



MOXA EDS-405A-PTP Series EtherDevice Switch Installation Guide

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MOXA EDS-405A-PTP Series EtherDevice Switch



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.

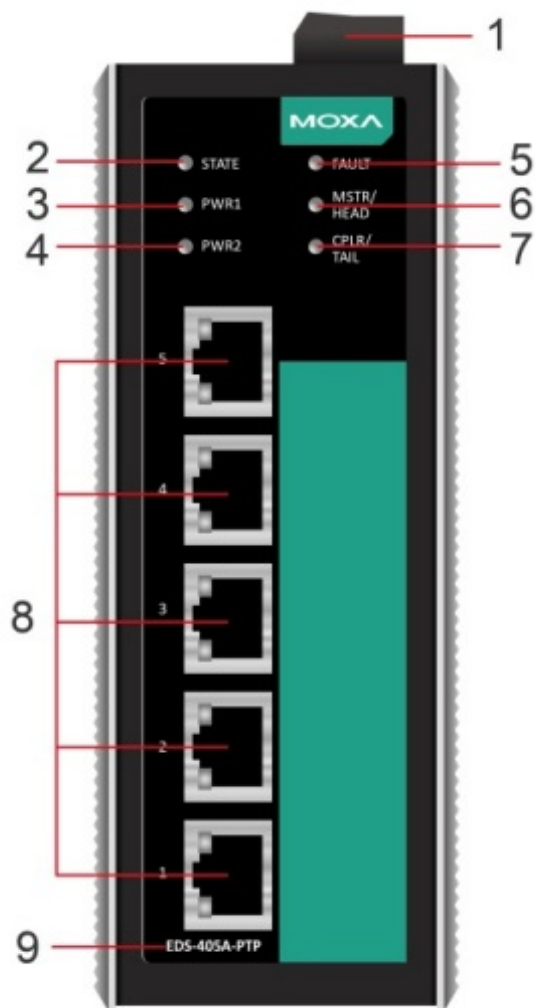
Package Checklist

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.

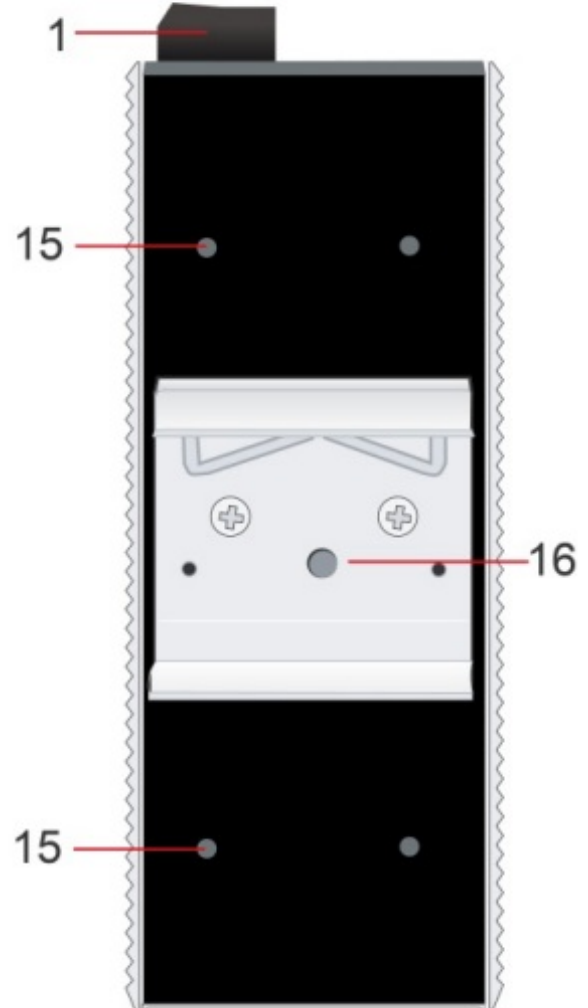
- EDS-405A-PTP Ethernet switch
- RJ45-to-DB9 console port cable
- Protective caps for unused ports
- Panel mounting kit (optional—must order separately)
- Quick installation guide
- Warranty card

EDS-405A-PTP Panel Layout (standard)

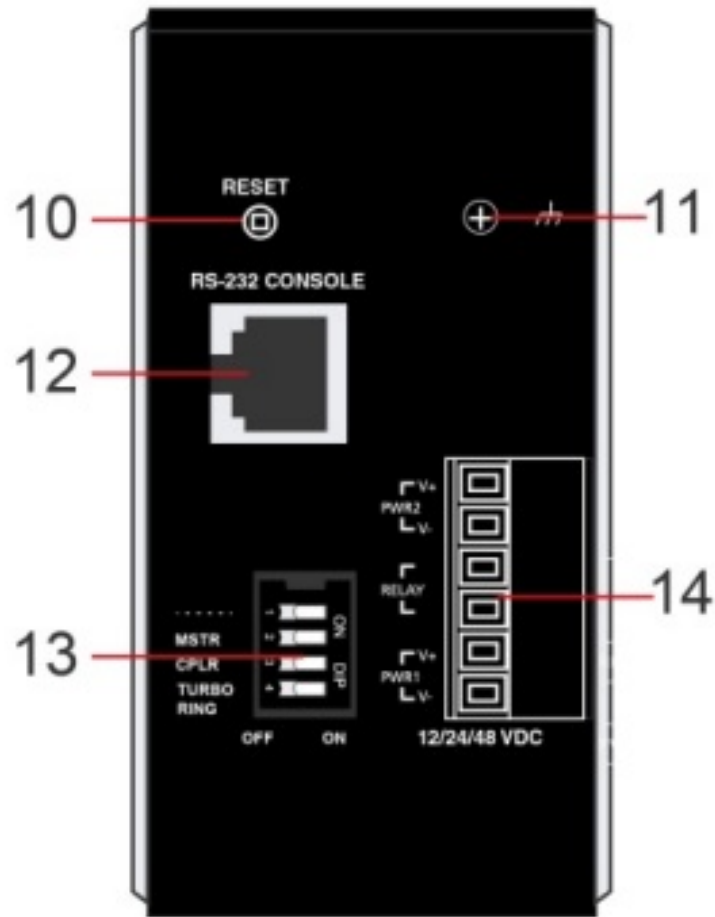
Front Panel View



Rear Panel View



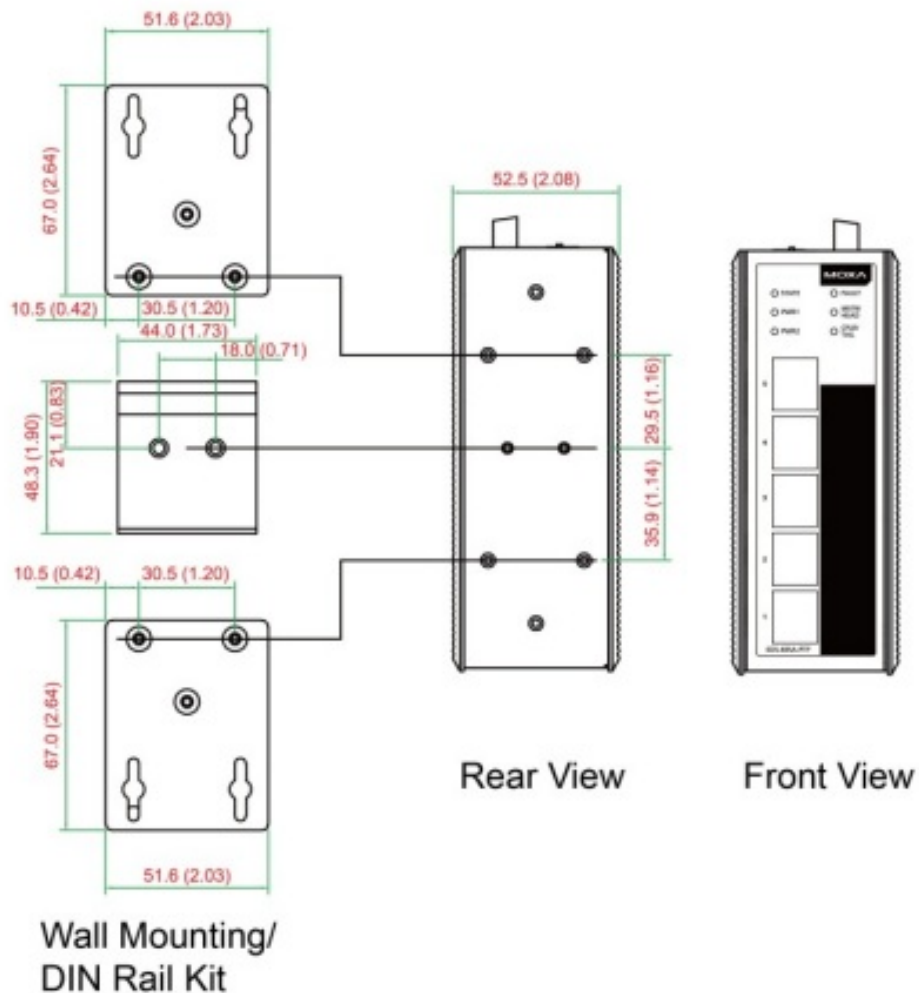
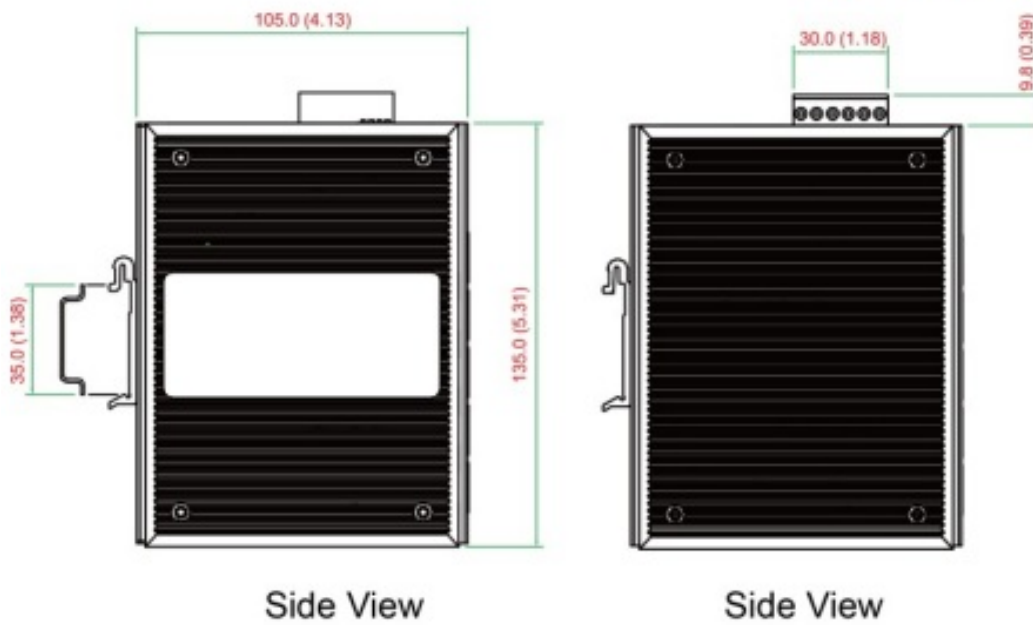
Top Panel View



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 (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.

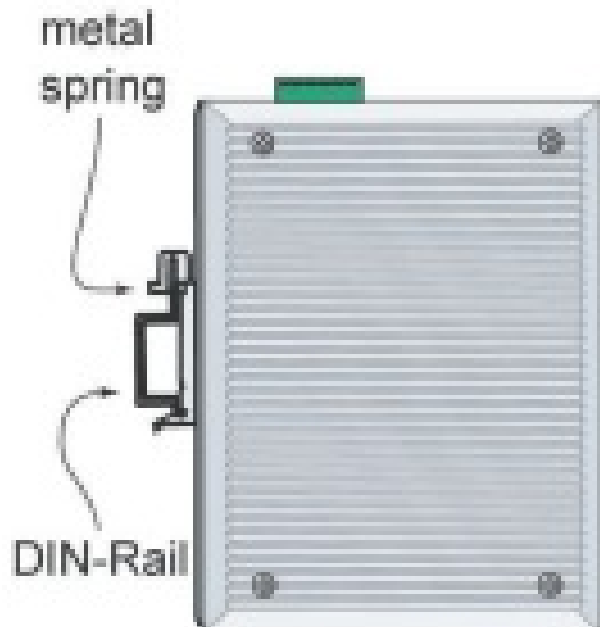
STEP 1

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



STEP 2

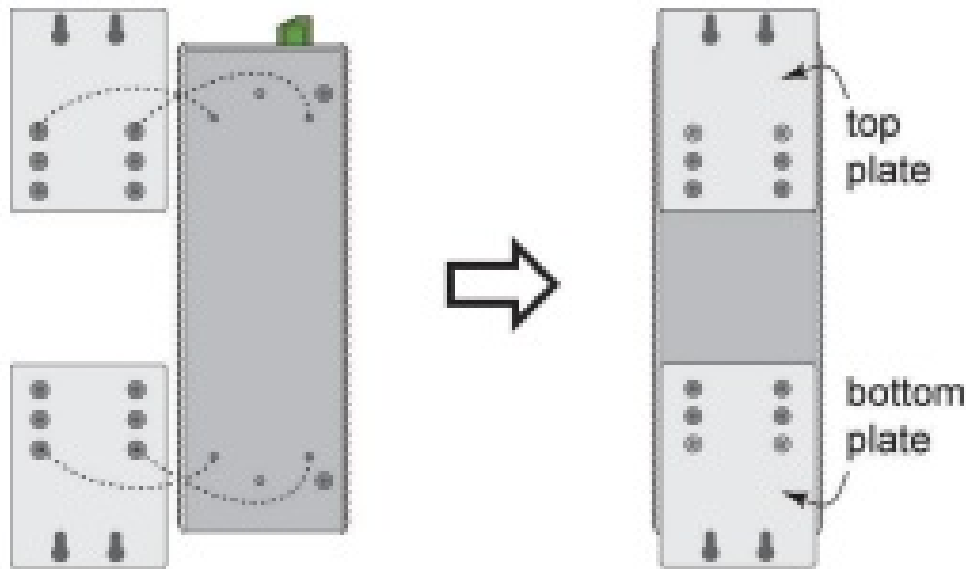
The DIN rail attachment unit will snap into place as shown.



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

Wall Mounting (optional)

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.

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

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.

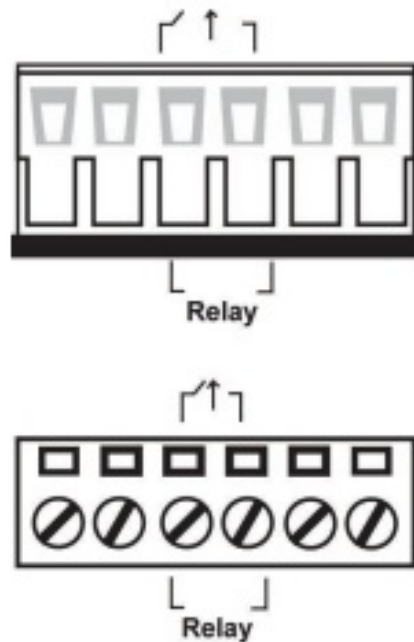
- Use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring that shares similar electrical characteristics can be bundled together.
- Keep input wiring and output wiring separate.
- When necessary, you should label the wiring 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.

Wiring the Relay Contact

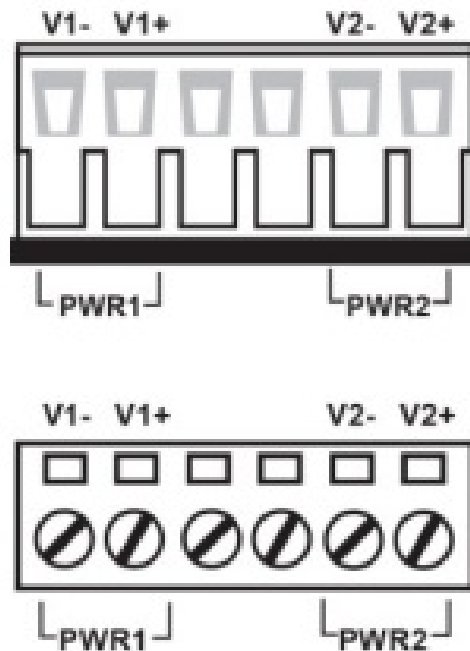
The Relay Contact consists of the two middle contacts of the terminal block on the EDS-405A-PTP's top panel. Refer to the next section for detailed instructions on how to connect the wires to the terminal block connector, and how to attach the terminal block connector to the terminal block receptor. 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.

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 MDI-

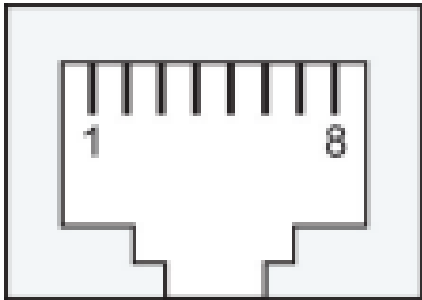
| Pin | Signal |
|-----|--------|
| 1 | Tx+ |
| 2 | Tx- |
| 3 | Rx+ |
| 6 | Rx- |

X Port Pinouts

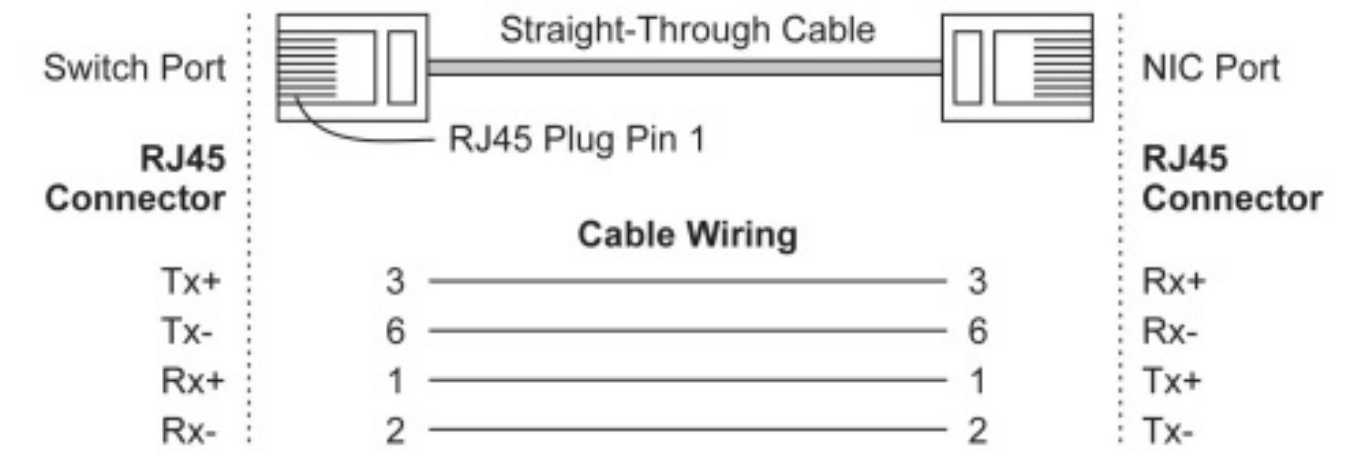
| Pin | Signal |
|-----|--------|
| 1 | Rx+ |
| 2 | Rx- |
| 3 | Tx+ |
| 6 | Tx- |

8-pin RJ45

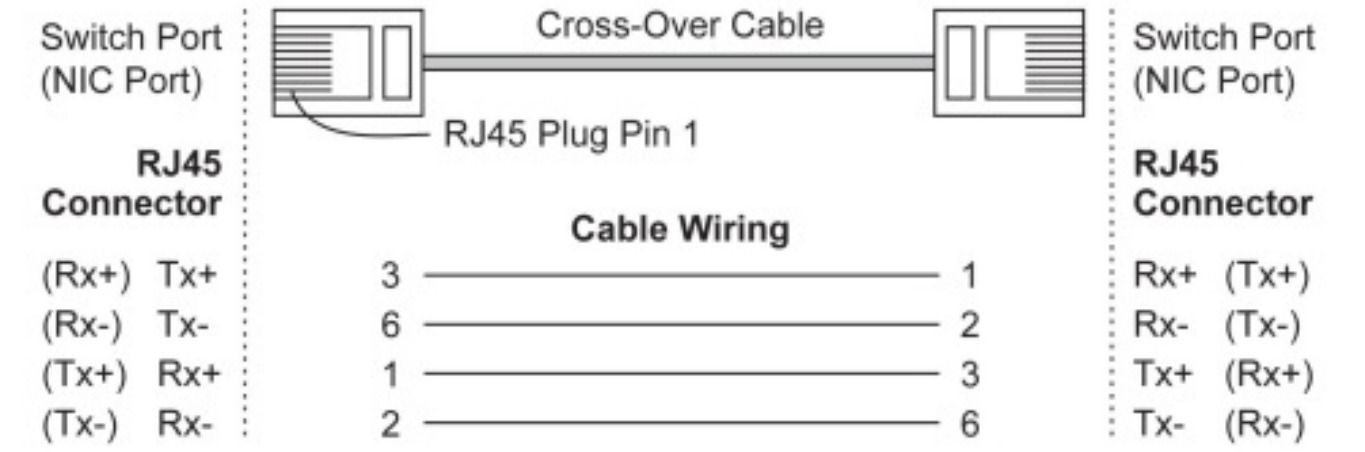
8-pin RJ45



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



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



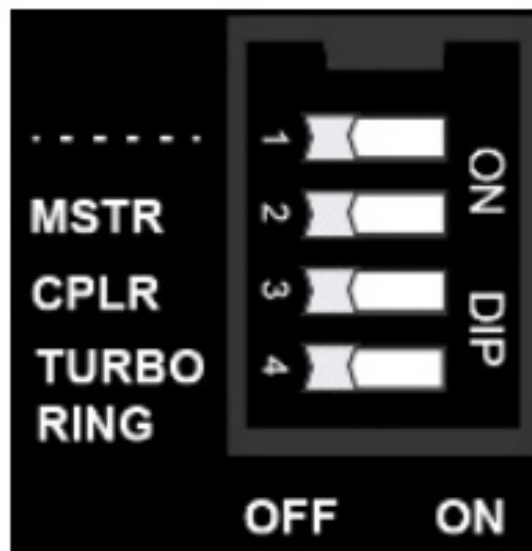
Reset Button

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.

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.

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. |

LED Indicators

| 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./PT P 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 | <ol style="list-style-type: none"> 1. The signal contact is open. 2. The port has been disabled because the packets have exceeded the ingress rate limit. 3. Incorrect loop connection in a single switch. 4. Invalid Ring port connection 5. A failure during start up. |
| MSTR/HEAD | GREEN | On | <ol style="list-style-type: none"> 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). 3. The switch is set as the Root of RSTP. |
| | | Blinking | <ol style="list-style-type: none"> 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 | <ol style="list-style-type: none"> 1. The switch is not the Master of this Turbo Ring. 2. This switch is set as a Member of the Turbo Chain. |
|--|--|-----|--|

| LED | Color | State | Description |
|-----------|-------|----------|--|
| CPLR/TAIL | GREEN | On | <ol style="list-style-type: none"> 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. Software initialization failed (+Stat on and Fault blinking) |
| | | Blinking | <ol style="list-style-type: none"> 1. Turbo Chain is down. 2. The switch is set as Turbo Chain's Member and the corresponding chain port is down. |
| | | Off | <ol style="list-style-type: none"> 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 (2 time/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. |

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

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 | <p>IGMPv1/v2, GMRP, GVRP, SNMPv1/v2c/v3, DHCP</p> <p>Server/Client, DHCP Option 66/67/82, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, SSH,</p> <p>Syslog, EtherNet/IP, Modbus/TCP, PROFINET, SNMP Inform, LLDP, IEEE 1588 PT P V2, IPv6, NTP</p> <p>Server/Client</p> |
| MIB | <p>MIB-II, Ethernet-Like MIB, P-BRIDGE MIB, RMON MIB</p> <p>Group 1, 2, 3, 9, Bridge MIB, RSTP MIB</p> |
| 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 |
| Inrush Current | Max. 8.6 A @ 24 VDC (0.1-1 ms) |
| 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 60C (14 to 140F); -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 |

Documents / Resources

| | |
|---|---|
|  | <p>MOXA EDS-405A-PTP Series EtherDevice Switch [pdf] Installation Guide EDS-405A-PTP Series EtherDevice Switch, EDS-405A-PTP Series, EtherDevice Switch</p> |
|---|---|

References

- [Moxa - Support](#)