

EDS-405A-PTP Series Hardware Installation Guide

Moxa EtherDevice™ Switch

First Edition, July 2014

MOXA®

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P/N: 1802004050010

Overview

The Moxa EtherDevice™ EDS-405A-PTP are 5-port 1588v2 PTP switches designed especially for real-time control applications. In addition, the built-in Modbus/TCP, PROFINET RT and EtherNet/IP help automation engineers to easily maintain an integrated SCADA control network..

Package Checklist

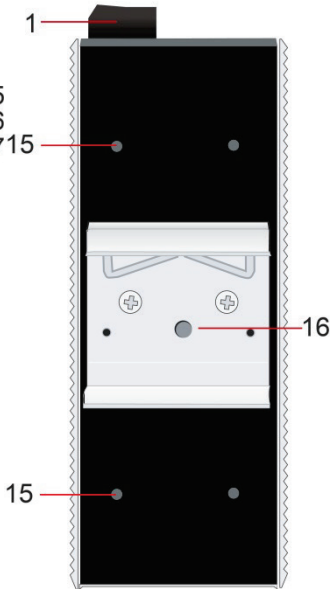
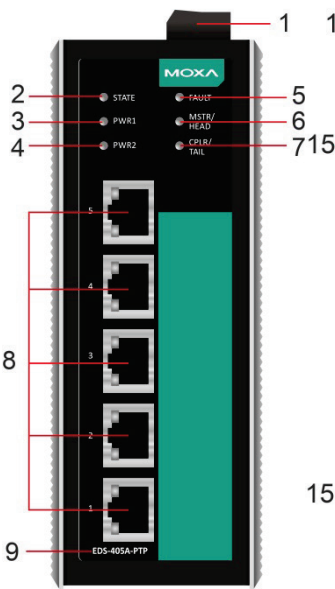
The Moxa EDS-405A-PTP switches are shipped with the following items. If any of these items is missing or damaged, please contact your customer service representative for assistance.

- EDS-405A-PTP Ethernet switch
- RJ45-to-DB9 console port cable
- Protective caps for unused ports
- Panel mounting kit (optional—must order separately)
- Hardware installation guide
- CD-ROM with user's manual and Windows utility
- Warranty card

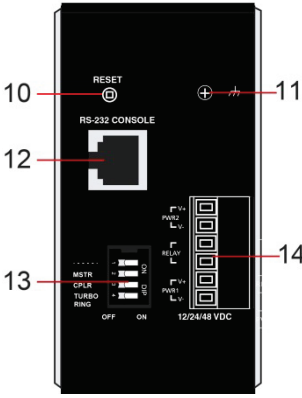
EDS-405A-PTP Panel Layout (standard)

Front Panel View

Rear Panel View

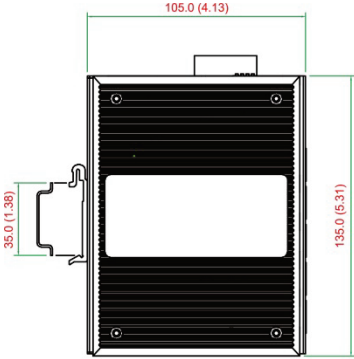


Top Panel View

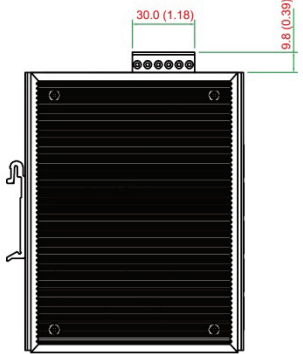


1. Terminal block for power input PWR1/PWR2 and relay output
2. System state LED
3. Power input 1 LED
4. Power input 2 LED
5. Fault LED
6. MSTR/HEAD LED
7. CPLR/TAIL LED
8. 10/100BaseT(X) ports
9. Model name
10. Reset button
11. Grounding screw
12. Console port
13. DIP switches
14. Power 1, 2/Relay input
15. Screw hole for wall mounting kit
16. DIN rail kit

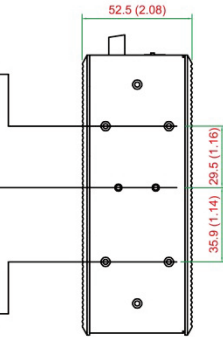
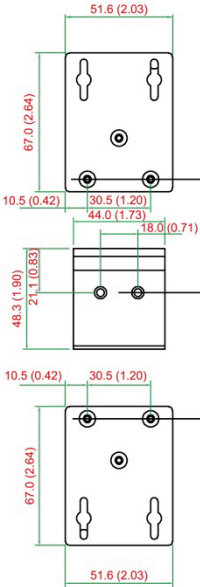
Mounting Dimensions (unit = mm)



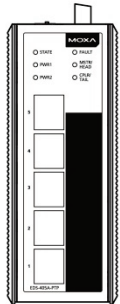
Side View



Side View



Rear View



Front View

Wall Mounting/
DIN Rail Kit

Unit = mm (inch)

DIN-Rail Mounting

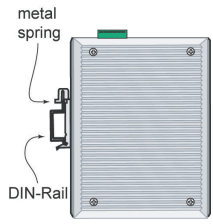
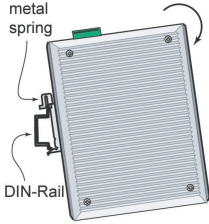
The aluminum DIN-Rail attachment plate should already be fixed to the back panel of the EDS-405A-PTP when you take it out of the box. If you need to reattach the DIN rail attachment plate, make sure the stiff metal spring is situated towards the top, as shown in the following figures.

STEP 1:

Insert the top of the DIN rail into the

STEP 2:

The DIN rail attachment unit will snap into place as shown.



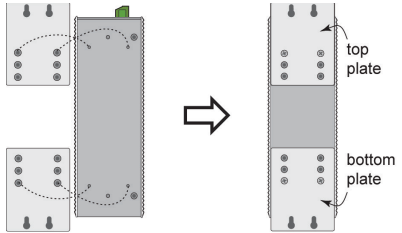
To remove the Moxa EtherDevice switch from the DIN-Rail, simply reverse Steps 1 and 2.

Wall Mounting (optional)

For some applications, you will find it convenient to mount the EDS-405A-PTP on the wall, as shown in the following figures.

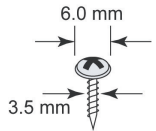
STEP 1:

Remove the aluminum DIN-Rail attachment plate from the EDS-405A-PTP's rear panel, and then attach the wall mount plates with M3 screws, as shown in the diagram at the right.



STEP 2:

Mounting the EDS-405A-PTP on the wall requires 4 screws. Use the switch, with wall mount plates attached, as a guide to mark the correct locations of the 4 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 at the right.



NOTE Before tightening the 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 completely—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, and then slide the EDS-405A-PTP downwards, as indicated. Tighten the four screws for added stability.

Wiring Requirements



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.

Be sure to read and follow these important 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.
- 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.
- When necessary, you should label the wiring to all devices in the system.

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.



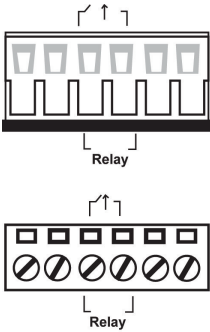
ATTENTION

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

Wiring the Relay Contact

The Relay Contact consists of the two middle contacts of the terminal block on the EDS-405A-PTP'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.

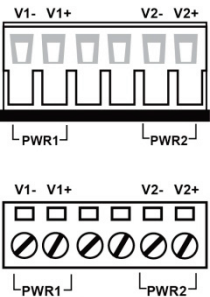
In this section, we explain the meaning of the two contacts used to connect the Alarm Contact.



FAULT: The two middle contacts of the 6-contact terminal block connector are used to detect 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 top two contacts and the bottom two contacts of the 6-contact terminal block connector on the EDS-405A-PTP's top panel are used for the EDS-405A-PTP's two DC inputs. Top and front views of one of the terminal block connectors are shown in the following figures:



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 EDS-405A-PTP's top panel.



ATTENTION

Before connecting the EDS-405A-PTP to the DC power inputs, make sure the DC power source voltage is stable.

Communication Connections

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.

Next, 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 cross-over Ethernet cables.

10/100Base T(x) RJ45 Pinouts

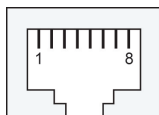
MDI Port Pinouts

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

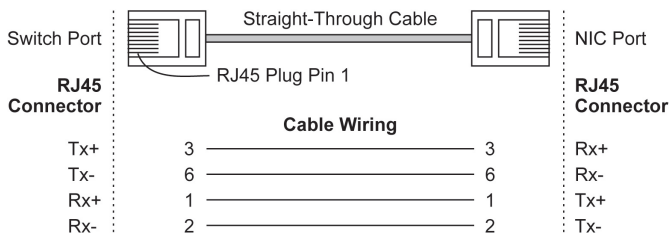
MDI-X Port Pinouts

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

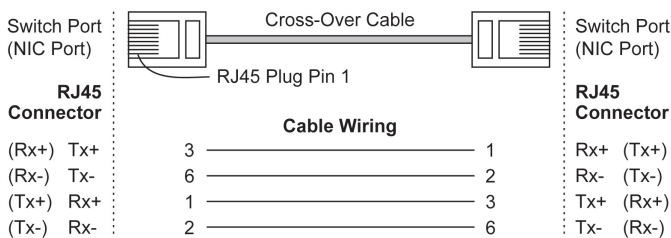
8-pin RJ45



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



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



Reset Button

The reset button is to reset the Ethernet switch to factory default settings by pressing and holding the reset button for 5 seconds. Use a pointed object, such as a straightened paper clip or toothpick, to depress the reset button. This will cause the STATE LED to blink once a second. After depressing the button for 5 continuous seconds, the STATE LED will start to blink rapidly. This indicates that factory default settings have been loaded and you can release the reset button.

NOTE DO NOT power off the Ethernet switch when loading default settings.

Turbo Ring DIP Switch Settings

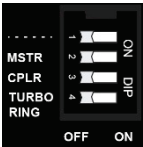
EDS-405A-PTP series switches are plug-and-play managed redundant Ethernet switches. The proprietary Turbo Ring protocol was developed by Moxa to provide better network reliability and faster recovery time. Moxa Turbo Ring's recovery time is less than 300 ms (**Turbo Ring**) or 20 ms (**Turbo Ring V2**) —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 the EDS-405A-PTP that can be used to set up the Turbo Ring easily within seconds. If you do not want to use a hardware DIP switch to set up Turbo Ring, you can use a web browser, Telnet, or console to disable this function.

NOTE Refer to the *Turbo Ring DIP Switch* section and *Using Communication Redundancy* section in the user’s manual for detailed information about the settings and usage of *Turbo Ring* and *Turbo Ring V2*.

EDS-405A-PTP 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.	<u>ON</u> : Enables this EDS as the Ring Master.	<u>ON</u> : Enables the default “Ring Coupling” ports.	<u>ON</u> : Activates DIP switches 1, 2, 3 to configure “Turbo Ring” settings.
	<u>OFF</u> : This EDS will not be the Ring Master.	<u>OFF</u> : Do not use this EDS as the ring coupler.	<u>OFF</u> : DIP switches 1, 2, 3 will be disabled.

“Turbo Ring V2” DIP Switch Settings

DIP 1	DIP 2	DIP 3	DIP 4
<u>ON</u> : Enables the default “Ring Coupling (backup)” port.	<u>ON</u> : Enables this EDS as the Ring Master.	<u>ON</u> : Enables the default “Ring Coupling” port.	<u>ON</u> : Activates DIP switches 1, 2, 3 to configure “Turbo Ring V2” settings.
<u>OFF</u> : Enables the default “Ring Coupling (primary)” port.	<u>OFF</u> : This EDS will not be the Ring Master.	<u>OFF</u> : Do not use this EDS as a ring coupler.	<u>OFF</u> : DIP switches 1, 2, 3 will be disabled.

NOTE If you do not enable any of the EDS-405A-PTP switches to be the Ring Master, the Turbo Ring protocol will automatically choose the EDS-405A-PTP with the smallest MAC address range to be the Ring Master. If you accidentally enable more than one EDS-405A-PTP to be the Ring Master, these EDS-405A-PTP switches will auto-negotiate to determine which switch will be the Ring Master.

NOTE You must enable the Turbo Ring function first before using the DIP switch to activate the Master and Coupler functions.

LED Indicators

There are several LEDs on the EDS's front panel. The function of each LED is described in the following table.

LED	Color	State	Description
STATE	GREEN	On	The system passed the self-diagnosis test on boot-up and is ready to run.
		Blinking	The switch is under reset progress (1 time/s)
	RED	On Blinking	The system self-diagnosis fails on boot-up. 1. RAM Test Fail / System Info Read Fail / Switch Init./PTP PHY error Fail (+ Green MSTR lit on : HW FAIL) 2. FW Checksum Fail / Uncompress Fail (+ Green Coupler lit on: SW FAIL)
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	1. The signal contact is open. 2. The port being disabled because of the ingress multicast and broadcast packets exceed the ingress rate limit 3. Incorrect loop connection in a single switch 4. Invalid Ring port connection
MSTR/HEAD	GREEN	On	1. The switch is set as the Master of the Turbo Ring, or as the Head of the Turbo Chain. 2. POST H.W. Fail (+Stat on and Fault blinking)
		Blinking	1. The switch has become the Ring Master of the Turbo Ring 2. The Head of the Turbo Chain, after the Turbo Ring or the Turbo Chain is down. 3. The switch is set as Turbo Chain's Member and the corresponding chain port is down.
		Off	1. The switch is not the Master of this Turbo Ring. 2. This switch is set as a Member of the Turbo Chain.

CPLR/TAIL	GREEN	On	1. The switch's coupling function is enabled to form a back-up path 2. When it's set as the Tail of the Turbo Chain. 3. POST S.W. Fails (+Stat on and Fault blinking)
		Blinking	1. Turbo Chain is down. 2. The switch is set as Turbo Chain's Member and the corresponding chain port is down.
		Off	1. This switch has disabled the coupling function. 2. This switch is set as a Member of the Turbo Chain.
STATE+FAULT +MSTR/HEAD+ CPLR/TAIL		Blinking	The switch is being discovered/located by MXview(2time/s)
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.

Auto MDI/MDI-X Connection

The Auto MDI/MDI-X function allows users to connect the EDS-405A-PTP'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 EDS-405A-PTP to Ethernet devices.

Specifications

Technology	
Standards	IEEE802.3, 802.3u, 802.3x, 802.1D, 802.1Q, 802.1w, 802.1p, 802.1X, 802.1s
Protocols	IGMPv1/v2, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, DHCP Option 66/67/82, BootP, TFTP, SNTp, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, SSH, Syslog, EtherNet/IP, Modbus/TCP, PROFINET, SNMP Inform, LLDP, IEEE 1588 PTP V2, IPv6, NTP Server/Client
MIB	MIB-II, Ethernet-Like MIB, P-BRIDGE MIB, RMON MIB Group 1, 2, 3, 9, Bridge MIB, RSTP MIB
Processing Type	Store and Forward
Flow Control	IEEE802.3x flow control, back pressure flow control
Interface	
RJ45 Ports	10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
Console	RS-232 (RJ45)
LED Indicators	PWR1, PWR2, FAULT, 10/100M (TP port),

	STATE, CPLR/TAIL and MSTR/HEAD
Relay Contact	One relay output with current carrying capacity of 1A @ 24 VDC
DIP Switches	Master, Coupler, Turbo Ring, Reserve
Power	
Input Voltage	12/24/48 VDC (9.6 to 60 VDC), redundant dual inputs
Input Current (@ 24 V)	Max. 0.24 A
Connection	One removable 6-pin terminal block
Overload Current Protection	Present
Reverse Polarity Protection	Present
Physical Characteristics	
Housing	Metal, IP30 protected
Dimensions	53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)
Weight	650 g
Installation	DIN-Rail, Wall Mounting (optional kit)
Environmental Limits	
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	
EMI	FCC Part 15 Subpart B Class A, EN 61000-6-4
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
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
WARRANTY	5 years

Technical Support Contact Information

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