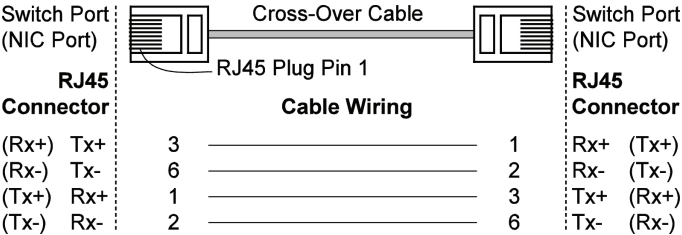
8-pin RJ45



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



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

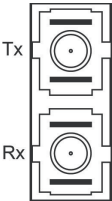


100BaseFX Ethernet Port Connection

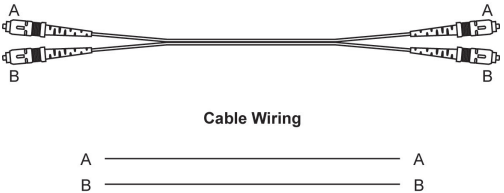
Contrary to electrical signals, optical signals do not require a circuit in order to transmit data. Consequently, one of the optical lines is used to transmit data from device A to device B while the other optical line is used transmit data in the other direction in full-duplex mode.

All you need to remember is to connect the Tx (transmit) port of device A to the Rx (receive) port of device B, and the Rx (receive) port of device A to the Tx (transmit) port of device B. 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).

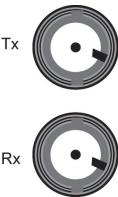
SC Port Pinouts



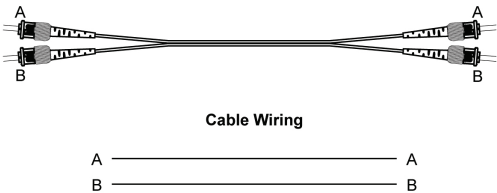
SC-Port to SC-Port Cable Wiring



ST Port Pinouts



ST-Port to ST-Port Cable Wiring





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.

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 EDS's power needs.

Alarm Contact

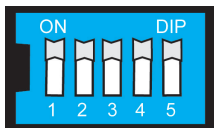
The Moxa EtherDevice Switch has one Alarm Contact located on the top panel. For detailed instructions on how to connect the Alarm Contact power wires to the two middle contacts of the 6-contact terminal block connector, see the Wiring the Alarm Contact section on page 8. A typical scenario would be to connect the Fault circuit to a warning light located in the control room. The light can be set up 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) EDS 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 occurs, the Fault circuit will be closed.

DIP Switch Settings

EDS-305 Series DIP Switches



- ON: Enables the corresponding PORT Alarm. If the port's 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.



ATTENTION

The relay output (1 A @ 24 V) and DIP switch can only be connected to ES1 or SELV, and PS2 or LPS low-voltage circuits of less than 100 VA.

LED Indicators

The front panel of the Moxa EtherDevice Switch 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.
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 (TP)	Green	On	TP port's 100 Mbps link is active.
		Blinking	Data is being transmitted at 100 Mbps.
		Off	100BaseTX Port's link is inactive.
100M (FX)	Green	On	FX port's 100 Mbps is active.
		Blinking	Data is being transmitted at 100 Mbps.
		Off	100BaseFX port is inactive.

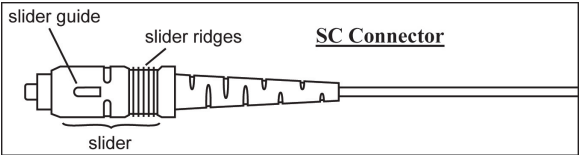
Auto MDI/MDI-X Connection

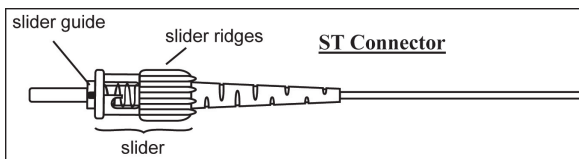
The Auto MDI/MDI-X function allows users to connect the EDS's 10/100BaseTX ports to any kind of Ethernet device using either a straight-through cable or cross-over.

Fiber Ports

The EDS's fiber switched ports operate at a fixed 100 Mbps speed and full-duplex mode to provide the best performance. The fiber ports are factory-built as either a multi-mode or single-mode SC/ST connector.

Consequently, you should use fiber cables that have SC/ST connectors at both ends. When plugging the connector into the port, make sure the slider guide is positioned to the right side so that it fits properly into the port.





The 100 Mbps fiber ports are switched ports, and perform as a domain, providing a high bandwidth backbone connection that supports long fiber cable distances (up to 5 km for multi-mode, and 15, 40, and 80 km for single-mode) for installation versatility.

Dual Speed Functionality and Switching

The EDS's 10/100 Mbps switched RJ45 ports auto-negotiate with the connected device for the fastest data transmission rate supported by both devices. All EDS-305 Series models are plug-and-play devices, meaning software configuration is not required during installation or maintenance. The half/full-duplex mode for the switched RJ45 ports is user-dependent and changes (through auto-negotiation) to full- or half-duplex, depending on which transmission speed is supported by the connected device.

Switching, Filtering, and Forwarding

Each time a packet arrives at one of the switched ports, a decision is made to either filter or forward the packet. Packets with source and destination addresses belonging to the same port segment will be filtered, constraining those packets to one port, and relieving the rest of the network from the need to process them. A packet with destination address on another port segment will be forwarded to the appropriate port, and will not be sent to the other ports where it is not needed. Packets that are used in maintaining the operation of the network (such as multicast packets) are forwarded to all ports.

The EDS operates in the store-and-forward switching mode, which eliminates bad packets and enables peak performance to be achieved when there is heavy traffic on the network.

Switching and Address Learning

The EDS has an address table that can hold up to 2K node addresses, which makes it suitable for use with large networks. The address tables are self-learning, so that as nodes are added or removed, or moved from one segment to another, the EDS automatically keeps up with new node locations. An address-aging algorithm causes the least-used addresses to be deleted in favor of newer, more frequently used addresses. To reset the address buffer, power down the unit and then power it back up.

Auto-negotiation and Speed Sensing

All of the EDS's RJ45 Ethernet ports independently support auto-negotiation for speeds in the 10BaseT and 100BaseTX modes, 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.

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

If an EDS 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	IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X) and 100BaseFX IEEE 802.3x for Flow Control
Processing Type	Store and Forward
Interface	
RJ45 Ports	10/100BaseT(X) auto-negotiation speed Full-/half-duplex mode Auto MDI/MDI-X connection
Fiber Ports	100BaseFX ports (SC/ST connector)
LED Indicators	PWR1, PWR2 (power), FAULT, 10/100M (TP port), 100M (fiber port)
DIP Switch	Port break alarm mask
Alarm Contact	One relay output with current carrying capacity of 1 A @ 24 VDC (resistive load)

Optical Fiber				
	Multi-mode	Single-mode, 15	Single-mode, 40	Single-mode, 80
Distance, km	5	15	40	80
Wavelength, nm	1300	1310	1310	1550
Min. TX Output, dBm	-20	-15	-5	-5
Max. TX Output, dBm	-14	-6	0	0
Sensitivity, dBm	-34 to -30	-36 to -32	-36 to -32	-36 to -32
Recommended Diameter (Core/Cladding) μm	50/125	9/125	9/125	9/125
(1 dB/km, 800 MHz x km)				
Power				
Input Voltage	12 to 48 VDC, redundant inputs			
Input Current	0.2 A (max.)			
Connection	Removable 6-pin terminal block			
Overload Current Protection	3 A			
Reverse Polarity Protection	Present			
Mechanical				
Casing	IP30 protection (not UL certified), metal case			
Dimensions	53.6 x 135 x 105 mm (W x H x D)			
Weight	0.63 kg (1.39 lb)			
Installation	DIN-rail, Wall mounting			

Environmental	
Operating Temperature	-10 to 60°C (14 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 61010-201-1, UL 62368, EN 62368-1, IEC 62368-1
EMC	EN 55032/35
EMI	FCC Part 15, CISPR (EN 55032) class A
EMS	EN 61000-4-2 (ESD), Level 3 EN 61000-4-3 (RS), Level 3 EN 61000-4-4 (EFT), Level 3 EN 61000-4-5 (Surge), Level 3 EN 61000-4-6 (CS), Level 3
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C, D ATEX Zone 2, Ex ec nC IIC T4 Gc, IECEX: EN IEC 60079-0:2018 EN IEC 60079-7:2015/A1:2018 EN IEC 60079-15:2019
Vibration	IEC 60068-2-6
Shock	IEC 60068-2-27
Free Fall	IEC 60068-2-32
Maritime	DNV
WARRANTY	5 years

NOTE The device should be deployed at least 400 mm away from any compass.

NOTE 이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.



WARNING

This equipment is intended to be used in a Restricted Access Location.

WARNING: HOT SURFACE!! Before touching it, special attention or protection is required.



WARNING

- The PWR terminal block plug requires 24-12 AWG wiring size, (0.2 to 4 mm²) torque 4.5 in-lb, (0.509 N-m) min. 88 °C, copper conductors only.
- The recommended stripping length is 7 to 8 mm.
- Only use optional optical transceivers (SFP/fixed fiber) that comply with IEC 60825-1, 21 CFR 1040 Section 1040.10 and 1040.11, classified as Class 1 laser products.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Installation to ensure the safety of any system incorporating the equipment is the responsibility of the system assembler.
- These devices are open-type devices that are to be installed in an enclosure with tool-removable cover or door suitable for the environment at that location.

Hazardous Location

ATEX information	II 3G Certification no.: ATEX: UL 24 ATEX 3161X IECEX: UL 24.0007X Certification strings: ATEX: Ex ec nC IIC T4 Gc IECEX: Ex ec nC IIC T4 Gc Ambient range: -10°C to 60°C (for models without -T suffix) -40°C to 75°C (for models with -T suffix) Standards covered: EN IEC 60079-0:2018 EN IEC 60079-7:2015/A1:2018 EN IEC 60079-15:2019 WARNING – DO NOT SEPARATE WHEN ENERGIZED Rated Cable Temp ≥ 88°C
Address of manufacturer	No. 1111, Heping Rd., Bade Dist., Taoyuan City 334004, Taiwan

Special Use Conditions

- The equipment must be installed in an enclosure that provides a minimum ingress protection of IP54 following IEC/EN IEC 60079-0 and accessible only by use of a tool.
- The equipment must be used in an area of pollution degree 2 or below as defined by EN/IEC 60664-1.

Usage Guidelines

- Installation of the equipment should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- This device should be used with a certified power supply with SELV output or certified power supply providing double insulation evaluated by UL61010-2-201 standards.
- For any repair or maintenance needs, please contact Moxa.