

# **KIEN1000-PSE Industrial Ethernet Switch**

## **User's Manual**

**KYLAND Telecom Technology Co., Ltd.**

# KIEN1000-PSE Industrial Ethernet Switch User's Manual

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# Preface

KIEN1000-PSE is a PoE-enabled PSE ( Power Source Equipment ) industrial Ethernet switch specially designed for industrial applications. Its high-performance switching engine, rugged chassis, ribbed fanless heat dissipation casing, protection against over-current, over-voltage and EMC protection enables it to work well in harsh environment. The redundancy of power supply ensures high reliability of the system.

The *User's Manual for KIEN1000-PSE0 Industrial Ethernet Switches* mainly introduces technological theory, performance indexes, mounting and testing of KIEN1000-PSE industrial Ethernet switches for user's reference on system opening, expansion and routine maintenance. It is also applicable to training to users and study of related technicians. It is a practical book for users to know and understand KIEN1000-PSE industrial Ethernet switches.

This Manual mainly includes the following:

The Chapter 1: system overview

The Chapter 2: performance

The Chapter 3: hardware structure;

The Chapter 4: hardware mounting;

The Chapter 5: testing methods.

The Chapter 6: networking and system configuration

Appendix A Twisted-pair and Pin Assignment Rules

Appendix B Glossary

# Safety Notices

These products have good and reliable performance in designed use range. But man-made damages to the switch shall be avoided.

- Read this Manual thoroughly and keep it well for future reference.
- Do not place the switch at where is close water source or dampness.
- Place power cables at where cannot be touched and do not place any stuff on power cables.
- Do not tie or wrap power cables to prevent fire.
- Fasten power connectors and connectors of other units tightly and check them often.

In case of following instances, disconnect power immediately and contact us.

1. water into the switch;
  2. switch is damaged due to falling or cases are broken;
  3. switch has abnormal running or completely changes its performance;
  4. the switch gives off odor, smoke or noise.
- Please note cleanness of the switch. If necessary, wipe it with soft cotton cloth.
  - Do not repair it by yourself except clear instruction in this Manual.

---

## Explanations on Warning Marks:

This Manual uses following two kinds of conspicuous warning marks to remind users in operating:



Warning: please give enough attention to explanations behind these marks. Inappropriate operations can cause severe damages of the switch and operators.



Careful, note, warning, dangerous: remind you to note explanations behind these marks.

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# Chapter 1 System Overview

## 1.1 Product Overview

KIEN1000-PSE is a PoE-enabled PSE ( Power Source Equipment ) industrial Ethernet switch specially designed for industrial applications. Its high-performance switching engine, rugged chassis, ribbed fanless heat dissipation casing, protection against over-current, over-voltage and EMC protection enables it to work well in harsh environment. The redundancy of power supply ensures high reliability of the system.

KIEN1000-PSE can be installed in two ways: DIN-Rail and Wall-mounting. The front panel of the switch offers 8-port 10/100Base-T/TX which is power sourcing. Each of the RJ45 ports is able to source DC24V power supply to offer max 300Ma current for remote Ethernet devices or PD (powered devices) switches. Each RJ45 port is adaptive to be configured to 10Base-T or 100Base-TX, and full-duplex/half-duplex. Auto MDI/MDI-X connection is also available.

## 1.2 System Features

### 1. High-Performance Industrial Ethernet Switches

10Base-T/100Base-TX adaptive Ethernet ports (full-duplex or half-duplex) and support automatic MDI/MDI-X connection.

Fast twisted-pair or optical fiber ring network redundant technology with recovery time less than 300ms improves reliability of system communication.

Relay terminal output of power alarm.

Broadcast storm protection.

IEEE802.3/802.U/802.3X store and forward switching mode.

Transparent transmission for VLAN Tag packages.

### 2. Industrial Power Design

Industrial DC24V (DC18V ~ 36V) power input.

Reliable protection against over current, over voltage and EMC.

Redundant power input improves system reliability.

### 3. Rugged, heavy-duty Design

Aluminum case, high-efficient heat dispersion without fan, wide range temperature of -35°C~+75°C.

IP40 protection class

DIN rail and wall mounting types for different installation conditions.

## 1.3 Packing List and Unpacking Check

### 1. Packing List

The packing box includes the following:

|   |   |
|---|---|
| KIEN1000-PSE  | 1 |
| 3-pin DC power terminal                                     | 2 |
| User's Manual of KIEN1000-PSE Industrial Ethernet Switches  | 1 |
| Customer Service Guide                                      | 1 |
| Φ 3 grounded cold pressure terminal and M3×8 grounded screw | 1 |

### 2. Unpacking Check

Before unpacking, place the box on level floor. Note direction of the packing box and ensure its face upward to prevent dropping of the switch after unpacking. If you use a hard object to prize the box, do not make this hard object go into the box too far to prevent damages to the switch.

After unpacking, count the switch, including the main machine, accessories, user's manual, customer service guide, etc, in accordance with the packing list. Check their appearance quality.



Warning :

The switch contains fine components. Please handle it softly and avoid intense vibration lest switch performance is affected.

---



# Chapter 2 Performance

## 2.1 System Specifications

The system specifications of KIEN1000-PSE industrial Ethernet switch is shown as table 2-1.

Table 2-1 System Indexes

| System Indexes          | KIEN1000-PES   |
|-------------------------|--|
| RJ45 ports              | 8 ×10Base-T/100Base-TX   |
| System parameters       | Standards: IEEE802.3、IEEE 802.3x、IEEE 802.3u<br>Store and forward rate: 148810 pps<br>Max filter rate: : 148810 pps<br>Switching mode: store and forward<br>System switching bandwidth: 4.8G<br>Electromagnetic compatibility harassment: EN55022<br>Electromagnetic compatibility immunity: EN55022-2 |
| RJ45 port               | Physical ports: RJ-45 (shielded)<br>RJ-45 ports: 10Base-T/100Base-TX ,auto-negotiation<br>Port standard: IEEE802.3<br>Feed voltage : DC24V<br>Feed current : max 300mA<br>Transmission distance: <100m   |
| Power parameters        | Input voltage: Dual ring DC24V(DC 18V ~ 36V)<br>Input consumption: <64W<br>Overcurrent protection: built-in  |
| Mechanical construction | Dimension (H x W x T): 142 mm×55.4 mm×120.5 mm, not including the size of the DIN rail and wall mounting part.<br>Installation: DIN rail or wall hanging<br>Connection mode: Service in front and power at top.<br>Weight: 1kg   |
| Ambient conditions      | Operating temperature: -35°C ~ +75°C<br>Storage/transport temperature: -45°C to +85°C<br>Relative humidity (non-condensing): 10% to 95%  |

## 2.2 Service Ports

- 1 . 8-port 10 /100Base-T/TX RJ45 are all adaptive to 10/100M or half/full duplex and support for auto MDI/MDI-X connection. Transmission distance is less than 100m.
- 2 . Each RJ45 port offers DC24V power source with 300MA max current.
- 3 . Conforms to IEEE802.3/802.3U/802.3X
- 4 . RJ45 indicating light: Yellow for rate. ON: 100M; OFF:10M
- 5 . Green for link state. ON: effective networking connection; Blinking: active networking; OFF: disconnection

## 2.3 Service Functions

KIEN1000-PSE offers such service functions as following:

### **LED Indicator**

The LEDs of the front panel indicate the port status correctly including transmission rate, link status and system status.

### **Layer-2 Switching**

Switches work in two ways: Cut-Through and Store-and-Forward. In Cut-Through, a data packet is immediately relayed further after detecting the target address; in Store-and-Forward, a data packet is first read-in completely and checked for errors before the switch relays the same. KIEN1000-PSE employs Store-and-Forward that is a switching mode widely used.

### **Power Sourcing**

Each RJ port supplies DC24V voltage and up to 300mA current to remote Ethernet instruments or PoE Powered Devices (PD).

# Chapter 3 Hardware Structure

## 3.1 System Structure

KIEN1000-PSE hardware is structured as Figure3-1

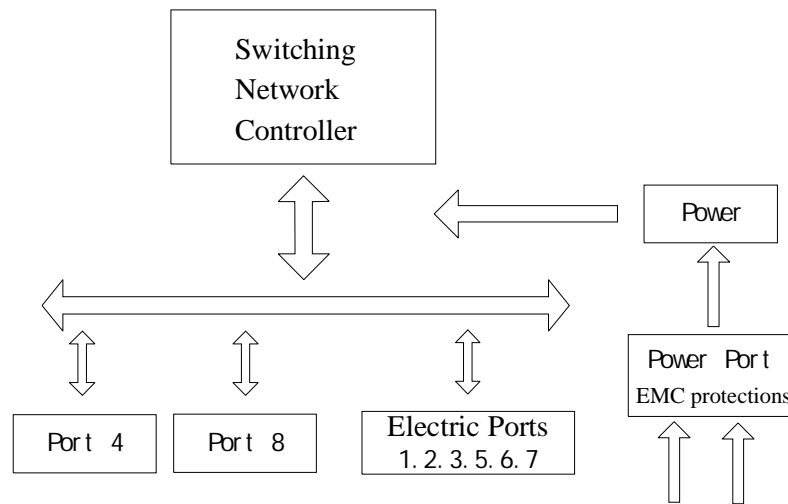


Figure 3-1 Hardware Structure

The system hardware mainly consists of the following:

- 1 . The switching network controller employs the high-performance ASIC chip technique and provides second-layer wire rate forward of data packages.
- 2 . The power adopts the industrial power and offers overcurrent, overvoltage and EMC protections.
- 3 . All Ethernet ports have EMC protections.

## **3.2 Structure of Switch**

### **3.2.1 Chassis**

The chassis of KIEN1000-PSE is structured for wall mounting or DIN rail mounting. The switch is covered completely for six sides. The left and right side plates of the switch are made of ribbed aluminum shapes and are a part of the heat dispersion system of the switch. The ribbed shape structure may increase one time the heat dispersion area. The heat generated by system is dissipated by using the single-rib shape heat dispersion in radiation and convection manners with high efficiency, greatly improving high temperature performance. It discards the traditional axial flow fan and reduces total power consumption but increases system stability. The chassis of KIEN1000-PSE is shown in the Figure 3-2:

Dimensions : 142 mm×55.4 mm×120.5 mm ( H×W×D )

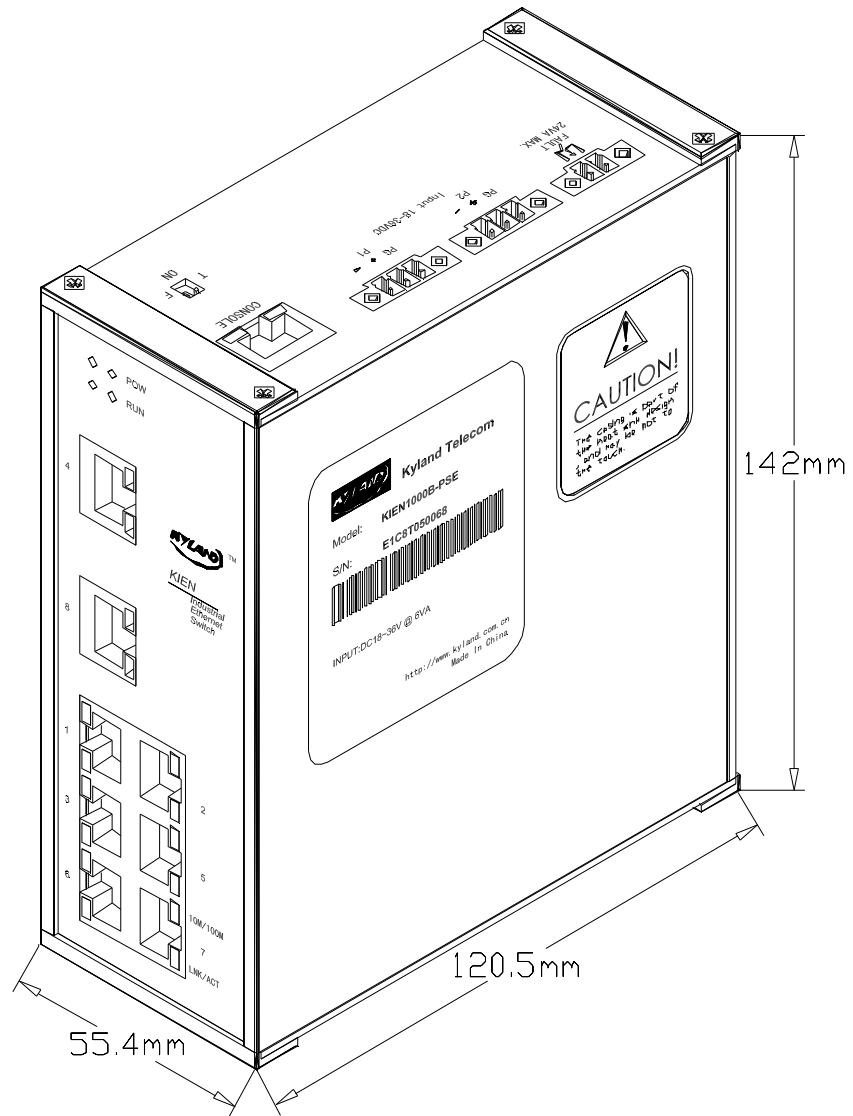


Figure 3-2 KIEN1000-PSE Chassis



**Warning :**

As a part of heat dispersion system, case is heat when it works. Do not touch the case in case of scald.

### 3.2.1 Front Panel

The front panel of KIEN1000-PSE serial industrial Ethernet switches integrates 8 10Base-T/100Base-TX Ethernet RJ45 ports, and 4 system indicators. Its structure is shown in the Figure 3-3.

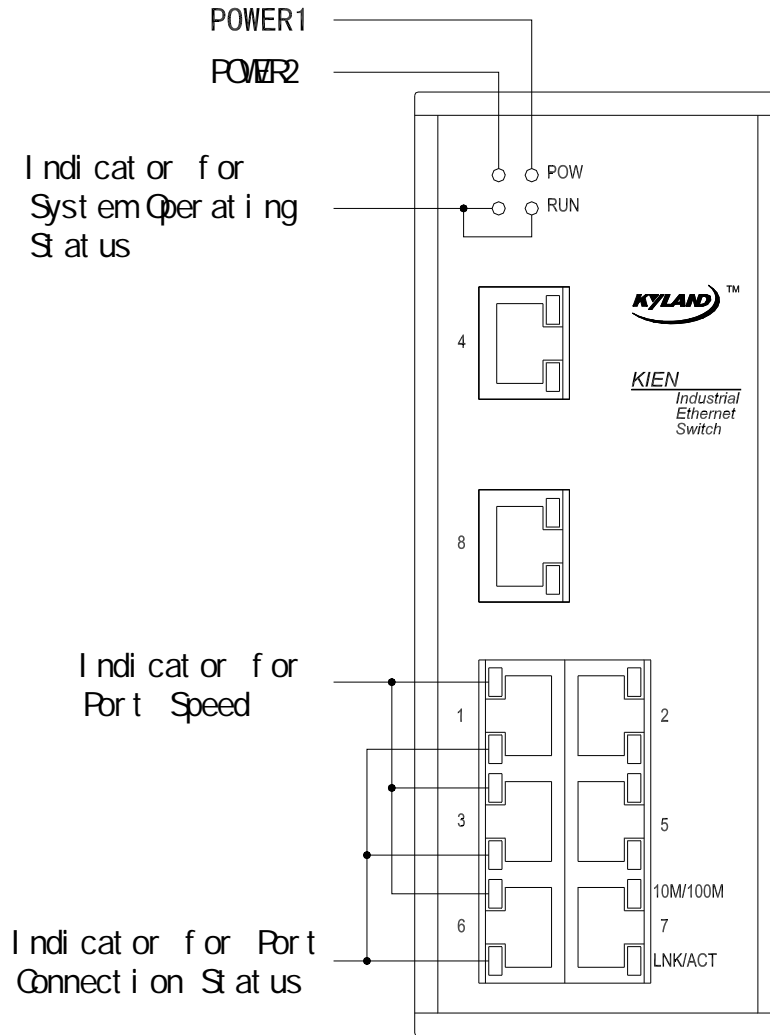


Figure 3-3 Front Panel of KIEN1000-PSE

### Ethernet RJ45 Ports

KIEN1000-PSE offers eight 10Base-T/100Base-TX Ethernet RJ45 ports with the

port number 1, 2, 3, 4, 5, 6, 7, 8. Each RJ45 port is adaptive and supports automatic MDI/MDI-X connection. With direct wires or cross wires, switches can be connected with terminals, servers, hubs, or other switches. Each port supports the IEEE802.3x adaptive function and it is able to automatically select optimal transmission mode (half-duplex or full-duplex) and rate (10Mbps or 100Mbps). If switches that connected to these ports do not support the adaptive function, these ports will transmit correct data with the default half-duplex transmission mode. Every RJ45 port has DC24V feed power output to supply remote Ethernet devices and switch at max current 300mA.

KI EN1000B-PSE  
RJ45 Connector

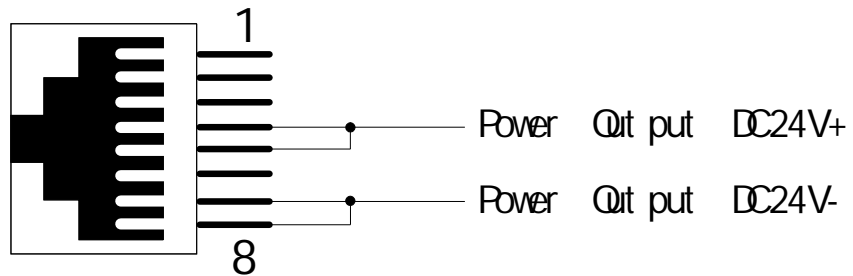


图 3-4 Wiring Diagram of Power Sourcing Output

### LED Indicators

Indicators on the front panel of KIEN1000-PSE show the status of system operation and ports to find and correct faults. The Table 3-1 shows the meanings of these LED indicators on the front panel.

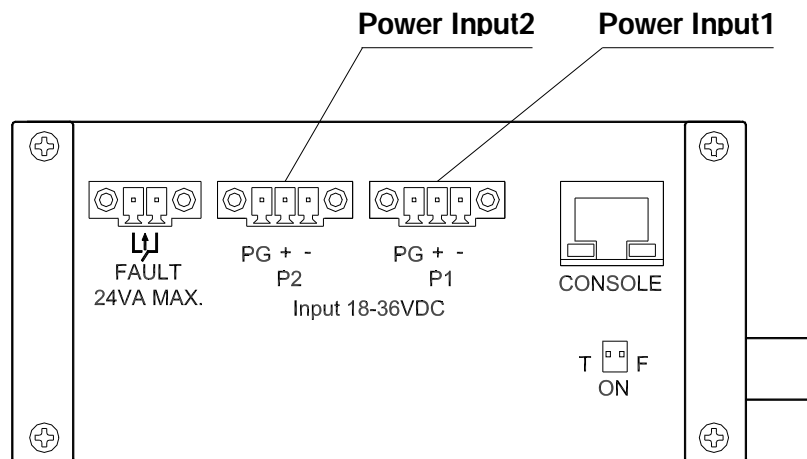
Table 3-1 Description for LED Indicators on the Front Panel of KIEN1000-PSE

| LED   | Conditions | Status                                      |
|---|------------|---|
| <b>System Status LED</b>  |            |   |
| RUN   | On         | Switch runs normally.                       |
|   | Off        | Switch runs abnormally.                     |
| POWER1  | On         | Power 1 is connected and runs normally.     |
|   | Off        | Power 1 is disconnected or runs abnormally. |
| POWER2  | On         | Power 2 is connected and runs normally.     |
|   | Off        | Power 2 is disconnected or runs abnormally. |
| <b>Status LED of Ethernet RJ45 Ports</b>  |            |   |
| Each RJ45 port has two indicators: the yellow is the indicator for port rate and the green is port link status. |            |   |
| 10M/100M<br>(Yellow)  | On         | 100M running status (i.e., 100Base-TX)      |
|   | Off        | 10M running status (i.e., 10Base-T)         |
| LINK/ACT<br>(Green)   | On         | Ports have effective network connection     |
|   | Off        | Ports have no effective network connection. |

### 3.2.2 Top Panel

The top panel of KIEN1000-PSE industrial Ethernet switch integrates two power input terminals of the redundant power system.

Figure 3-5 Top Panel Structure



KIEN1000-PSE industrial Ethernet switch has the redundant power input function. P1 and P2 are two power input terminals. Any one of them can be used



independently. Or, they can be connected with two sets of external independent DC power systems. In case that any one has failures, the switch is able to run normally, improving reliability of network running. 3-pin terminals with the space of 3.81 mm are used to connect powers and the diameter of power cables is less than 1.5mm.

Wiring is showed in the Figure 3-6. Connection and mounting steps are as follows:

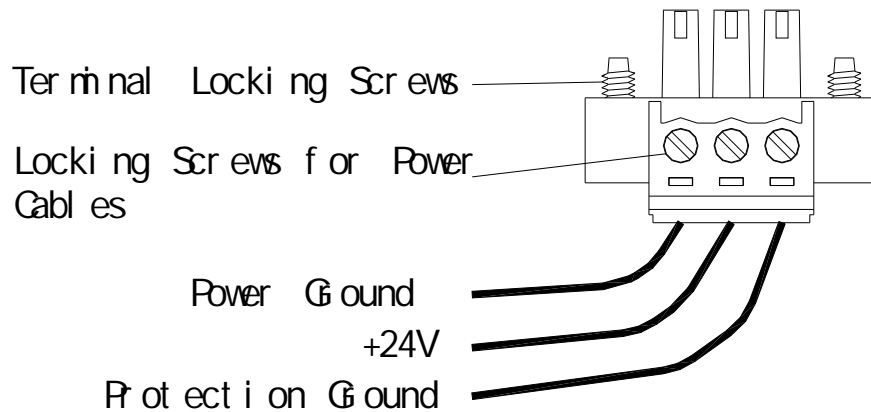


Figure 3-6 Wiring of the DC Power Terminal

- 1 . Peel off the outer skin of a length of 5mm of the power cable and twist the copper wires together.
- 2 . Screw on the “locking screws for power cables” with a 2.5mm one-slot screwdriver. Insert the power cable into holes at the tail of the terminal and screw down the “locking screws for power cables”.
- 3 . Plug the power terminal into the DC socket of the switch. Screw down two “terminal locking screws” with s 2.5mm one-slot screwdriver to make the terminal connect with the power connector tightly.

### 3.2.3 Bottom Panel

There is a grounding screw hole on the bottom panel of KIEN1000-PSE serial

industrial Ethernet switches. The M3×8 grounding screw and  $\Phi 3$  grounding cold pressure terminal are attached with the switch. As showed in the Figure 3-7, one side of the grounding wire is pressed together with the cold pressing terminal and is fixed on the grounding hole on the case with the grounding screw. Another side of the grounding wire is reliably grounded. The diameter of the grounding wire is less than 2mm.

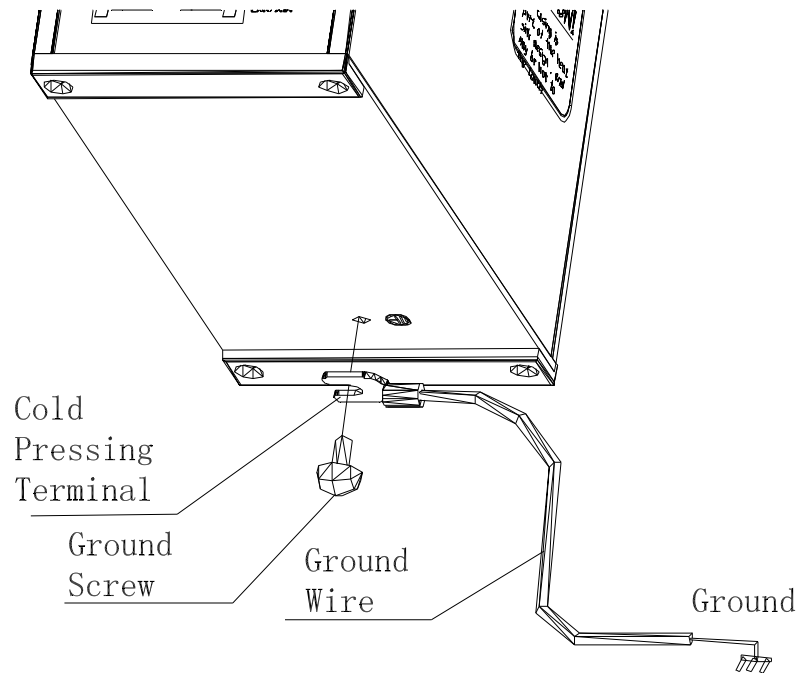


Figure 3-7 Case Grounding Method

# Chapter 4 Hardware Mounting

## 4.1 Mounting Requirements

The switch is single-body structure and can be directed locked on the standard 35mm DIN rail or is mounted on vertical walls or internal walls of the switch cabinet with the wall mounting part.

Prior to mounting of the switch, firstly confirm appropriate operating environment, including power requirements, enough space, whether is close to other network units to be connected, and whether other units are in place. Please confirm the following mounting requirements:

- 1 . Power: standard products of KIEN1000-PSE serial industrial switches use the redundant 24V (18VDC ~ 36VDC) DC power.
- 2 . Environment temperature: -35°C ~ 75°C, relative humidity 10% ~ 95%
- 3 . Grounding resistance: <math><5\Omega</math>
- 4 . Avoid direct sunshine and keep it away from heating sources or areas where have strong electromagnetic interference.
- 5 . Standard products of KIEN1000-PSE industrial Ethernet switches only provide DIN rail mounting parts. Users need to prepare DIN rails. But if the wall mounting is required, users need to purchase the wall mounting part additionally. Users must prepare screws, nuts and tools required by the wall mounting to ensure reliable mounting.
- 6 . Check existence of cables and connectors required by mounting.

### 4.1.1 DIN Rail-Type Mounting

The standard 35mm DIN rail-type mounting provides most industrial applications with convenient mounting. When you take out the switch from the packing box, you will find that the green plastic DIN rail-connecting position has already been fixed on the rear panel of KIEN1000-PSE. The Figure 4-1 shows the size of rail-type mounting. If you want to mount KIEN1000-PSE on the DIN rail, please check mounting of the DIN rail prior to mounting of the switch. The check shall mainly focus on two items below:

- 1 . Ensure the DIN rail is fixed solidly, other units are not on it, and enough space is reserved for mounting the switch.
- 2 . On the DIN rail, make sure there is power input that is suitable for operating of KIEN1000-PSE.

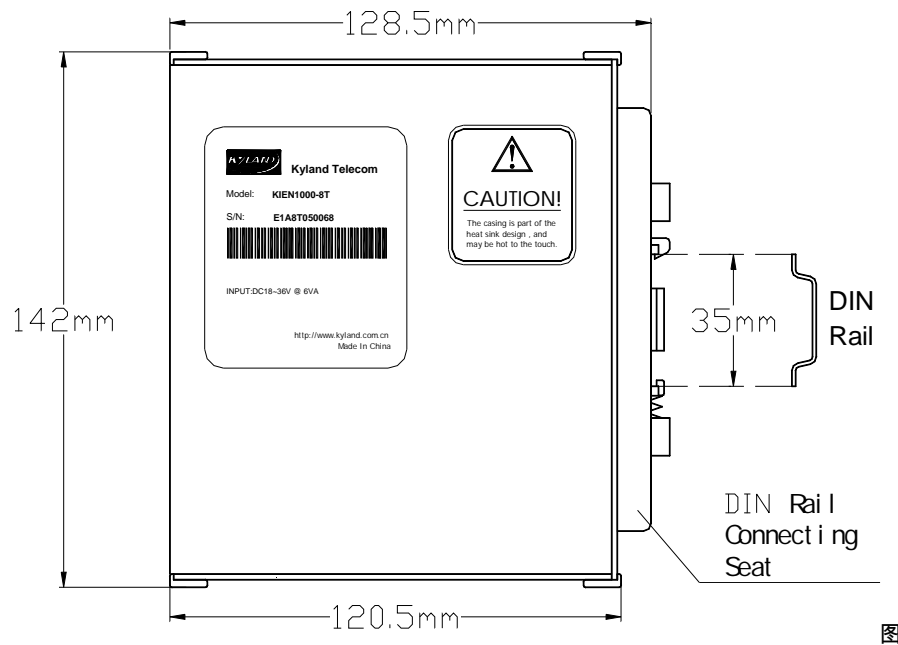


Figure 4-1 KIEN1000-PSE DIN-Rail Mounting Dimensions

After determine the mounting position of the switch, mount it on the DIN rail according to following steps:

1. As showed in the Figure 4-2a, insert the lower part of the DIN rail into the fixing slot with spring support under the rail connecting seat. Push the bottom panel of the switch upward slightly and turn it,.
2. As showed in the Figure 4-2b, lock the DIN rail into the DIN rail connecting position and confirm reliable mounting on the DIN rail of the switch.

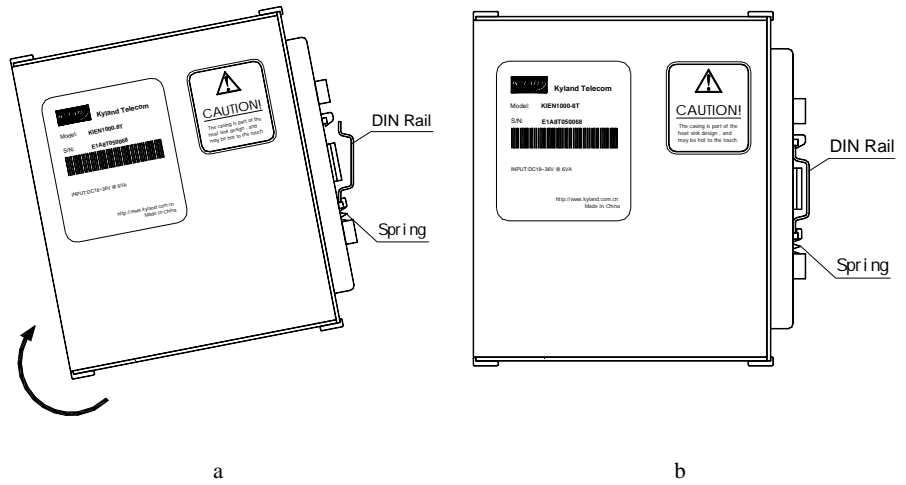


Figure 4-2 KIEN1000-PSE DIN-Rail Mounting Method

### 4.1.2 Wall Mounting

In case that DIN rail-type mounting is inconvenient, it is better to adopt wall mounting. KYLAND Telecom provides users with wall mounting boards that are mounting parts for mounting of KIENT1000-PSE industrial Ethernet switches. The size of wall mounting is showed in the Figure 4-3.

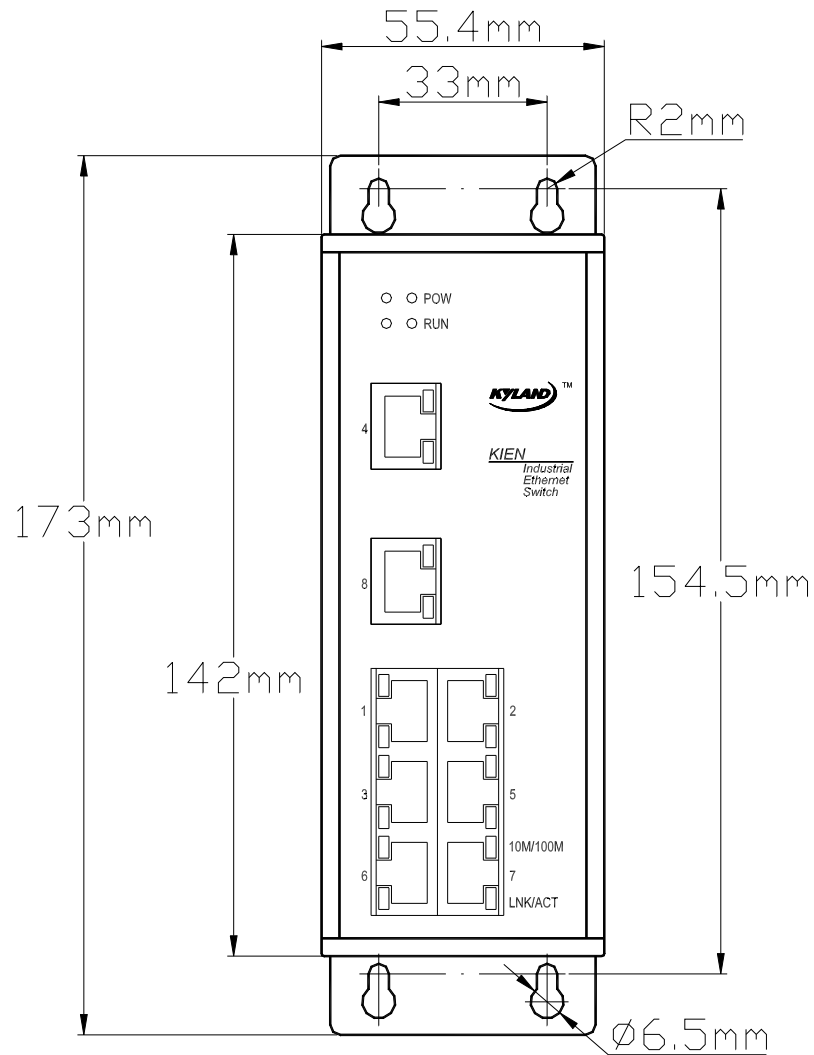


Figure 4-3 KIEN1000-PSE Wall-Mounting Dimensions



**Note:**

The wall mounting board is not contained in the standard configuration of KIEN1000-PSE serial industrial Ethernet switches. If you need it, please order it additionally when you order the switch.

The steps of wall mounting of KIEN1000-PSE serial industrial Ethernet switches are as follows:

- 1 . Unfasten two screws on the switch which is used to fix the DIN rail connecting seat with a cross head screwdriver and dismantle the green DIN rail connecting seat.
- 2 . Take out the wall mounting board and its mounting screws (M3×6 cross recessed countersunk flat head screws) from the packing box. Mount the board on the position as the DIN rail connecting seat mounting. Ensure the mounting direction of the board in accordance with the Figure 4-4.

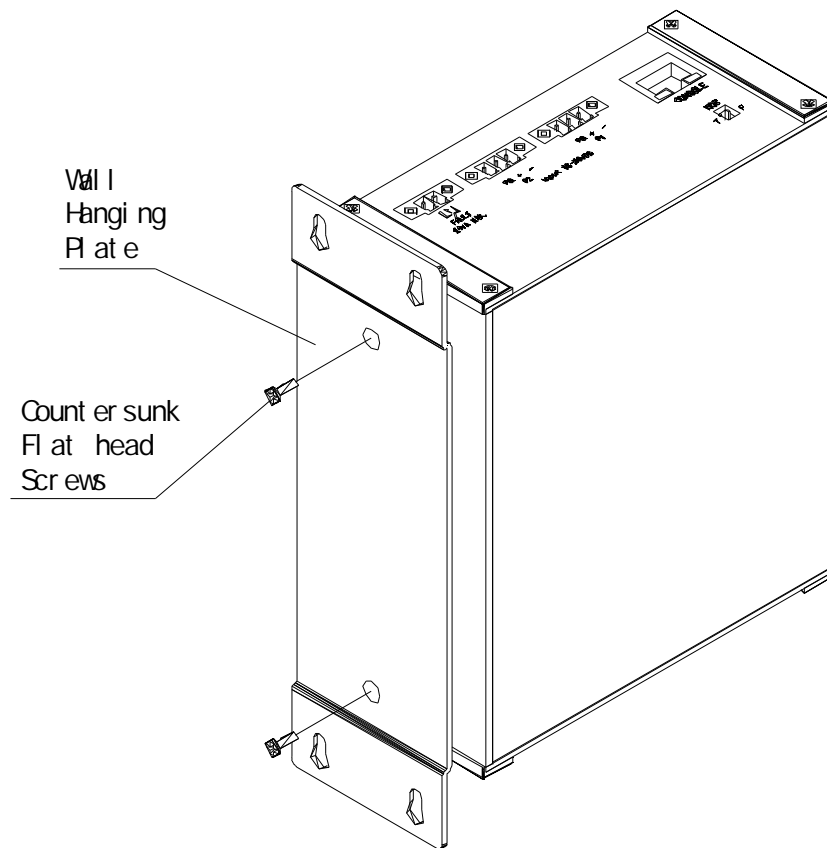


Figure 4-4 Installation of Wall Mounting Board

- 3 . Select a vertical wall or internal wall of the switch cabinet as the mounting position. If the vertical wall is selected, recommend to mount the switch with  $\Phi 6$  plastic expansion bolts and  $\Phi 3$  tapping screws. In accordance with the mounting size in the Figure 4-3, drill 4  $\Phi 6$  holes on the wall with a impact electric drill

with a depth that can completely contains the  $\Phi 6$  plastic expansion bolts. Insert the plastic expansion bolts into holes on the wall and screw the tapping screws into the plastic expansion bolts with a cross head screwdriver. But do not screw them tightly and keep a space of about 5mm. If the internal wall of the switch cabinet is selected, recommend to open 4 M3 screw holes when the switch cabinet is manufactured in accordance with the mounting size in the Figure 4-3. Or drill  $4\Phi 4$  holes with a electric portable drill on site. Screw four M3 $\times$ 10 cross recessed pan head screws into 4 holes. If the holes have no threads, mount four M3 nuts on its back. At last, do not completely screw down screws and keep a space of 5mm.

- 4 . After screws are fixed on the wall, mount the switch on the selected position and make 4 screws pass through  $4\Phi 6.5$  holes on the wall hanging plate. Slide down the switch, as showed in the Figure 4-5. Screw down 4 screws to fasten the switch on the wall or the internal wall of the switch cabinet.

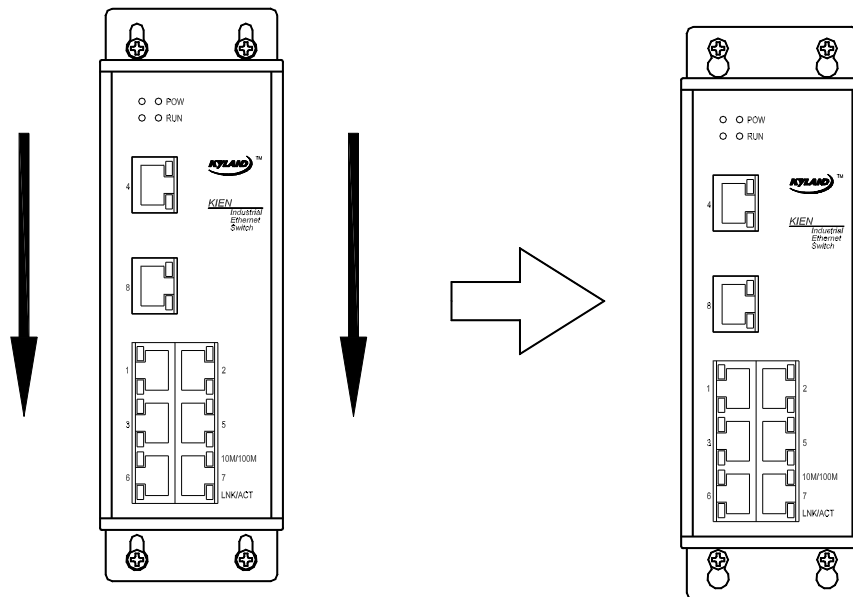


Figure 4-5 Wall Mounting Method



## 4.2 Cables Connection

After KIEN1000-PSE is mounted correctly, cable connection can be made, which mainly include cable connection of the following ports:

1 . Service Ports

KIEN1000-PSE serial industrial Ethernet switches provide 10Base-T/100Base-TX Ethernet RJ45 ports that are connected with terminals with straight-through cables and connect with network units with cross-over cables.

2 . Power Connection

KIEN1000-PSE serial industrial Ethernet switches use the 24V DC powers. After other cables are connected, power cable can be connected.

## 4.3 Cables Wiring

Wiring shall accord with following conditions:

- 1 . Prior to laying, verify accordance of the specification, model and quantity of all cables and wires with construction drawings and requirements under the contract.
- 2 . Prior to laying, check whether cables and wires are damaged and ensure they have ex-works records and quality guarantee, and other certificates that prove their quality.
- 3 . The specification, quantity, route, and position of cables and wires shall accord with design requirements under construction drawings. The laying length of each cable and wire shall be determined according to real position.
- 4 . In laying, cables and wires shall not have breaking or connectors except ends.
- 5 . User cables shall be separated from power cables.
- 6 . In walkways, cables and wires shall be laid straightly and tidily and they shall have even, smooth and straight bends.
- 7 . In wire casings, they shall be straight without overreaching casings to block holes of other cables. At exits or bends of casings, cables shall be bundled and fastened.

- 8 . When cables, power cables and earthing wires are in a casing, they shall not overlap. If they are over long, they shall be tidily coiled and placed in the middle of chutes and they shall not be placed on other cables and wires.
- 9 . Tow side of cables and wires shall have marks with simple and clear identification to facilitate maintenance.

# Chapter 5 Testing Methods

## 5.1 Self Check

When the power is connected, all service indicators on the front panel will flash one time, which means normal running of these ports. Later on, the POW indicator is on. The RUN indicator is on/flash/off according to the setting of the properties switch.

## 5.2 Testing Ethernet Ports

As shown in Figure 5-1, KIEN1000-PSE is powered up and any two Ethernet ports are connected to the uplink Ethernet ports of KIEN1000-PD (powered device) by cross-over or straight-through cables. Any port of the PD is connected to the Ethernet port of PC. Ping command is sent while they can be ping each other without packet loss. Meanwhile, the yellow light of KIEN1000-PSE should be always on and green light is blinking. All these can prove the test hardware is working normally. The same way is used for other Ethernet ports (Please refer to the example for PING command operation).

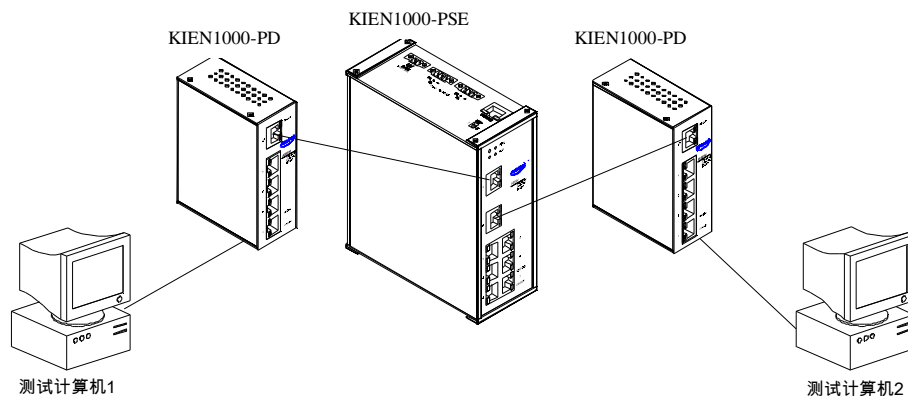


Figure 5-1 Testing Electric Ports

## An Example of the PING Command

The IP address of the testing computer 1 is 192.168.100.10 and the 2 is 192.168.100.11. On the testing computer 1, run "cmd" in the WIN2000 operating system or "command" in the WIN98/95 operating system from "Run" in the "Start" menu. Send "ping 192.168.100.11 -l 1000 -t". (-l means byte number of the sent data package; -t means continuously sending data). On the testing computer 2, run "cmd" in the WIN2000 operating system or "command" in the WIN98/95 operating system from "Run" in the "Start" menu. Send "ping 192.168.100.10 -l 1000 -t". If switches run normally, the testing computer 1 returns "Reply from 192.168.100.11 : bytes=1000 time<10ms TTL=128" and the 2 returns "Reply from 192.168.100.10 : bytes=1000 time<10ms TTL=128", and the counted package loss rate is zero checked by the CTL+C command ten minutes after running.

# Chapter 6 Networking Modes and System Configuration

## 6.1 Networking Modes

KIEN1000-PSE offers 8 power sourcing ports of 10Base-T/100Base-TX, each of whom can be connected directly to remote Ethernet devices and provides max 300MA current. It can be also connected to KIEN1000-PD (powered device) to form star topology network. It is widely used in power, transportation, energy, water and factory automation.

The typical application of KIEN1000-PSE is shown as Figure 6-1:

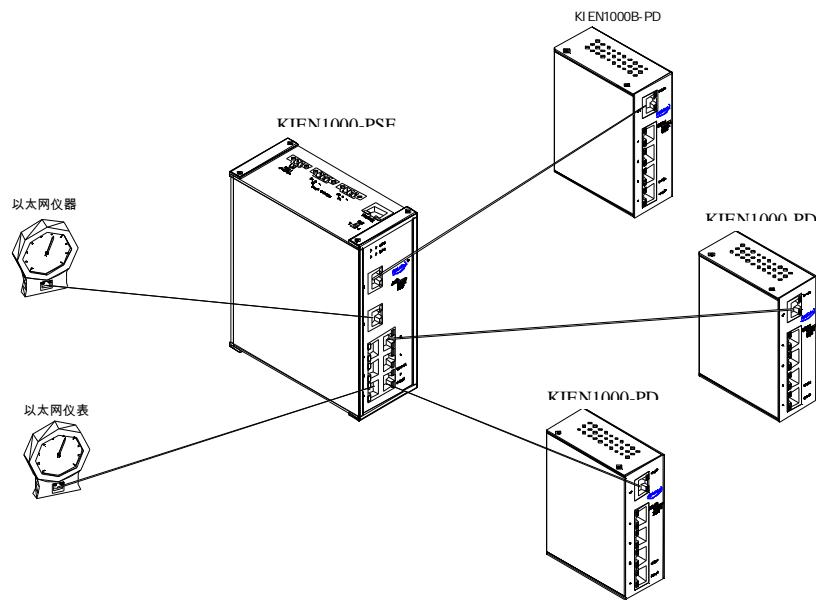


Figure 6-1 KIEN1000-PSE application

## 6.2 System Configuration

KIEN1000-PSE is structured integrative. 8 ports 10Base-T/100Base-TX are fixed. Power supply is fixed at DC24V. The detailed model and description is shown as figure 6-1:

Figure 6-1 KIEN1000-PSE Configurations

| Model        | Description                                   |
|--------------|---|
| KIEN1000-PSE | 8 x 10Base-T/100Base-TX, RJ45, power sourcing |

# Appendix A Twisted -pair and Pin Distribution

For the connection of 10Base-T/100Base-TX, the twisted-pair must have two pair cable. Each pair is distinguished with two different colors. For example, one strand is green, and the other is the alternate of green and white stripes. RJ-45 connector should be equipped at both ends of the cable.



Warning:

Don't insert a telephone plug into any RJ-45 port. Only use twisted-pair with RJ45 connectors at both ends conforming to FCC standard.

---

Fig. A-1 Shows how the connector of RJ-45 is numbered please make sure that the inserting direction is correct.

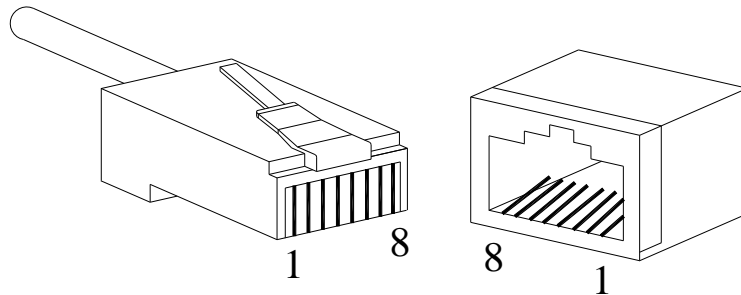


Figure A-1 Connector of RJ-45

## Pin distribution of 10Base-T/100Base-TX

Unshielded twisted- pair (UTP) or shielded twisted-pair (STP) will be used for the connection of RJ-45: for the connection of 10Mbps, category 3, 4 and 5 of 100 ohm will be used, and cat.5 of 100 ohm will be used for 100Mbps. Additionally, do make sure that the connecting length of any twisted-pair shall not exceed 100 meter.

Port of RJ-45 supports automatic MDI/MDI-X operation, PC or server may be connected with straight-through cable, or connect with other switch or hub. In

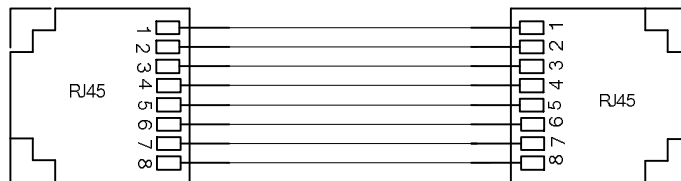
straight-through cable, pin 1, 2, 3 and 6 at one end of the cable are connected to pin 1, 2, 3 and 6 at the other end of the straight-through cable respectively. Cross-over cable must be used for switch or hub with MDI-X port. The pin distribution of 10Base-T/100Base-TX is listed in the table A-1.

Table A-1 Pin distribution of 10Base-T/100Base-TX

| Pin           | MDI-X signal name        | MDI signal name          |
|---------------|--------------------------|--------------------------|
| 1             | Receiving data + ( RD+ ) | Output data + ( TD+ )    |
| 2             | Receiving data - ( RD- ) | Output data - ( TD- )    |
| 3             | Output data + ( TD+ )    | Receiving data + ( RD+ ) |
| 6             | Output data - ( TD- )    | Receiving data - ( RD- ) |
| 4 , 5 , 7 , 8 | Unused                   | Unused                   |

Note: " + " " - " denoting cable polarity.

Definition of straight-through cable from RJ45 (8-pin) to RJ45 (8-pin)

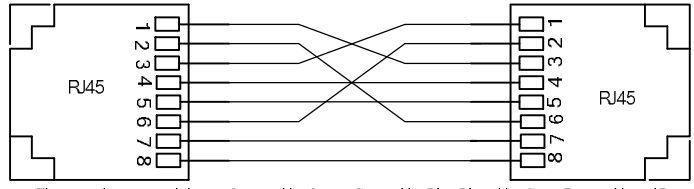


The connection sequence is in turn: Orange-white, Orange, Green-white, Blue, Blue-white, Green, Brown-white and Brown

Figure A-2 Cable sequence of straight-through cable

Definition of Cross-over cable from RJ45 (8-pin) to RJ45 (8-pin)





The connection sequence is in turn: Orange-white, Orange, Green-white, Blue, Blue-white, Green, Brown-white and Brown  
Green-white, Green, Orange-white, Blue, Blue-white, Orange, Brown-white and Brown

Figure A-3 Cable sequence of cross-over cable



## Appendix B Glossary

| Terminology     | Explanation   |
|-----------------|---|
| 10Base-T        | Twisted-pair standard of Cat3, Cat4 and Cat5 in IEEE specification for 10Mbps Ethernet  |
| 100Base-TX      | Twisted-pair standard of Cat5 or above in IEEE specification for 100Mbps Fast Ethernet  |
| 100Base-F X     | Fast Ethernet which uses one pair of multi-mode or single mode optical fiber to transmit.   |
| Adaptive        | A characteristic that is automatically configured to adaptive mode for the speed, duplex and traffic control port.  |
| Bandwidth       | The information capacity that the channel can transmit. For instance, the bandwidth of the Fast Ethernet is 100Mbps ( bit per second ) .  |
| Baud Rate       | It expresses the signaling rate which is defined as the change times of the status for the electric or optical transmission medium within 1 second.   |
| Bridge          | One of network equipments which run on the layer2 in the OSI layer7 model, and it can be connected to the LAN or network segment which uses the same protocol. It presents the automatic network address learning and network configuration function. |
| Traffic Control | It is a congestion control mechanism. The network equipment sends the data to the equipment which has overloaded and causes the port to congest. The traffic control can prevent the data packet from loss and avoid the congestion for the port.     |
| VLAN            | It is the Virtual Local Area Network, which means that it takes the network management software to establish the point to point logic network which can cross different network segment and various network on the switching LAN.                     |
| Broadcast       | One data packet is sent to all equipments on the network.   |
| Broadcast storm | Restless forward broadcast frame or multicast frame on bridge caused by the bridge ring.  |
| IGMP            | IGMP means Internet Group Multicast Protocol.   |
| Full Duplex     | Use switches to set up the point to point connection among nodes in the LAN and allow them to receive and send data packet at the same time.  |
| Half Duplex     | The communication for two nodes can only move toward one direction at the same time, but can not move toward both directions.   |
| MDI             | It is the Medium Dependent Interface, in which, one Ethernet port is taken as the receiving terminal to connect to the port of other equipment.   |
| MDI-X           | Medium Dependent Interface Cross-over   |