

**EKI-2728**

**8-port Industrial Unmanaged  
Gigabit Ethernet Switch**

**User Manual**

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2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

## **Declaration of Conformity**

### **CE**

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.

### **FCC Class A**

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.

## **Technical Support and Assistance**

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

## Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User's Manual for later reference.
3. Disconnect this equipment from any AC 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:
  - a. The power cord or plug is damaged.
  - b. Liquid has penetrated into the equipment.
  - c. The equipment has been exposed to moisture.
  - d. The equipment does not work well, or you cannot get it to work according to the user's manual.
  - e. The equipment has been dropped and damaged.
  - f. The equipment has obvious signs of breakage.
15. **DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -40°C (-40°F) OR ABOVE 85°C (185°F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.**

## **Safety Precaution - Static Electricity**

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

1. 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.
2. 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.

# Contents

|                   |   |           |
|-------------------|---|-----------|
| <b>Chapter 1</b>  | <b>Overview</b>                                   | <b>2</b>  |
| 1.1               | Introduction                                      | 2         |
| 1.1.1             | High-Speed Transmissions                          | 2         |
| 1.1.2             | Dual Power Input                                  | 2         |
| 1.1.3             | Flexible Mounting                                 | 2         |
| 1.1.4             | Advanced Protection                               | 2         |
| 1.1.5             | Wide Operating Temperature                        | 2         |
| 1.1.6             | Easy Troubleshooting                              | 2         |
| 1.2               | Features  | 3         |
| 1.3               | Specification                                     | 4         |
| 1.4               | Packing List                                      | 6         |
| 1.5               | Safety Precaution                                 | 6         |
| <b>Chapter 2</b>  | <b>Installation</b>                               | <b>8</b>  |
| 2.1               | LED Indicators                                    | 8         |
|                   | Table 2.1: EKI-2728 LED Definition                | 8         |
| 2.2               | Dimensions (units: mm)                            | 9         |
|                   | Figure 2.1: Front View of EKI-2728                | 9         |
|                   | Figure 2.2: Side View of EKI-2728                 | 10        |
|                   | Figure 2.3: Rear View of EKI-2728                 | 11        |
|                   | Figure 2.4: Top View of EKI-2728                  | 12        |
| 2.3               | Mounting  | 13        |
| 2.3.1             | Wall mounting                                     | 13        |
|                   | Figure 2.5: Combine the Metal Mounting Kit        | 13        |
| 2.3.2             | DIN-rail Mounting                                 | 14        |
|                   | Figure 2.6: Installation to DIN-rail Step 1       | 14        |
|                   | Figure 2.7: Installation to DIN-rail Step 2       | 15        |
| 2.4               | Network Connection                                | 16        |
| 2.5               | Power Connection                                  | 16        |
|                   | Figure 2.8: Pin Assignment of the Power Connector | 16        |
| <b>Chapter 3</b>  | <b>Troubleshooting</b>                            | <b>18</b> |
| <b>Appendix A</b> | <b>Pin Assignment &amp; Wiring</b>                | <b>20</b> |
|                   | Figure A.1: RJ-45 Pin Assignment                  | 20        |
|                   | Figure A.2: EIA/TIA-568B                          | 20        |
|                   | Figure A.2: EIA/TIA-568A                          | 20        |





## Overview

Sections include:

- Introduction
- Features
- Specifications
- Packing List
- Safety Precaution

# Chapter 1 Overview

## 1.1 Introduction

---

The EKI-2728 is a full industrial Gigabit Ethernet switch. Featuring 8 x 10/100/1000Base-TX ports, the EKI-2728 is designed not only to handle data intensive applications, but by also featuring the "Jumbo Frames" function with an MTU (Maximum Transmission Unit) up to 9Kbytes in one frame, the EKI-2728 can handle voice, video, and even large multimedia transmissions at Gigabit high speeds.

### 1.1.1 High-Speed Transmissions

The EKI-2728 includes a switch controller that can automatically sense transmission speeds (10/100/1000 Mbps). The RJ-45 interface can also be auto-detected, so MDI or MDI-X is automatically selected and a crossover cable is not required. All Ethernet ports have memory buffers that support the store-and-forward mechanism. This assures that data is properly transmitted.

### 1.1.2 Dual Power Input

EKI-2728 redundant power input design is with power reserve protection to prevent the switch device broken by wrong power wiring. When one of power input is fail, P-Fail LED will turn on and send an alarm through a relay output for notifying user.

### 1.1.3 Flexible Mounting

EKI-2728 is compact (37 x 140 x 95 mm) and can be mounted on a DIN-rail or a panel, so it is suitable for any space-constrained environment.

### 1.1.4 Advanced Protection

EKI-2728 supports up to 3,000 VDC surge protection for power line, and also supports 4,000V ESD for Ethernet ports. With these 2 strong protections, it can secure equipment against unregulated voltage and make systems safer and more reliable. Further, EKI-2728 provides currency overload protection with a resettable fuse to ensure that the device component won't be damaged by overload current.

### 1.1.5 Wide Operating Temperature

The operating temperature of the EKI-2728 is between -10 ~ 60 °C. With such a wide range, you can use the EKI-2728 in some of the harshest industrial environments that exist.

### 1.1.6 Easy Troubleshooting

LED indicators make troubleshooting quick and easy. Each 10/100/1000Base-TX port has 2 LEDs that display the link status, transmission speed and collision status. Also the three power indicators P1, P2 and P-Fail help you diagnose the status immediately.

## 1.2 Features

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- Provides 8 Gigabit Ethernet ports with Auto Negotiation
- Supports 10/100/1000Mbps Auto Negotiation
- Supports jumbo frame transmission up to 9Kbytes
- Provides surge (EFT) protection 3,000 V<sub>DC</sub> for power line
- Supports 4,000 V<sub>DC</sub> Ethernet ESD protection
- Provides Slim size, DIN-rail with IP30 metal mechanism
- Supports Redundant 12 ~ 48 V<sub>DC</sub> power input and P-Fail Relay
- Supports operating temperature between -10 ~ 60°C

## 1.3 Specification

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### Communications

|                              |   |
|------------------------------|---|
| <b>Standard LAN</b>          | IEEE 802.3, 802.3u, 802.3x, 802.3ab<br>10/100/1000Base-TX |
| <b>Transmission Distance</b> | Up to 100m (4-wire Cat.5e, Cat 6 RJ-45 cable)             |
| <b>Transmission Speed</b>    | Up to 1000Mbps  |

### Interface

|                       |   |
|-----------------------|---|
| <b>Connectors</b>     | 8 x RJ-45<br>6-pin removable screw terminal (power & relay) |
| <b>LED Indicators</b> | Unit: P1, P2, P-Fail<br>10/100/1000TX: Link/Active, 1000M   |

### Power

|                          |   |
|--------------------------|---|
| <b>Power Consumption</b> | Max. 7.79W                              |
| <b>Power Input</b>       | 2 x Unregulated 12 ~ 48 V <sub>DC</sub> |
| <b>Fault Output</b>      | 1 Relay Output                          |

### Mechanism

|                           |  |
|---------------------------|--|
| <b>Dimensions (WxHxD)</b> | 37 x 140 x 95 mm                           |
| <b>Enclosure</b>          | IP30, Metal shell with solid mounting kits |
| <b>Mounting</b>           | DIN-rail, Wall                             |

### Protection

|                              |                                |
|------------------------------|--------------------------------|
| <b>ESD (Ethernet)</b>        | 4,000 V <sub>DC</sub>          |
| <b>Surge (EFT for power)</b> | 3,000 V <sub>DC</sub>          |
| <b>Power Reverse</b>         | Present                        |
| <b>Overload</b>              | 1.6A@12V <sub>DC</sub> (25 °C) |

### Environment

|                              |                           |
|------------------------------|---------------------------|
| <b>Operating Temperature</b> | -10 ~ 60 °C (14 ~ 140°F)  |
| <b>Operating Humidity</b>    | 5 ~ 95% (non-condensing)  |
| <b>Storage Temperature</b>   | -40 ~ 85 °C (-40 ~ 185°F) |
| <b>Storage Humidity</b>      | 0 ~ 95% (non-condensing)  |
| <b>MTBF</b>                  | 607,008 hrs               |

## Certifications

### **Safety EMC**

UL, 60950-1, CAN/CSA-C22.2 No.60950

U.S.A.: FCC Part 15 CISPR 22

EU: EN55011, EN61000-6-4

EN55022, Class A,

EN61000-3-2/3

EN55024

IEC61000-4-2/3/4/5/6/8/11/12

EN61000-6-2

### **Freefall Shock Vibration**

IEC60068-2-32

IEC60068-2-27

IEC60068-2-6

## 1.4 Packing List

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- 1 x EKI-2728 Industrial Ethernet Switch
- 1 x eAutomation Industrial Communication CD-ROM with software, and User manual
- 2 x Wall Mounting Bracket and Screws
- 1 x DIN-rail Mounting Bracket and Screws
- 1 x EKI-2728 Startup Manual
- 1 x DC Jack Cable  $\phi$  2.0/150mm

## 1.5 Safety Precaution

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*Attention*    *IF DC voltage is supplied by an external circuit, please use a protection device on the power supply input.*

## **Installation**

Sections include:

- LED Indicators
- Dimensions
- Mounting
- Network Connection
- Power Connection

## Chapter 2 Installation

In this chapter, you will be given an overview of the EKI-2728 hardware installation procedures.

### 2.1 LED Indicators

---

There are few LEDs display the power status and network status located on the front panel of EKI-2728, each of them has their own specific meaning as below table.

| <i>Table 2.1: EKI-2728 LED Definition</i> |       |             |  |
|---|-------|-------------|--|
| LED                                       | Color | Description |  |
| P1  | Green | On          | Power input 1 is active                                      |
|   |       | Off         | Power input 1 is inactive                                    |
| P2  | Green | On          | Power input 2 is active                                      |
|   |       | Off         | Power input 2 is inactive                                    |
| P-Fail                                    | Red   | On          | Power input 1 or 2 is inactive                               |
|   |       | Off         | Power input 1 and 2 are both active, or no power input       |
| 1~8 (Upper LED)                           | Green | On          | Connected to network   |
|   |       | Flashing    | Networking is active   |
|   |       | Off         | Not connected to network                                     |
| 1~8 (Lower LED)                           | Green | On          | Connected to network at speed of 1000Mbps                    |
|   |       | Off         | Not connected to network or not working at speed of 1000Mbps |



## 2.2 Dimensions (units: mm)

---

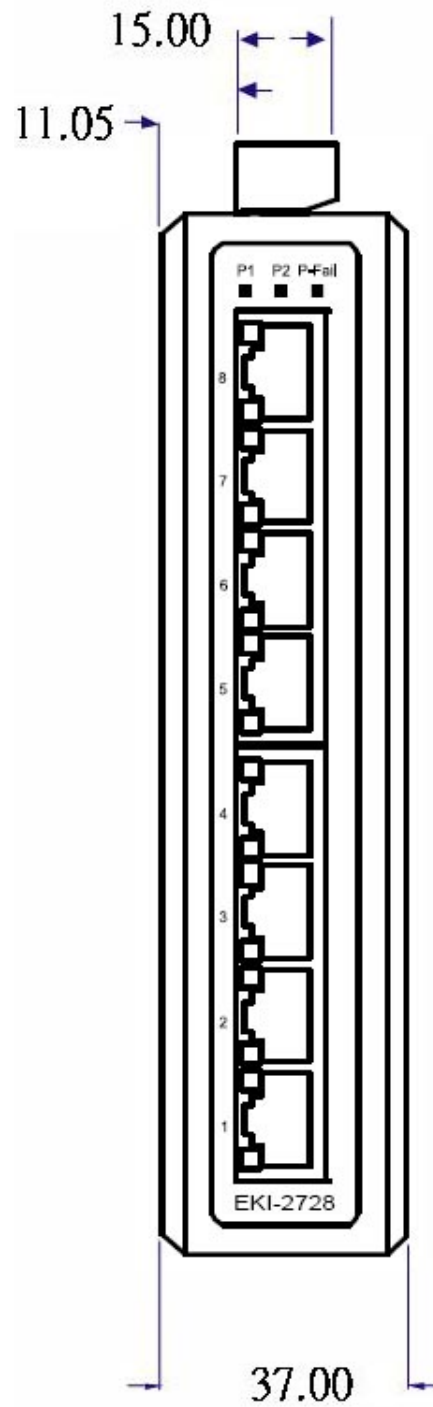


Figure 2.1: Front View of EKI-2728

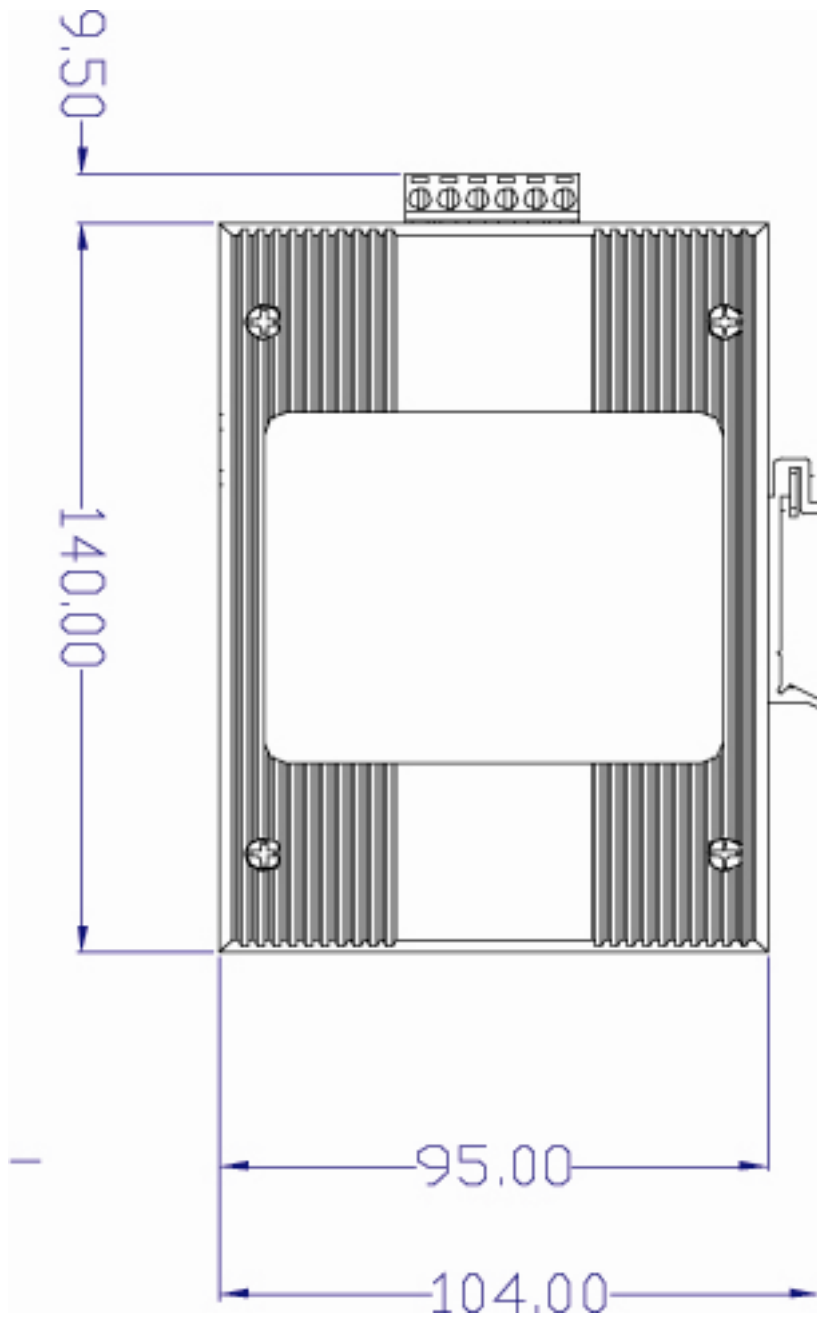


Figure 2.2: Side View of EKI-2728

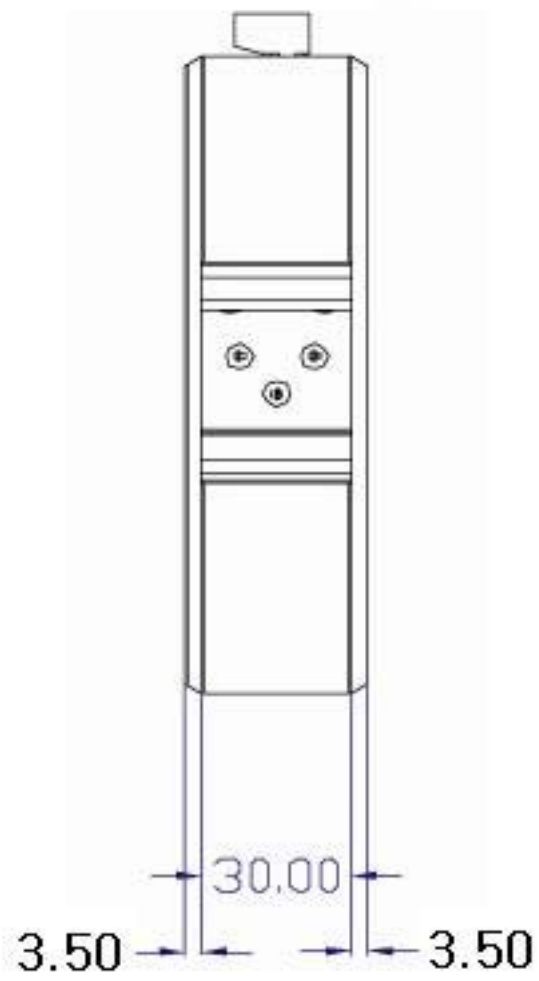


Figure 2.3: Rear View of EKI-2728

The power & relay terminal block is located on the top. Please refer to page 16 for pin assignment.

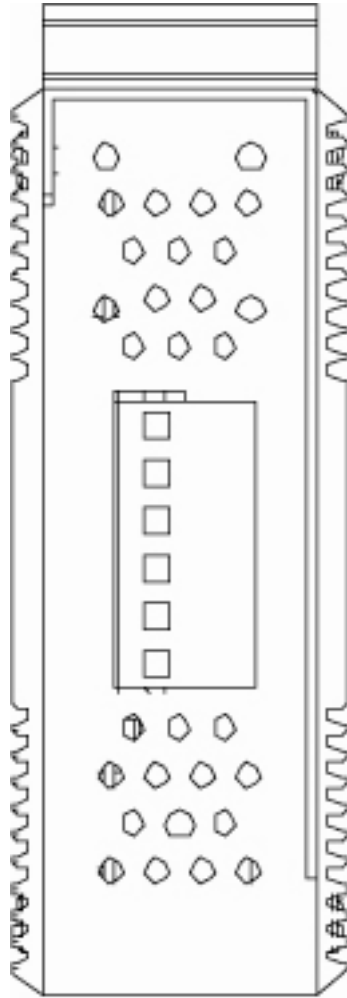


Figure 2.4: Top View of EKI-2728

## 2.3 Mounting

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The EKI-2728 supports two mounting methods: DIN-rail & Wall.

### 2.3.1 Wall mounting

EKI-2728 can be wall-mounted by using the included mounting kit. Then, hang on the EKI-2728 to the nails on the wall.

First, use the screws included in the package to combine the EKI-2728 and metal mounting kit. And then you can install the device firmly via the components, please see Figure 2.5 as below.



Figure 2.5: Combine the Metal Mounting Kit

### 2.3.2 DIN-rail Mounting

You can also mount EKI-2728 on a standard DIN-rail by the steps below.

The DIN-rail kit is screwed on the industrial switch when out of factory. If the DIN-rail kit is not screwed on the industrial switch, please screw the DIN-rail kit on the switch first.

First, hang the EKI-2728 to the DIN-rail with angle of inclination. See figure 2.6.



*Figure 2.6: Installation to DIN-rail Step 1*

Then, let the device down straight to slide over the rail smoothly. See Figure 2.7



*Figure 2.7: Installation to DIN-rail Step 2*

## 2.4 Network Connection

---

The EKI-2728 has 8 x RJ-45 ports that support connection to 10 Mbps Ethernet, 100 Mbps Fast Ethernet, or 1000 Mbps Gigabit Ethernet, and half or full duplex operation. EKI-2728 can be connected to other hubs/switches through a twisted-pair straight-through cable or a crossover cable up to 100m long. The connection can be made from any TX port of the EKI-2728 (MDI-X) to another hub or switch either MDI-X or uplink MDI port.

The EKI-2728 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.

## 2.5 Power Connection

---

The EKI-2728 supports dual +12 ~ 48 V<sub>DC</sub> power inputs and power-fail relay output.

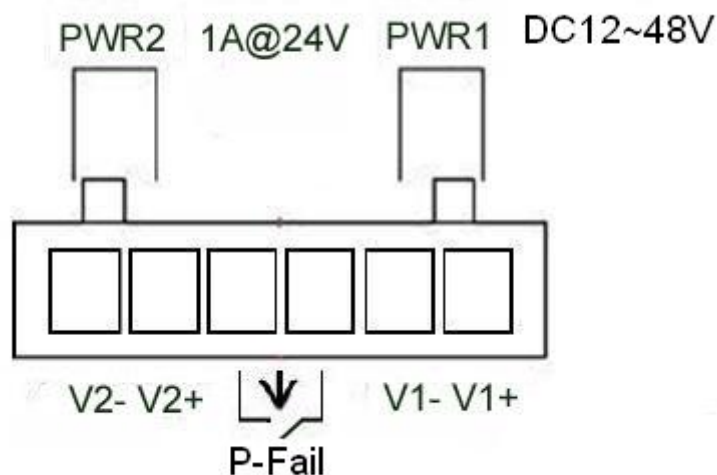


Figure 2.8: Pin Assignment of the Power Connector

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 ('Open' means if you connect relay output with an LED, the light would be off).



CHAPTER  
**3**

**Troubleshooting**

## Chapter 3 Troubleshooting

### 1. Power Input

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

### 2. Cable

Select the proper UTP/STP cable to construct your network. Please check that you are using the right cable. Use Unshielded Twisted-Pair (UTP) or Shielded Twisted-Pair (STP) cable for RJ-45 connections: 100 Category 3, 4 or 5 cable for 10 Mbps connections, 100 Category 5 cable for 100 Mbps, or 100 Category 5e/above cable for 1000Mbps connections. Also, be sure that the length of any twisted-pair connection does not exceed 100 meters (328 feet).

### 3. 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 problems.

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.

**APPENDIX  
A**

**Pin Assignment & Wiring**

# Appendix A Pin Assignment & Wiring

It is suggested to adopt ELA/TIA as the wiring of the RJ-45.

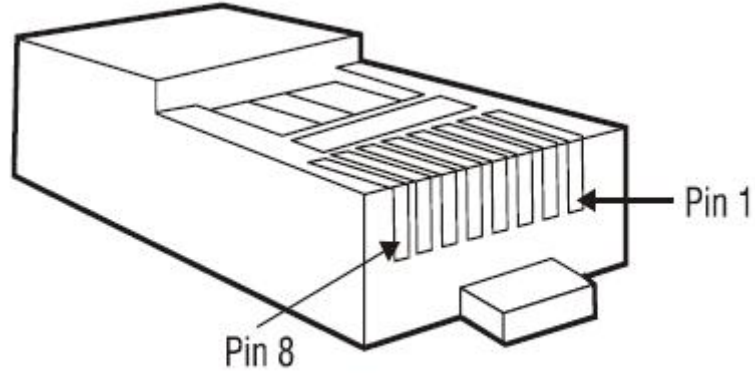


Figure A.1: RJ-45 Pin Assignment

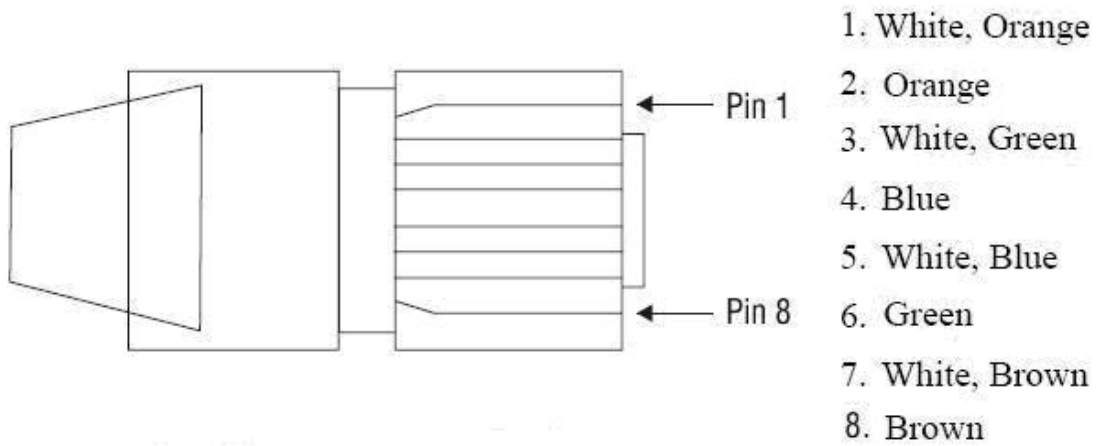


Figure A.2: EIA/TIA-568B

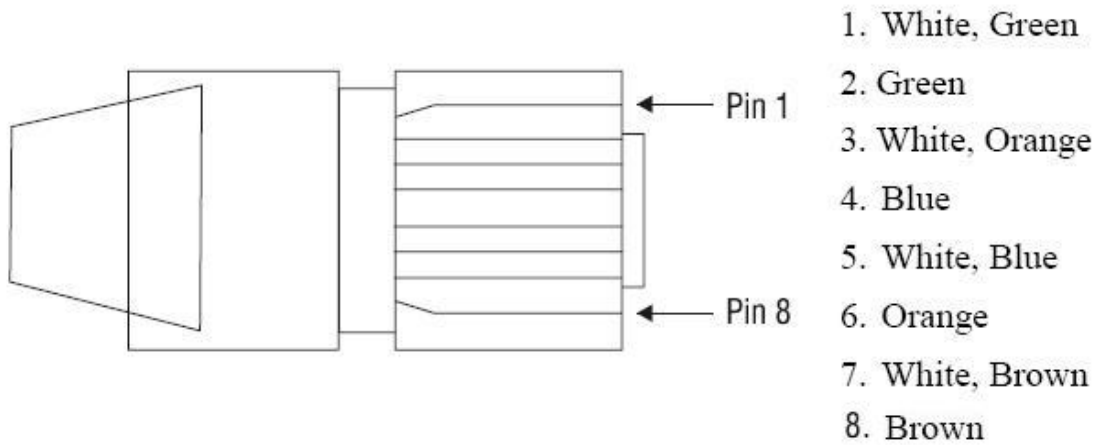


Figure A.2: EIA/TIA-568A