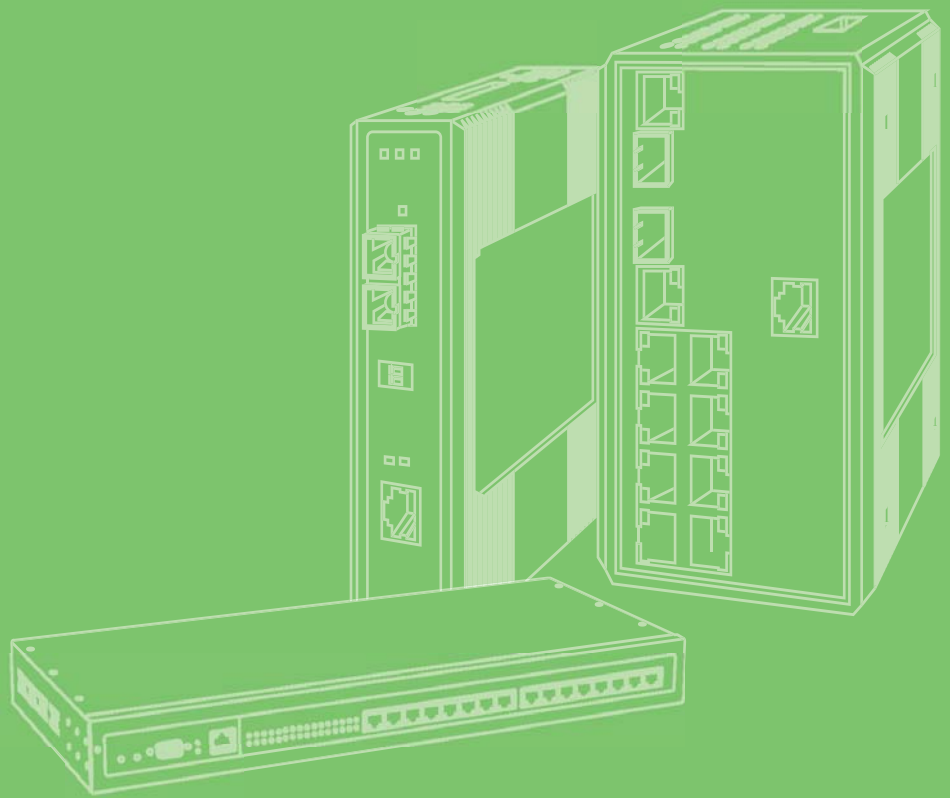


User Manual



EKI-2741FI/LXI/SXI

10/100/1000T (X) to Fiber Optic
Gigabit Industrial Media
Converters

ADVANTECH

Enabling an Intelligent Planet

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CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from Advantech. Please contact your local supplier for ordering information.

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

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Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about the product.
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 - Product name and serial number
 - Description of your peripheral attachments
 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

Warnings, Cautions and Notes

Warning! Warnings indicate conditions, which if not observed, can cause personal injury!



Caution! Cautions are included to help you avoid damaging hardware or losing data. e.g.



There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Note! Notes provide optional additional information.



Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: ICG.Support@advantech.com.tw

Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

- 1 x EKI-2741FI/LXI/SXI Industrial Ethernet Switch
- 2 x Wall Mounting Bracket and Screws
- 1 x DIN-rail Mounting Bracket and Screws
- 1 x EKI-2741FI/LXI/SXI Startup Manual

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any Power outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
 15. The power cord or plug is damaged.
 16. Liquid has penetrated into the equipment.
 17. The equipment has been exposed to moisture.
 18. The equipment does not work well, or you cannot get it to work according to the user's manual.
 19. The equipment has been dropped and damaged.
 20. The equipment has obvious signs of breakage.
21. **DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.**
22. **CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.**

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

Technical Support and Assistance

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2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
 - Product name and serial number
 - Description of your peripheral attachment
 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

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About This Manual

This user manual is intended to guide professional installers in installing and configuring the Serial Device Server. It includes technical specifications, software utility introduction, as well as procedures for the use of the software utility to self-manage the devices.

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Chapter 1

Overview

1.1 Introduction

The EKI-2741FI/LXI/SXI are designed to convert Gigabit Ethernet networks to Gigabit fiber networks by transparently converting Ethernet signals to optic signals. Therefore, the EKI-2741FI/LXI/SXI are ideal solutions for Fiber To The Building (FTTB) applications at central offices or local sites. EKI-2741FI/LXI/SXI support MDI/MDIX auto detection, so you don't need to use crossover wires. Furthermore, the EKI-2741FI/LXI/SXI accept a wide voltage range from 12 ~ 48 V_{DC}.

EKI-2741FI/LXI/SXI are an enhanced gigabit Ethernet to fiber optic converter. Aside from its standard features, the versatile the EKI-2741FI/LXI/SXI also have the LFP (Link Fault Pass-through) feature, which allows the transmission of packets even when one link fails. EKI-2741FI/LXI/SXI forces the shutdown of the failed link to allow for an application continuous transmission.

1.2 Device Features

- Provides 1 x 10/100/1000 Mbps Ethernet port with RJ45 connector
- Provides 1 x 1000 Mbps fiber port with SC type connector for 1000Base-SX/LX device
- Provides 1 x 100/1000 Mbps Ethernet port with SFP (mini-GBIC) type
- Provides DIP switch for power alarm & LFP
- Supports MDI/MDI-X auto crossover
- Supports auto-negotiation
- Supports redundant 12 ~ 48 V_{DC} power input
- Provides flexible mounting: DIN-rail and wall mounting
- Provides Link Fault Pass-through (LFP)
- Jumbo Frame: 9216 bytes

1.3 Device Specifications

Specifications	Description	
Interface	I/O Ports	<ul style="list-style-type: none"> ■ 1 x RJ45 ■ 1 x SFP type fiber connector (EKI-2741F) ■ 1 x SC type fiber connector (EKI-2741SX/LX) See the Ethernet Communications and Fiber Communications
	Power Connector	6-pin removable screw terminal (power & relay)
Physical	Enclosure	IP30, metal shell with solid mounting kits
	Installation	DIN-Rail and wall mounting
	Dimensions (W x H x D)	30 x 140 x 95 mm (1.18" x 5.51" x 3.74")
LED Display	System LED	P1, P2, P-Fail
	Port LED	<ul style="list-style-type: none"> ■ LAN: 1000M, Link/Active ■ Fiber: Link/Active
	DIP Switch	Power alarm, LFP
Environment	Operating Temperature	-40 ~ 75°C (-40 ~ 167°F)
	Storage Temperature	-40°C ~ 85°C (-40°F ~ 185°F)
	Ambient Relative Humidity	10 ~ 95% (non-condensing)
Ethernet Communications	Compatibility	IEEE 802.3, 802.3u, 802.3ab, 802.3x, IEEE 802.3z
	Speed	10/100/1000 Mbps, auto MDI/MDIX
	Port Connector	8-pin RJ45
	Ports	1 x RJ45
	Protection	Built-in 1.5 KV magnetic isolation
Fiber Communications	Multi-mode (EKI-2741SX/SXI)	<ul style="list-style-type: none"> ■ Wavelength: 850 nm ■ Tx Power: -4/-9.5 dBm ■ Rx Sensitivity: -18 dBm ■ Parameters: 50/125 um, 62.5/125 um
	Single-mode (EKI-2741LX/LXI)	<ul style="list-style-type: none"> ■ Wavelength: 1310 nm ■ Tx Power: -3/-9.5 dBm ■ Rx Sensitivity: -20 dBm ■ Parameters: 9/125 um
Power	Power Consumption	3.5W
	Power Input	12 ~ 48 V _{DC}

Specifications	Description	
Regulatory Approvals	Safety	UL 60950
	EMI	FCC Part 15 Subpart B Class A, EN 55022 Class A
	EMS	■ EN 61000-4-2
		■ EN 61000-4-3
		■ EN 61000-4-4
		■ EN 61000-4-5
		■ EN 61000-4-6
		■ EN 61000-4-8
Shock	IEC 60068-2-27	
Freefall	IEC 60068-2-32	
Vibration	IEC 60068-2-6	

Chapter 2

Getting Started

2.1 Hardware Overview

2.1.1 Front View

The following view applies to EKI-2741FI.

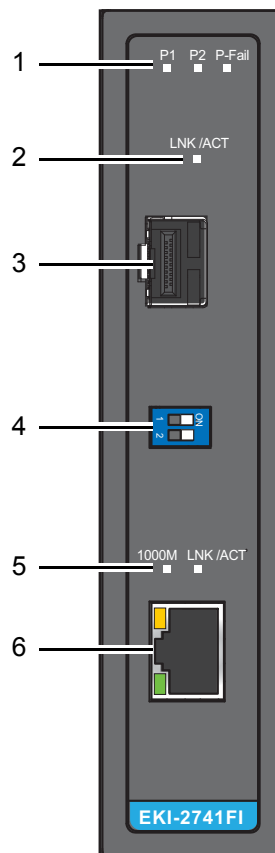


Figure 2.1 Front View

No.	Item	Description
1	System LED panel	See “LED Indicators” on page 9 for further details.
2	LNK/ACT LED	Link activity LED.
3	ETH port	100/1000BASE-X (SFP) port.
4	DIP switch	Configure operation mode for LFP (Link Fault Pass-through).
5	1000M, LNK/ACT LED	1000M LED and link activity LED.
6	ETH port	10/100/1000Base-T/TX ports x 1.

The following view applies to EKI-2741LXI and EKI-2741SXI.

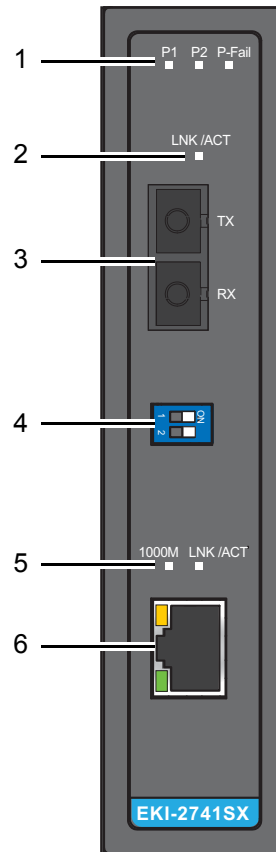


Figure 2.2 Front View

No.	Item	Description
1	System LED panel	See "LED Indicators" on page 9 for further details.
2	LNK/ACT LED	Link activity LED.
3	Fiber port	1000 Mbps fiber port with SC type connector.
4	DIP switch	Configure operation mode for LFP (Link Fault Pass-through).
5	1000M, LNK/ACT LED	1000M LED and link activity LED.
6	ETH port	10/100/1000Base-T/TX ports x 1.

2.1.2 Rear View

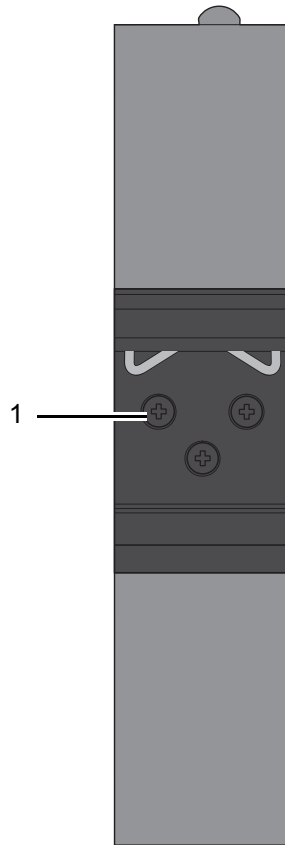


Figure 2.3 Rear View

No.	Item	Description
1	DIN-Rail mounting plate	Mounting plate used for the installation to a standard DIN rail

2.1.3 Top View

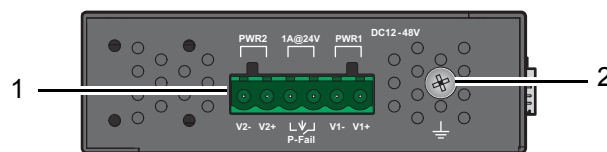


Figure 2.4 Top View

No.	Item	Description
1	Terminal block	Connect cabling for power and alarm wiring
2	Ground terminal	Screw terminal used to ground chassis

2.1.4 LED Indicators

No.	LED Name	LED Color	Description
1	P1	Green on	Power input 1 is active.
		Off	Power input 1 is inactive.
2	P2	Green on	Power input 2 is active.
		Off	Power input 2 is inactive.
3	P-Fail	Red on	Power input 1 or 2 has failed.
		Off	Power input 1 and 2 are both functional, or no power input.
4	LINK/ACT (fiber)	Green on	Connected to network.
		Blinking	Network is active.
		Off	Not connected to network.
5	1000M (RJ45)	Yellow on	Link to 1000M bps network.
		Off	Not connected to network.
6	LINK/ACT (RJ45)	Green on	Connected to network.
		Blinking	Network is active.
		Off	Not connected to network.

2.1.5 Dimensions

The following view applies to EKI-2741FI.

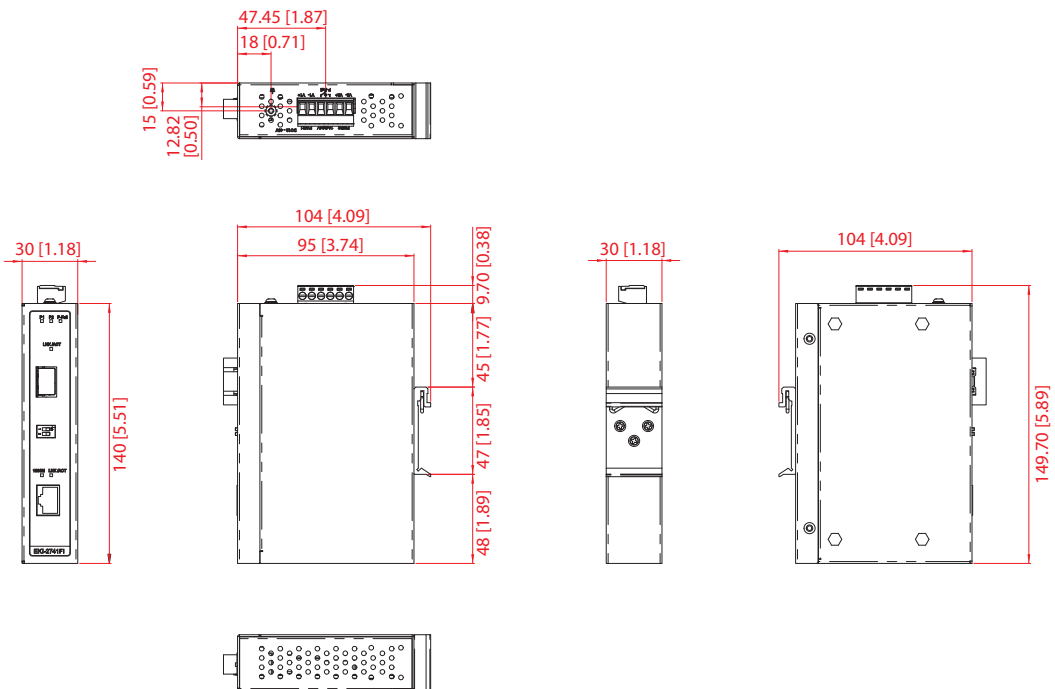


Figure 2.5 Dimensions

The following view applies to EKI-2741LXI and EKI-2741SXI.

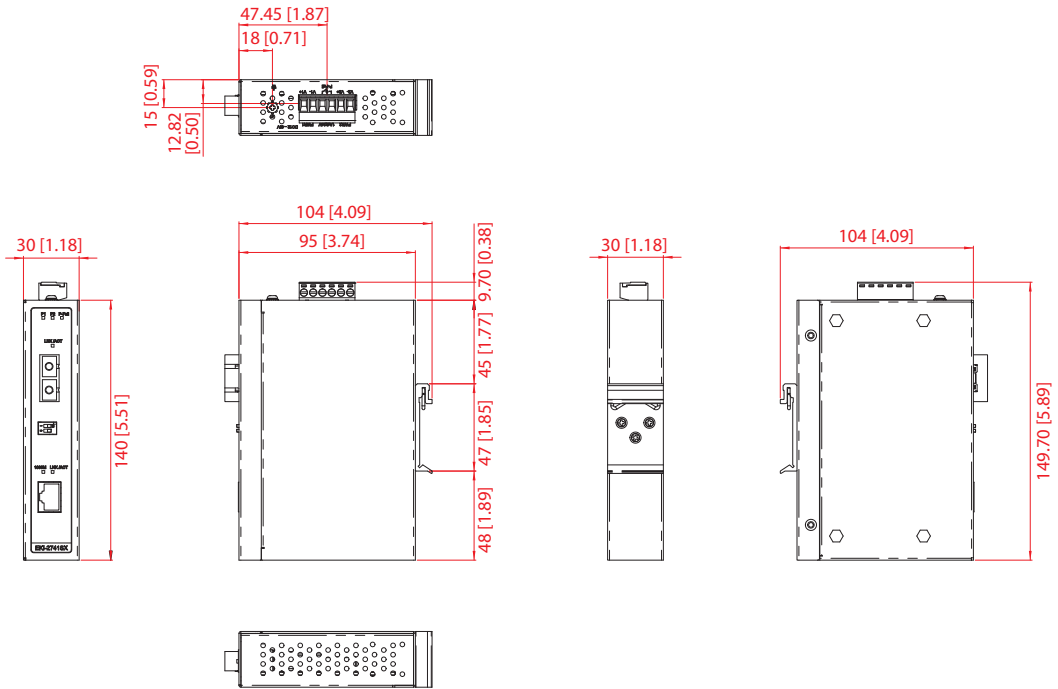


Figure 2.6 Dimensions

2.2 Connecting Hardware

2.2.1 Choosing a Location

2.2.1.1 DIN Rail Mounting

The DIN rail mount option is the quickest installation option. Additionally, it optimizes the use of rail space.

The metal DIN rail kit is secured to the rear of the device. The device can be mounted onto a standard 35mm (1.37") x 75 mm (3") height DIN rail. The devices can be mounted vertically or horizontally. Refer to the following guidelines for further information.

Note! A corrosion-free mounting rail is advisable.



When installing, make sure to allow for enough space to properly install the cabling.

Installing the DIN-Rail Mounting Kit

1. Insert the top back of the mounting bracket over the DIN rail.
2. Push the bottom of the device towards the DIN rail until it snaps into place.

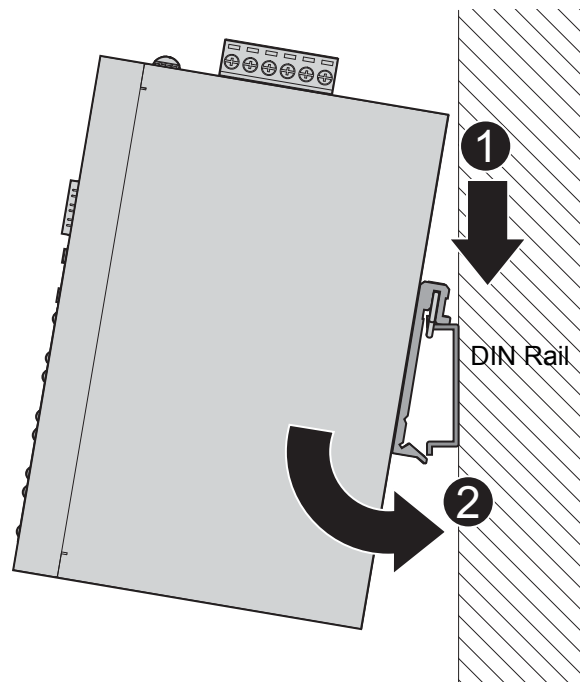


Figure 2.7 Installing the DIN-Rail Mounting Kit

Removing the DIN-Rail Mounting Kit

1. Push the device down to free the bottom of the plate from the DIN rail.
2. Rotate the bottom of the device towards you and away from the DIN rail.
3. Once the bottom is clear of the DIN rail, lift the device straight up to unhook it from the DIN rail.

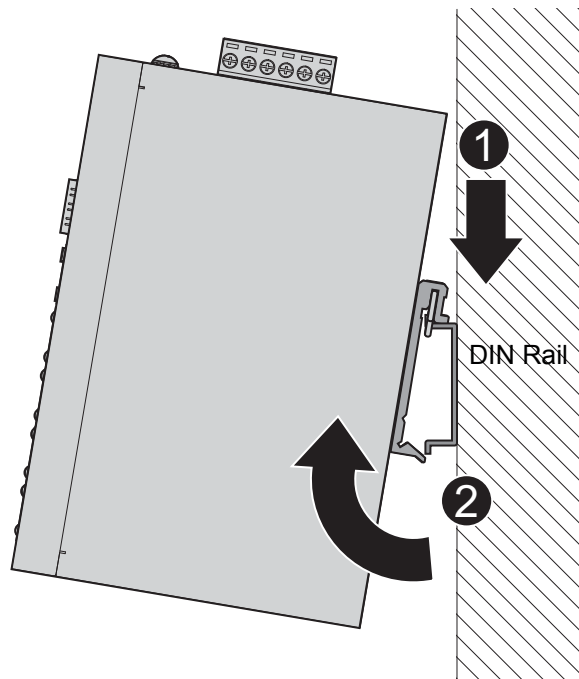


Figure 2.8 Removing the DIN-Rail

2.2.1.2 Wall-Mounting

The wall mounting option provides better shock and vibration resistance than the DIN rail vertical mount.

Note! When installing, make sure to allow for enough space to properly install the cabling.



Before the device can be mounted on a wall, you will need to remove the DIN rail plate.

1. Rotate the device to the rear side and locate the DIN mounting plate.
2. Remove the screws securing the DIN mounting plate to the rear panel of the server.
3. Remove the DIN mounting plate. Store the DIN mounting plate and provided screws for later use.
4. Align the wall mounting plates on the rear side. The screw holes on the device and the mounting plates must be aligned, see the following illustration.
5. Secure the wall mount plates with M3 screws, see the following figure.

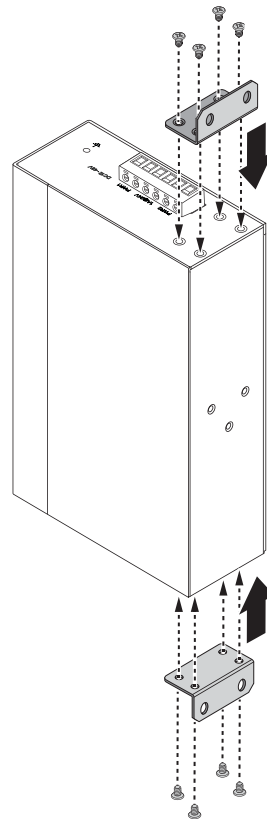


Figure 2.9 Installing Wall Mount Plates

Once the wall mounting plates are secure on the device, you will need to attach the wall screws (x8).

6. Locate the installation site and place the server against the wall, making sure it is the final installation location.
7. Use the wall mount plates as a guide to mark the locations of the screw holes.
8. Drill four holes over the four marked locations on the wall, keeping in mind that the holes must accommodate wall sinks in addition to the screws.
9. Insert the wall sinks into the walls.

10. To mount the wall plate, use screws of the size shown in the following illustration.

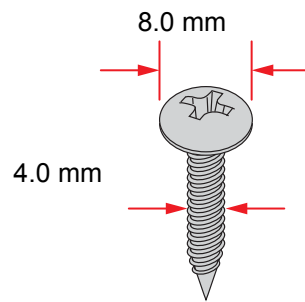


Figure 2.10 Wall Mounting Screw Dimensions

- Note!**
- Make sure the screws dimensions are suitable for use with the wall mounting plate.
 - Do not completely tighten the screws into the wall. A final adjustment may be needed before fully securing the wall mounting plates on the wall.

11. Align the wall mount plate over the screws on the wall.
12. Install the wall mount plate on the screws and slide it forward to lock in place, see the following figure.

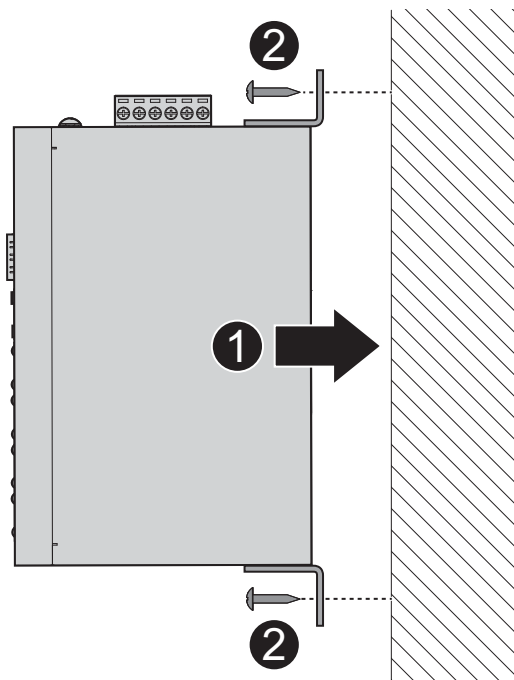


Figure 2.11 Wall Mount Installation

13. Once the device is installed on the wall, tighten the screws to secure the device.

2.2.2 DIP Switch

The DIP switch is used to configure operation mode for LFP (Link Fault Pass-Through) and operation mode for UTP/Fiber port. The default value of DIP switch is OFF.

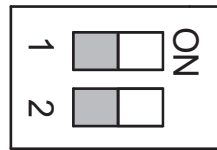




Figure 2.12 DIP Switch

S/W No	Status	Description
1	ON	Enables Power Alarm.
	OFF	Disable Power Alarm.
2	ON	Enables LFP.
	OFF	Disables LFP.

Link Fault Pass-Through (DIP switch 2): When LFP is enabled, allowing UTP link failures to be reported to the fiber side and also allows Fiber link failures to be reported to the UTP side. Therefore, a link loss forwarding feature is provided in both UTP and Fiber side.

Note!  When SW 2 is on, once the fiber or UTP/STP cable is disconnected, the LNK/ACT LED off. When the cable is reconnected, the LNK/ACT LED blinks for 2 ~ 6 seconds which means the connection recovers from failure.

Note!  Please don't change the DIP switch setting when UTP or fiber port is transmitting or receiving data. It may cause some data error. Besides, if you change the DIP switch setting, please power off the converter and power on again to make the setting effective.

2.2.3 SFP Connection

EKI-2741FI has one SFP slot for connecting to the network segment with single or multi-mode fiber. You can choose appropriate mini-GBIC module to plug into the slot. Make sure the module is aligned correctly and then slide the module into the SFP slot until a click is heard. You can use proper multi-mode or single-mode fiber according to the used SFP module. With fiber optic, it transmits speed up to 1000 Mbps and you can prevent noise interference from the system and transmission distance up to 110 km, depending on the mini-GBIC module.

Also, if you insert the 100Mbps SFP transceiver into the SFP module even without a fiber connection to the remote, the connection of the accompanying copper port will link down immediately.

2.2.3.1 Installing SFP Modules

To connect the fiber transceiver and LC cable, use the following guidelines:

1. Position the SFP transceiver with the handle on top, see the following figure.
2. Locate the triangular marking in the slot and align it with the bottom of the transceiver.
3. Insert the SFP transceiver into the slot until it clicks into place.
4. Make sure the module is seated correctly before sliding the module into the slot. A click sounds when it is locked in place.

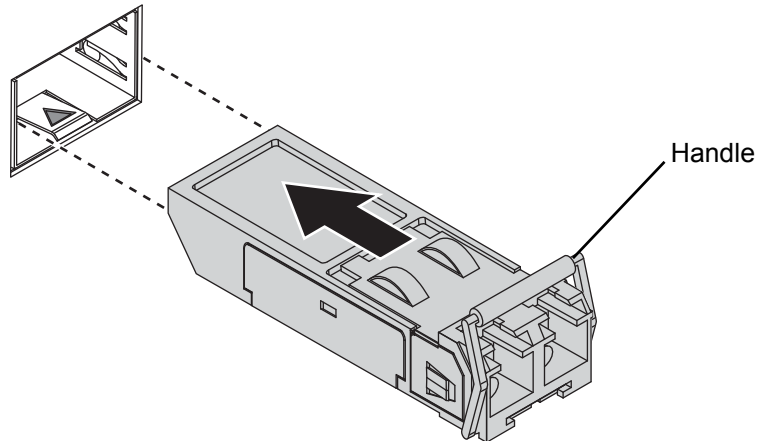


Figure 2.13 Installing an SFP Transceiver

Note! *If you are attaching fiber optic cables to the transceiver, continue with the following step. Otherwise, repeat the previous steps to install the remaining SFP transceivers in the device.*



5. Remove the protective plug from the SFP transceiver.

Note! *Do not remove the dust plug from the transceiver if you are not installing the fiber optic cable at this time. The dust plug protects hardware from dust contamination.*



6. Insert the fiber cable into the transceiver. The connector snaps into place and locks.

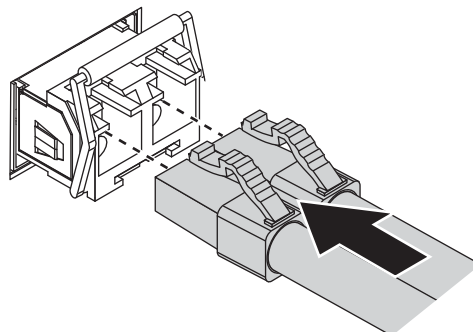


Figure 2.14 Attaching a Fiber Optic Cable to a Transceiver

7. Repeat the previous procedures to install any additional SFP transceivers in the device.
The fiber port is now setup.

2.2.3.2 Removing SFP Modules

To disconnect an LC connector, use the following guidelines:

1. Press down and hold the locking clips on the upper side of the optic cable.
2. Pull the optic cable out to release it from the transceiver.

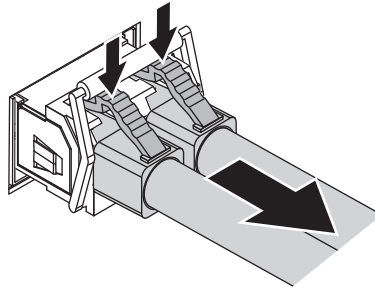


Figure 2.15 Removing a Fiber Optic Cable to a Transceiver

3. Hold the handle on the transceiver and pull the transceiver out of the slot.

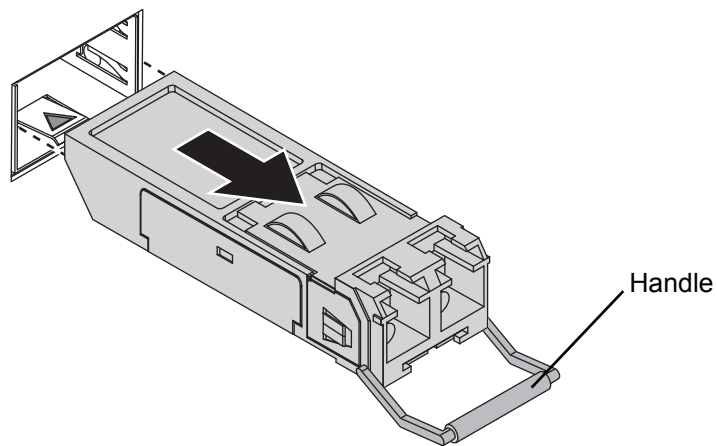


Figure 2.16 Removing an SFP Transceiver

Note! Replace the dust plug on the slot if you are not installing a transceiver. The dust plug protects hardware from dust contamination.



2.2.4 Ethernet Connection

2.2.4.1 RJ45 Ethernet Cable Wiring

For RJ45 connectors, data-quality, twisted pair cabling (rated CAT5 or better) is recommended. The connector bodies on the RJ45 Ethernet ports are metallic and connected to the GND terminal. For best performance, use shielded cabling. Shielded cabling may be used to provide further protection.

Straight-thru Cable Wiring		Cross-over Cable Wiring	
Pin 1	Pin 1	Pin 1	Pin 3
Pin 2	Pin 2	Pin 2	Pin 6
Pin 3	Pin 3	Pin 3	Pin 1
Pin 6	Pin 6	Pin 6	Pin 2

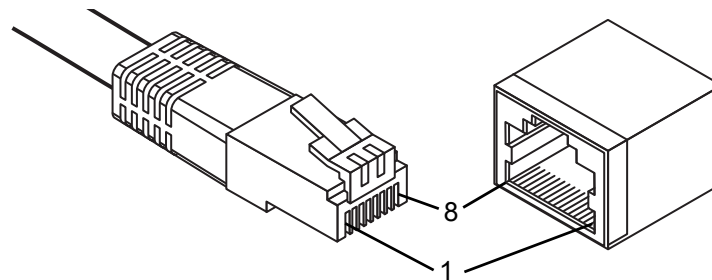


Figure 2.17 Ethernet Plug & Connector Pin Position

Maximum cable length: 100 meters (328 ft.) for 10/100/1000BaseT.

2.2.5 Fiber Connection

2.2.5.1 Fiber Cable Usage

- Twisted-pair segment can use unshielded twisted pair (UTP) or shielded twisted pair (STP) cabling. The cable between the link partner (switch, hub, workstation, etc.) and the converter, must be less than 100 meters (328 ft.) long and comply with the IEEE 802.3ab 1000Base-T standard for Category 5e or above.
- Fiber segment using single-mode connector type must use 9/125 μ m single-mode cable. You can connect two devices in the distance of 10 kilometers in full-duplex operation. For half-duplex operation, the recommended maximum distance is 412 meters (1,352 ft.).
- Fiber segment using multi-mode connector type must use 50 or 62.5/125 μ m multimode fiber cable. You can connect two devices up to a 550 meters (1,804.46 ft.) distance.

2.2.5.2 Fiber Connection

The EKI-2741LXI or EKI-2741SXI has the SC type fiber port in single mode (10Km) or multi mode (550m). When you connect the fiber port to another one, please follow the below figure to connect it. Wrong connection will not allow the port to work normally.

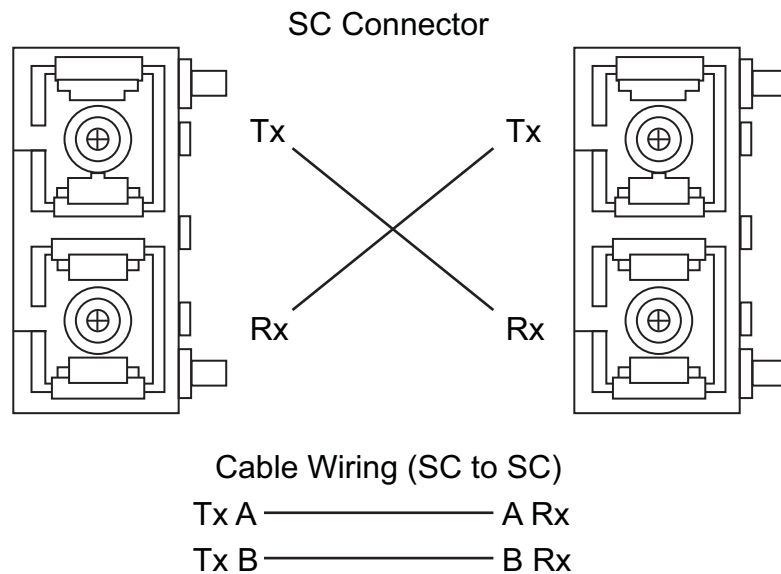


Figure 2.18 Pin Assignment of the SC Connector

Note! This is a Class 1 Laser/LED product. Don't stare into the Laser/LED Beam.



The EKI-2741LXI or EKI-2741SXI both have 1 x RJ-45 port that supports connection to 1000 Mbps Ethernet and half or full duplex operation. Both EKI-2741LXI and EKI-2741SXI can be connected to other hubs or switches through a twisted-pair straight through the cable or a crossover cable up to 100m long. The connection can be made from any TX port of the EKI-2741LXI or EKI-2741SXI (MDI-X) to another hub or switch either MDI-X or uplink MDI port.

Both EKI-2741LXI and EKI-2741SXI supports auto-crossover to make networking more easy and flexible. You can connect any RJ-45 (MDI-X) station port on the switch to any device such as a switch, bridge or router.

2.2.6 Power Connection

2.2.6.1 Overview

Warning! Power down and disconnect the power cord before servicing or wiring the serial device server.



Caution! Do not disconnect modules or cabling unless the power is first switched off.



The device only supports the voltage outlined in the type plate. Do not use any other power components except those specifically designated for the serial device server.

Caution! Disconnect the power cord before installation or cable wiring.



The EKI-2741FI/LXI/SXI supports dual 12 to 48 VDC power inputs and power-fail relay output.

The following figure illustrates a P-Fail alarm application example. The P-Fail alarm contacts are visible on the front view of the terminal block.

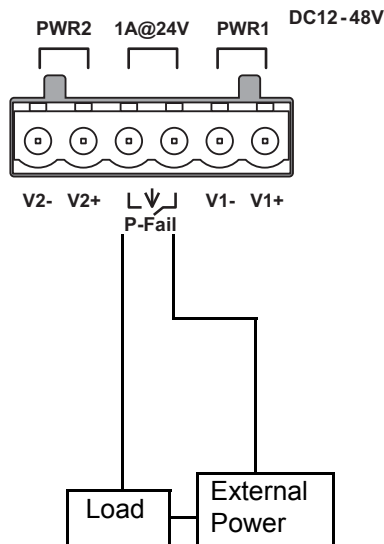


Figure 2.19 Power Wiring for EKI-2741FI/LXI/SXI

You can connect an alarm indicator, buzzer or other signaling equipment through the relay output. The relay opens if power input 1 or 2 fails. In a wiring example where an LED is connected to the relay output, the LED would be off in an Open state.

Chapter 3

Troubleshooting

3.1 Troubleshooting

1. Power Input

Verify that is using the right power cord/adaptor (+12~48 VDC), please don't use the power adaptor with DC output voltage higher than 48V, or it will burn this converter down.

2. Cable

Select the proper UTP/Fiber cable to construct your network. The single-mode converter must use single-mode fiber cable. Please check that you are using the right cable.

3. DIP Switch

Check the configuration DIP switch. It must be setting in the same operation mode with the link partner.

4. Diagnosing LED Indicators

The switch can be easily monitored through panel indicators, which describes common problems user may encounter and where user can find possible solutions, to assist in identifying.

If the power indicator does not light up when the power cord is plugged in, user may have a problem with power cord. Then check for loose power connections, power losses or surges at power outlet. If user still cannot resolve the problem, contact the local dealer for assistance.

If the Industrial switch LED indicators are normal and the connected cables are correct but the packets still cannot transmit, please check your system's Ethernet devices configuration or status.

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