

EDS-210A Series Hardware Installation Guide

Moxa EtherDevice Switch

First Edition, May 2013



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P/N: 1802002100010

Overview

The EDS-210A series 10-port industrial Ethernet switches are equipped with 1 Gigabit fiber optic Ethernet port, up to 8 10/100M copper ports, and 4 100M fiber optic Ethernet ports, making it ideal for applications that require high bandwidth data convergence and long-distance uplinks. The EDS-210A series provides 12/24/48 VDC redundant power inputs, has a rugged IP30-rated metal housing, and is DIN-rail mountable. These switches are compliant with FCC/UL/CE standards and undergo a 100% burn-in test to ensure that they fulfill the special needs of industrial automation control applications. The EDS-210A series has a -10 to 60°C operating temperature range and is also available with wide-temperature operation (-40 to 75°C).

NOTE Throughout this Hardware 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 is missing or damaged, please contact your customer service representative for assistance.

- Moxa EtherDevice™ Switch
- Hardware installation guide
- Moxa product warranty booklet
- Protective caps for unused ports

Features

High Performance Network Switching Technology

- 10/100/1000BaseT(X) (EDS-210A-1GTX-1GSFP-4SFP only), 10/100BaseT(X) auto-negotiation speed, full/half duplex mode, auto MDI/MDI-X connection, and 100Base SFP slot /1000Base SFP slot.
- IEEE 802.3 for 10BaseT, IEEE 802.3u for 100BaseT(X), IEEE 802.3ab for 1000BaseT, and IEEE 802.3z for 1000BaseX.
- Store-and-forward switching process type.

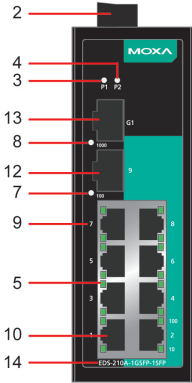
Rugged Design

- Operating temperature range of -10 to 60°C, or extended operating temperature of -40 to 75°C (T models only)
- IP30, rugged high-strength case
- DIN-rail or panel mounting available
- Redundant dual 12/24/48 VDC

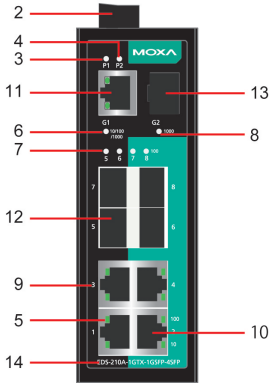
Panel Layout of EDS-210A-1GSFP-1SFP/

EDS-210A-1GTX-1GSFP-4SFP

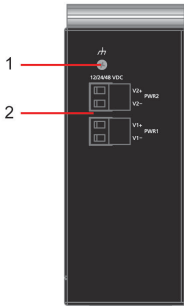
EDS-210A-1GSFP-1SFP
Front Panel View



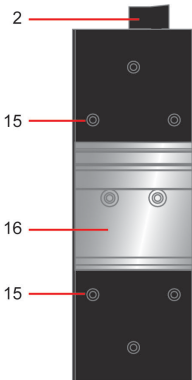
EDS-210A-1GTX-1GSFP-4SFP
Front Panel View



Top Panel View



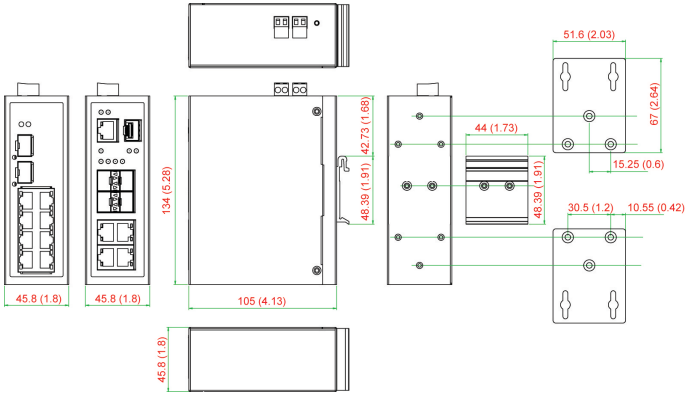
Rear Panel View



1. Grounding screw
2. Terminal block for power input (PWR1, PWR2) and relay output
3. Power input PWR1 LED
4. Power input PWR2 LED
5. TP port's 10/100 Mbps LED
6. TP port's 10/100/1000 Mbps LED
7. SFP port's 100Mbps LED
8. SFP port's 1000Mbps LED
9. Port number
10. 10/100 BaseT(X) Port
11. 10/100/1000 BaseT(X) Port
12. 100Base SFP slot
13. 1000Base SFP slot
14. Model Name
15. Screw hole for wall mounting kit
16. DIN rail kit

Mounting Dimensions

unit = mm (in)

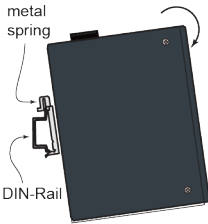


DIN-Rail Mounting

The aluminum DIN-rail attachment plate should already be 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 metal spring is situated towards the top, as shown in the figures below.

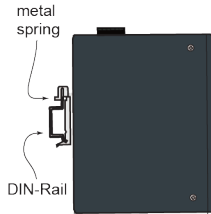
STEP 1:

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



STEP 2:

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



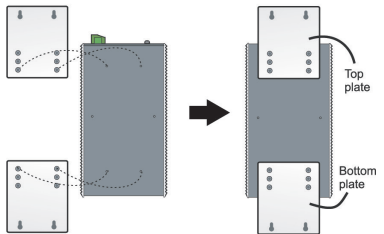
To remove the DIN-rail from the EDS, simply reverse Steps 1 and 2.

Wall Mounting (optional)

For some applications, you will find it convenient to mount the EDS on the wall, as illustrated below.

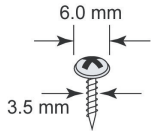
STEP 1:

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



STEP 2:

Mounting the EDS 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.

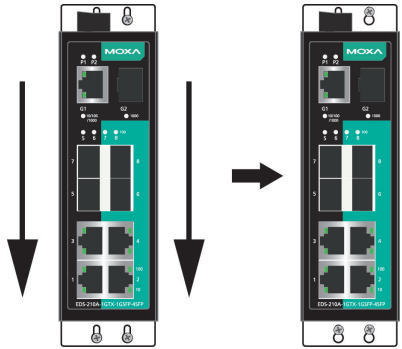


NOTE Before tightening screws into the wall, make sure the screw head and shank size are suitable by inserting the screw into one of the keyhole-shaped apertures of the wall mounting plates.

Do not tighten the screws all the way in — 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 downwards, as indicated. Tighten the four screws for added stability.



Wiring Requirements



WARNING

Safety First!

Turn the power off before disconnecting modules or wires. The proper power supply voltage is listed on the product label. Check the voltage of your power source to make sure you are using the correct voltage. Do NOT use a voltage greater than what is specified on the product label.

These devices must be supplied by an AELV source as defined in the Low Voltage Directive 2006/95/EC and 2004/108/EC.



WARNING

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 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 with similar electrical characteristics can be bundled together.
- Keep input wiring and output wiring separated.
- It is strongly advised that you label wiring for all devices in the system when necessary.

Grounding the Moxa 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.



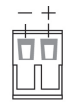
ATTENTION

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

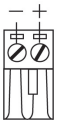
Wiring the Redundant Power Inputs

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 the EDS-210A with power.

The two 2-contact terminal block connectors on the EDS's top panel are used for the EDS's two DC power inputs. Top and front view of the terminal block connectors are shown here.



Top View



Front View

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-210A to the DC power inputs, make sure the DC power source voltage is stable.

Communication Connections

EDS-210A models have 10/100BaseT(X) Ethernet ports, 10/100/1000BaseT(X) Ethernet ports, 100BaseSFP and 1000BaseSFP.

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.

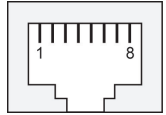
MDI Port Pinouts

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

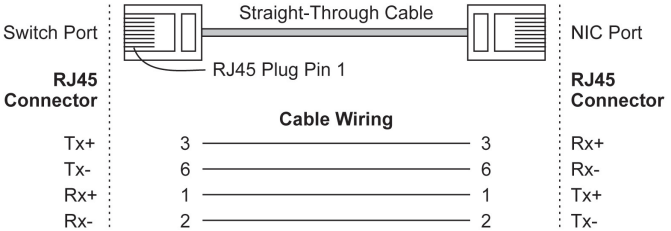
MDI-X Port Pinouts

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

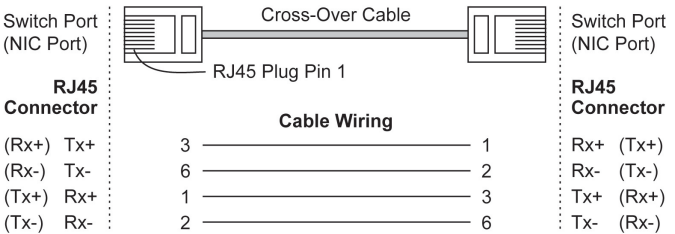
8-pin RJ45



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



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



10/100/1000BaseT(X) Ethernet Port Connection

The 10/100/1000BaseT(X) ports located on Moxa EtherDevice Switch’s front panel are used to connect to Ethernet-enabled devices. Most users will choose to configure these ports for Auto MDI/MDI-X mode, in which case the port’s pinouts are adjusted automatically depending on the type of Ethernet cable used (straight-through or cross-over), and the type of device (NIC-type or HUB/Switch-type) connected to the port.

In the following section, we give pinouts for both MDI (NIC-type) ports and MDI-X (HUB/Switch-type) ports. We also give cable wiring diagrams for straight-through and cross-over Ethernet cables.

10 / 100Base T(x) RJ45 Pinouts

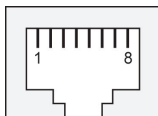
MDI Port Pinouts

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

MDI-X Port Pinouts

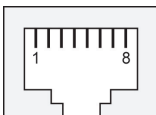
Pin	Signal
1	Rx+
2	Rx-
3	Tx+
6	Tx-

8-pin RJ45

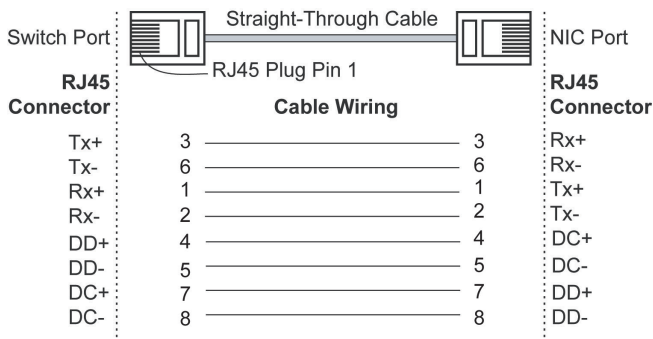


1000BaseT RJ45 Pinouts

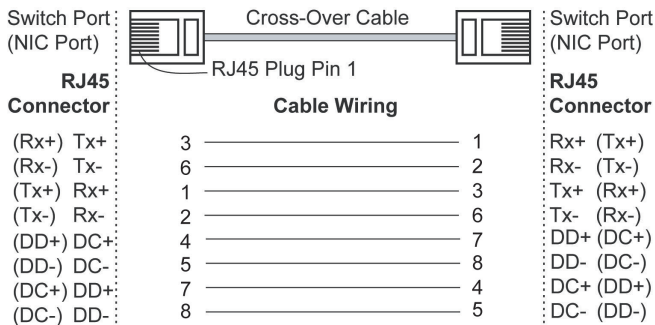
Pin	MDI	MDI-X
1	BI_DA+	BI_DB+
2	BI_DA-	BI_DB-
3	BI_DB+	BI_DA+
4	BI_DC+	BI_DD+
5	BI_DC-	BI_DD-
6	BI_DB-	BI_DA-
7	BI_DD+	BI_DC+
8	BI_DD-	BI_DC-



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



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



100Base-FX or 1000Base-X Fiber Port

The Fiber ports on the EDS-210A series are SFP type slots, which support both 100Base-FX and 1000Base-X speed fiber transceiver to work properly. Moxa provides complete transceiver models for various distance requirements.

Multi-mode:

1000BaseSX	0 to 550 m, 850 nm (50/125 μ m, 400MHz*km) 0 to 275 m, 850 nm (62.5/125 μ m, 200MHz*km)
1000BaseLX	0 to 1100 m, 1310 nm (50/125 μ m, 800MHz*km) 0 to 550 m, 1310 nm (62.5/125 μ m, 500MHz*km)

Single-mode:

1000BaseLX	0 to 10 km, 1310 nm (9/125 μ m, 3.5 PS/(nm*km))
1000BaseLHX	0 to 40 km, 1310 nm (9/125 μ m, 3.5 PS/(nm*km))
1000BaseZX	0 to 80 km, 1550 nm (9/125 μ m, 19 PS/(nm*km))

Multi-mode:

100BaseFx	0 to 5 km, 1300 nm (50/125 μ m, 800MHz*km) 0 to 4 m, 1300 nm (62.5/125 μ m, 500MHz*km)
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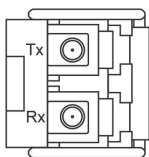
Single-mode:

100BaseFx	0 to 40 km, 1310 nm (9/125 μ m, 3.5 PS/(nm*km))
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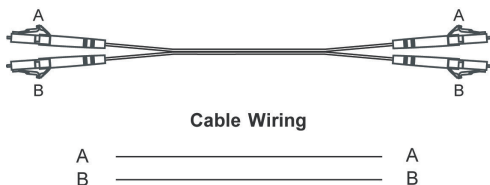
The concept behind the LC port and cable is quite straightforward. Suppose you are connecting devices I and II. Unlike electrical signals, optical signals do not require a circuit in order to transmit data. Consequently, one of the optical lines is used to transmit data from device I to device II, and the other optical line is used to transmit data from device II to device I, for full-duplex transmission.

Remember 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 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).

LC-Port Pinouts



LC-Port to LC-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.

LED Indicators

The front panel of the Moxa EtherDevice Switch contains 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 P1
		Off	Power is not being supplied to power input P1.
PWR2	AMBER	On	Power is being supplied to power input P2
		Off	Power is not being supplied to power input P2.
100M	GREEN	On	TP port's 100Mbps link is active.
		Blinking	Data is being transmitted at 10/100Mbps.
		Off	TP port's 100Mbps link is inactive.
10/100M	AMBER	On	TP port's 10/100Mbps link is active.
		Blinking	Data is being transmitted at 10/100Mbps.
		Off	TP port's 10/100Mbps link is inactive.
1000M	GREEN	On	TP port's 1000 Mbps link is active.
		Blinking	Data is being transmitted at 1000 Mbps.
		Off	TP port's 100 Mbps.

Auto MDI/MDI-X Connection

The Auto MDI/MDI-X function allows users to connect the EDS's 10/100/1000BaseT(X) ports to any kind of Ethernet device, without paying 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 to Ethernet devices.

Triple Speed Functionality and Switching

The EDS's 10/100/1000 Mbps RJ45 switched port auto negotiates with the connected device for the fastest data transmission rate supported by both devices. The EDS is a plug-and-play device, so software configuration is not required at installation or during maintenance.

The half/full duplex mode for the RJ45 switched ports is user dependent and changes (by auto-negotiation) to full or half duplex, depending on which transmission speed is supported by the attached device.

Auto-Negotiation and Speed Sensing

The EDS's RJ45 Ethernet ports independently support auto-negotiation for transmission speeds of 10 Mbps, 100 Mbps, and 1000 Mbps, with operation according to the IEEE802.3 standard.

This means that some nodes could be operating at 10 Mbps, while at the same time, other nodes are operating at 100 Mbps or 1000 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 10 Mbps, 100 Mbps, or 1000 Mbps transmission speeds, with the device at the other end of the cable expected to advertise similarly. Depending on what type of device is connected, this will result in agreement to operate at a speed of 10 Mbps, 100 Mbps, or 1000 Mbps.

If an EDS's 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 IEEE802.3 standard.

Specifications

Technology

Standards IEEE 802.3 for 10BaseT,
IEEE 802.3u for 100BaseT(X) and 100Base FX,
IEEE 802.3ab for 1000BaseT,
IEEE 802.3z for 1000BaseSX/LX/LHX/ZX

Flow Control IEEE 802.3x flow control, back pressure flow control

Interface

RJ45 Ports 10/100BaseT(X) and 10/100/1000BaseT(X) auto negotiation speed

Fiber Ports 100Base-FX or 1000Base-X SFP slot

LED Indicators PWR1, PWR2, 10/100M, 10/100M/1000M, 100M, 1000M

Optical Fiber: 100 or 1000Base SFP modules

	Gigabit Ethernet			
	SFP-SX	SFP-LX	SFP-LHX	SFP-ZX
Wavelength	850nm	1310nm	1310nm	1550nm
Max.TX	-4 dBm	-3 dBm	1 dBm	5 dBm
Min.TX	-9.5 dBm	-9.5 dBm	-4 dBm	0 dBm
RX Sensitivity	-18 dBm	-20 dBm	-24 dBm	24 dBm
Link Budget	8.5 db	10.5 dB	20 dB	24 dB
Typical Distance	550 m ^a 275 m ^b	1100 m ^c 550 m ^d 10 km ^e	40 km ^e	80 km ^f
Saturation	0 dBm	-3 dBm	-3 dBm	-3 dBm

- a. 50/125 μm, 400 MHz*km fiber optic cable
- b. 62.5/125 μm, 200 MHz*km fiber optic cable
- c. 50/125 μm, 800 MHz*km fiber optic cable
- d. 62.5/125 μm, 500 MHz*km fiber optic cable
- e. 9/125 μm, 3.5 PS/(nm*km) fiber optic cable
- f. 9/125 μm, 19 PS/(nm*km) fiber optic cable

	100Base Ethernet	
	Multi Mode	Single Mode
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km ^a 4 km ^b	40 km ^c
Saturation	-6 dBm	-3 dBm

- a. 50/125μm, 800 MHz*km fiber optic cable
- b. 62.5/125μm, 500 MHz*km fiber optic cable
- c. 9/125μm, 3.5 PS/(nm*km) fiber optic cable

Power

Input Voltage 12/24/48 VDC (9.6 to 60 VDC),
redundant dual inputs

Input Current @ 24VDC 0.45A

Connection One removable 2-pin terminal block

Overload Current 3A

Protection

Reverse Polarity Present

Protection

Mechanical

Casing IP30 protection, metal case

Dimension (W x H x D) 45.8 x 134 x 105 mm (1.8 x 5.28 x 4.13 in)

Weight EDS-210A-1GSFP-1SFP: 520g

EDS-210A-1GTX-1GSFP-4SFP: 570g

Installation DIN-rail, Wall Mounting (optional kit)

Environmental

Operating Temperature -10 to 60°C (32 to 140°F)

-40 to 75°C (-40 to 167°F) for -T models

Storage Temperature -40 to 80°C (-40 to 185°F)

Ambient Relative Humidity 5 to 95% (non-condensing)

Humidity

Regulatory Approvals

Safety UL508

EMI FCC Part 15, CISPR (EN55022) class A

EMS EN61000-4-2 (ESD), Level 3

EN61000-4-3 (RS), Level 3

EN61000-4-4 (EFT), Level 3

EN61000-4-5 (Surge), Level 3

EN61000-4-6 (CS), Level 3

EN61000-4-8

EN61000-4-11

Shock IEC60068-2-27

Free Fall IEC60068-2-32

Vibration IEC60068-2-6

WARRANTY 5 years

Technical Support Contact Information
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