

KIEN8000 Industrial Ethernet Switch

User's Manual

KYLAND Telecom Technology Co., Ltd.

KIEN8000 Industrial Ethernet Switch User's Manual

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Preface

KIEN8000 is a PoE-enabled PSE (Power Source Equipment) industrial Ethernet switch with IP67 protection class 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 enable it to work well in harsh environment.

The *User's Manual for KIEN8000 Industrial Ethernet Switches* mainly introduces technological theory, performance indexes, mounting and testing of KIEN8000 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 KIEN8000 industrial Ethernet switches.

This document mainly contains following contents:

Chapter1 Overview and System Features

Chapter2 Performance Specifications and Service Functions

Chapter3 Hardware Structure

Chapter4 Installation & Mounting

Chapter5 Testing Method

Chapter6 Networking Modes and System Configuration

Appendix A Twisted-pair and Pin Distribution Rules

Appendix B Glossary

Statement: For continuous update and perfection of the product and technology, the contents of this material may not be consistent with the actual product, please contact with us about related contents. If it is necessary for you to query the latest information on the product, please query our cooperation Website or contact with your local service representative directly.

Safety Notices

This product can provide excellent and reliable performance within its design scope. However, it needs to avoid the damage or destroy by human reasons.

- Read this Manual thoroughly and keep it well for future reference.
- Do not place the equipment next to the source of water and the damp place.
- Do not place anything on the power cable. Please place it somewhere that can not be reached.
- In order to avoid fire, do not tie or pack the cable.
- The connector of the power supply and other equipment connection should be connected firmly and regularly checked.

Under following conditions, please power off and contact with our company immediately.

1. Water into equipment;
 2. Equipment is broken or the crust is cracked.
 3. The equipment works abnormally or the performance provided has changed completely.
 4. The equipment gives off odor, smoke or noise.
- Pay attention to the cleanness of the equipment and clean it with soft cotton cloth if necessary.
 - Do not repair the equipment by yourself unless it is definitely indicated in this manual.

Description of Warning Mark:

This manual uses two kinds of obvious warning marks to prompt users that more attention should be paid during operation. The meanings of these marks as follows:



Warning: The comment after this mark should be paid more attention, the incorrect operation will cause the switch to be damaged seriously or it will cause body injury for the operator.



Caution, Note, Warning and Dangerous: Prompt where more attention should be paid.

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Chapter 1: System Overview

1.1 Product Overview

KIEN8000 is a PoE-enabled PSE (Power Source Equipment) industrial Ethernet switch with IP67 protection class 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 enable it to work well in harsh environment.

KIEN8000 comes with a aluminum-made chassis of IP67 protection class. All its interface components are with IP67 protection. It offers two types of interfaces: RJ45 and M12 respectively for KIEN8000-RJ45(P) and KIEN8000-M12(P). It can be installed in two ways: DIN-Rail and Wall-mounting. KIEN8000 offers 8 ports 10Base-T/100Base-TX(power sourcing or not). The power sourcing ports can provide power supply of DC24V to remote Ethernet devices or powered devices (PD for short) at a max current of 300MA. Each Ethernet port of KIEN8000-RJ45(P) is adaptive to 10Base-T or 100Base-TX, e, it can also do auto MDI/MDI-X connection. Each Ethernet port of KIEN8000-M12(P) is fixed at 10Base-T and adaptive to half-duplex or full-duplex mode, it can be auto MDI/MDI-X connected too.

1.2 System Features

1. High-performance Industrial Ethernet Switch

10/100Base-T/TX Ethernet ports, adaptive, full/half duplex, Auto MDI/MDI-X connection.

Ethernet port can be power sourcing; sourcing-voltage: DC24V; sourcing-current: 300mA max.

Broadcasting storm Protection

Store-and-forward switching mode conforms to IEEE802.3/802.U/802.3X.

Transparent transmission of VLAN tag packet

2. Industrial Power

Industrial power input of DC24V (DC18V ~ 36V).

Reliable protection for EMC and against over-current/over-voltage.

3. Rugged Design

Ribbed heat-removal design (fanless); operation at -35° to +75°.

Solid IP67 housing.

Easy DIN-Rail mounting or optional wall-mounting.

1.3 Packing List and Unpacking Check

1. Packing List

The packing box includes the following:

KIEN8000	1
M12 power terminal	1
M12 Ethernet terminal IP67 accessories for KIEN8000-M12(P)	8
RJ45 Ethernet terminal IP67 accessories for KIEN8000-RJ45(P)	8
User's Manual of KIEN8000 Industrial Ethernet Switches	1
Customer Service Guide	1
Φ3 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 unit, 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.

Section 2: Performance Specifications

1.4 System Specifications

The system specifications of KIEN8000 industrial Ethernet switch is shown as table 2-1.

Table 2-1 System Specifications

Specs	Description
Port Type and Quantity	8 ×10Base-T/100Base-TX
System Performance	Standard: IEEE802.3、IEEE 802.3x、IEEE 802.3u Storage and forward rate: 148810 pps Maximum filtering rate: 148810 pps Switch method: Store and forward System switching bandwidth: 4.8G EMC: EN55022; EN50082-2
Ethernet Port	Physical interface: RJ-45(shielded) or M12 socket, IP67 RJ-45: 10/100Base-T/TX, auto-negotiable Standard: IEEE802.3 Transmission Distance: <100m Sourcing Voltage: DC24V Sourcing Current: Max 300mA
Power Supply	Power interface: M12 at IP67 protection class Power supply: DC24V (DC 18V ~ 36V) Consumption: <64W Over-current protection: Built-in
Mechanical Parameters	Dimension (H×W×D) : 215mm□120mm□66mm Installation: DIN-Rail or Wall-mounting Heat removal: Ribbed aluminum casing without fan Outlet: Service in front or side, power supply in front Protection class: IP67 Weight: 2kg
Ambient Conditions	Operation temperature: -35°C ~ 75°C Storage temperature: -45°C ~ 85°C Humidity: 10% ~ 100% (non-condensing)

1.5 Service Interface

- 1 . 8 Ethernet ports 10Base-T/100Base-T, each is adaptive to 10M or 100M and half-duplex or full-duplex mode. AutoMDI/MDI-X connection is supported. The transmission distance is less than 100m.
- 2 . The Ethernet port is able to source DC24V power supply with max 300MA current.
- 3 . Conform to IEEE802.3/802.3U/802.3X.

1.6 Service Functions

KIEN8000 offers such service functions as following:

1 . LED Indicator

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

2 . 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.

3 . Power Sourcing

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

Section 3: Hardware Structure

1.7 System Structure

KIEN8000 hardware is structured as Figure 3-1:

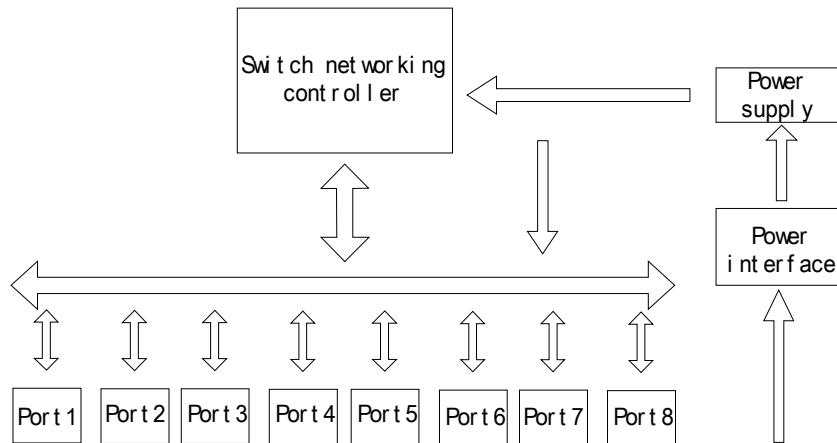


Figure 3-1 Hardware Structure

System hardware mainly consist the following parts:

- 1 . Switching network controller employs ASIC chip technology, offering layer-2 wire-speed transfer of data packets.
- 2 . Industrial isolated power supply with protection of over-current, over-voltage and EMC.
- 3 . EMC protection for all Ethernet ports.

1.8 Switch Structure

1.8.1 Chassis

The chassis of KIEN8000 is structured for wall mounting or DIN rail mounting. The switch is covered completely for six sides to reach IP67 protection class. The aluminum-made chassis is one part of the heat dissipation system. The heat generated

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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 KIEN8000 is shown in the Figure 3-2:

Dimensions : 142mm □ 55.4mm □ 120.5mm (H×W×D) : 215mm □ 120mm □ 66mm

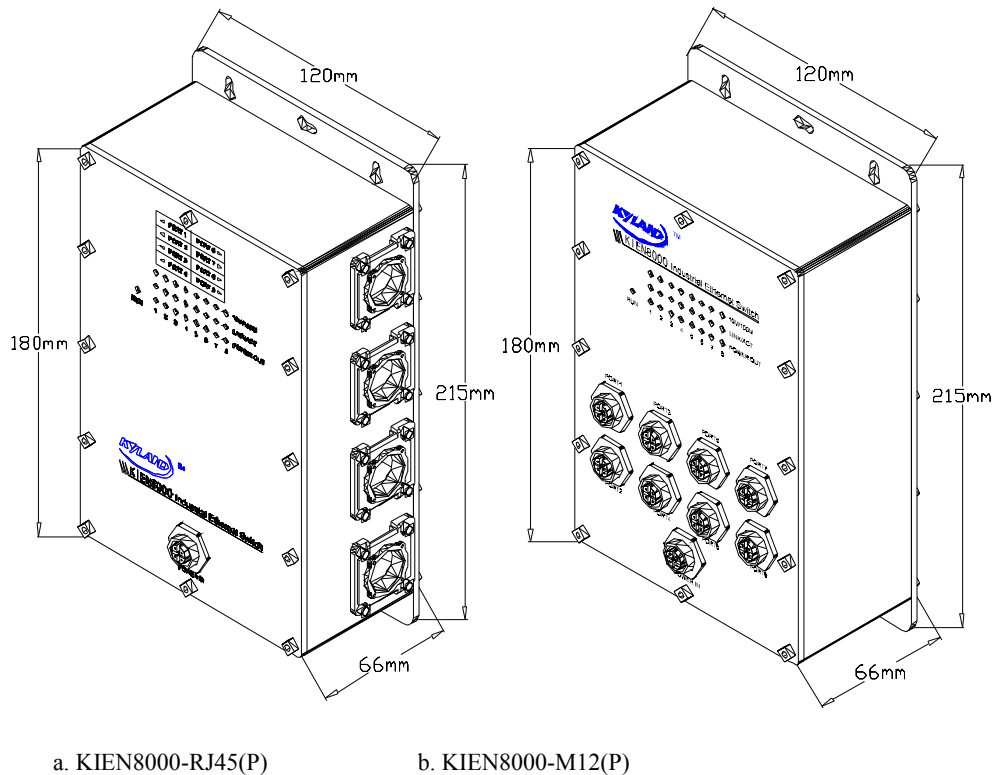


Figure 3-2 KIEN8000



Warning:

The shell of this switch is a part of the whole equipment heat dissipation system. It will get hot because of heat dissipation when the equipment works normally, do not touch the crust when the equipment works to prevent from scalding.

1.8.2 Front Panel

The front panel of KIEN8000 integrates 8 LED running indicators of service interfaces

and system indicators as well as a power input M12 terminal. For KIEN8000-RJ45(P), the 8 M12 Ethernet ports are also fixed in the front panel. The 8 RJ45 Ethernet ports are in the side of the chassis of KIEN8000-RJ45(P). Its structure is showed in the Figure 3-3:

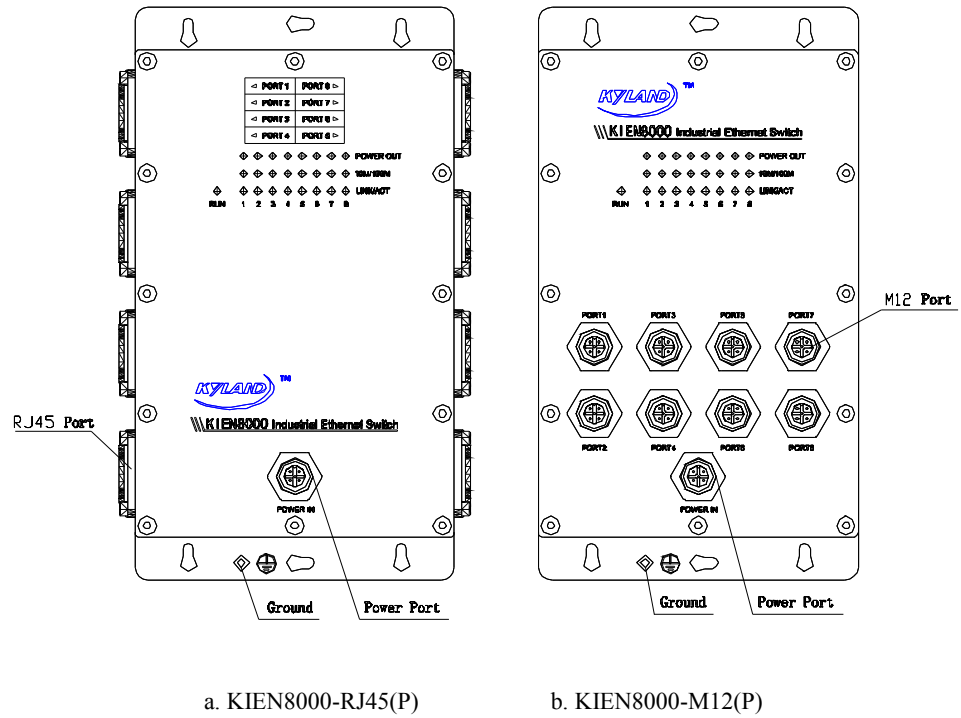


Figure 3-3 Front Panel

LED Indicators

Indicators on the front panel of KIEN8000 show the status of system operation and ports to find and correct faults. The Table 3-1 shows the meanings of these LED indicators in the front panel.

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Table 3-1 LED Indicator Description

LED	Conditions	Status
System Status LED		
RUN	ON	Running normally
	OFF	Running abnormally
Ethernet Port Status LED		
POWER OUT	ON	Power is being sourced
	OFF	No power sourcing
10M/100M	On	100M running status (i.e., 100Base-TX)
	Off	10M running status (i.e., 10Base-T)
LINK/ACT	On	Ports have effective network connection
	Blink	Ports have network activity.
	Off	Ports have no effective network connection.

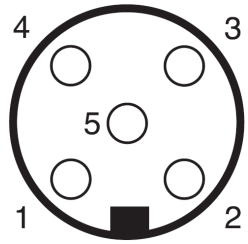
Power Connector M12

The power terminal of KIEN8000 is M12 of IP67 protection class. Its appearance is shown in Figure 3-4:



Figure 3-4 M12 Power Connector

M12 power terminal has five pins for input of DC24V, the pins are positioned as figure 3-5.



M12 Power Terminal Pin Definition :

- pin 1 : TX+ , (Sourcing DC24V +)
- pin 3 : TX- , (Sourcing DC24V

Figure 3-5 PIN Position

Disassemble the cable plug of M12 terminal as shown in Figure 3-6:

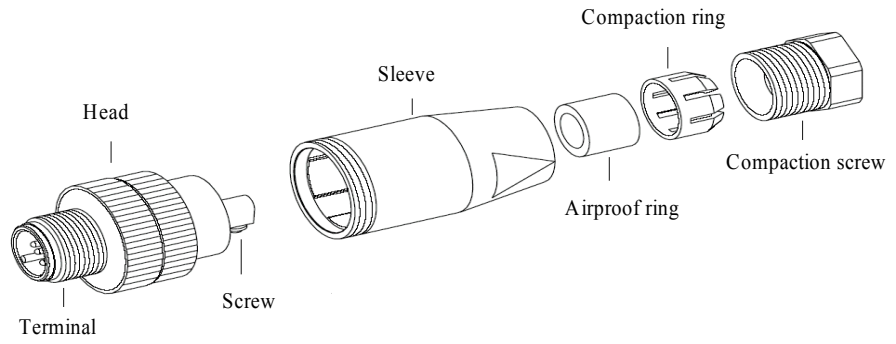
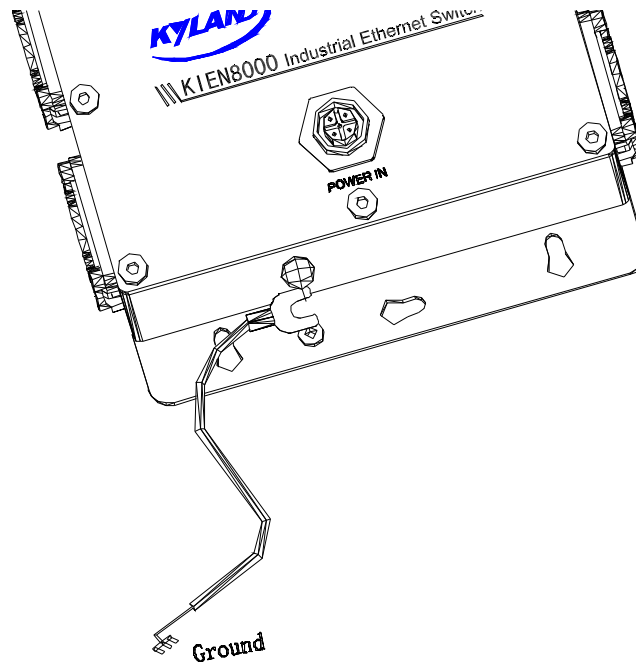


Figure 3-6 M12 Terminal Plug

Grounding Protection

There are a tread hole at the bottom panel of KIEN8000 and a $\Phi 3$ grounded cold pressure terminal and M3 \times 8 grounded screw enclosed with the switch. As shown in Figure 3-7, connect one end of grounding cable with the cold pressure terminal and fix it on the grounding hole of switch by screw. The other end of grounding cable can be connected to ground. The diagram of grounding cable is less than 2mm.

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Picture3-7 KIEN8000 Grounding Method

1.8.3RJ45 Ethernet Port

KIEN8000-RJ45(P) offers 8 RJ45 IP67 ports of 10Base-T/100Base-TX which may be power sourcing or not. Each port is adaptive and support for auto MDI/MDI-X connection. The switch can be connected to terminal device or other switches by straight-through or cross-over cables. Each port can automatically select half-duplex or full-duplex and correct port rate (10 Mbps or 100Mbps) when the connected devices support for such a feature. If the feature is not available to the connected devices, the correct rate will be set up and half-duplex will be selected default.



Figure 3-8 RJ45 Terminal Connector

Each RJ45 Ethernet of the power sourcing KIEN8000 offers DC24V power supply for remote Ethernet device or PD with max 300MA current. The cable wiring way is shown in Figure 3-9:

KI EN8000- RJ45
RJ45 Port

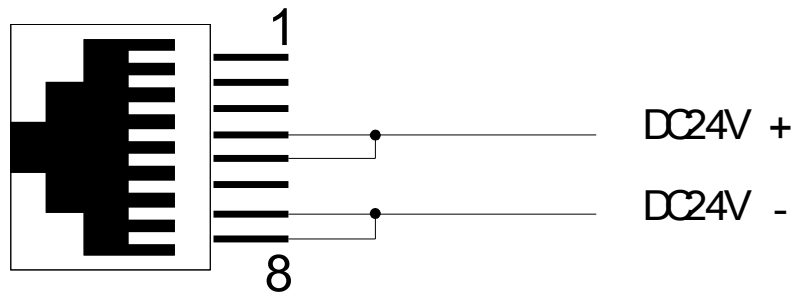


Figure 3-9 Wiring of RJ45 Power Sourcing

Connect RJ45 terminal as below:

- 1、 Disassemble the RJ45 connector as shown in Figure 3-10:

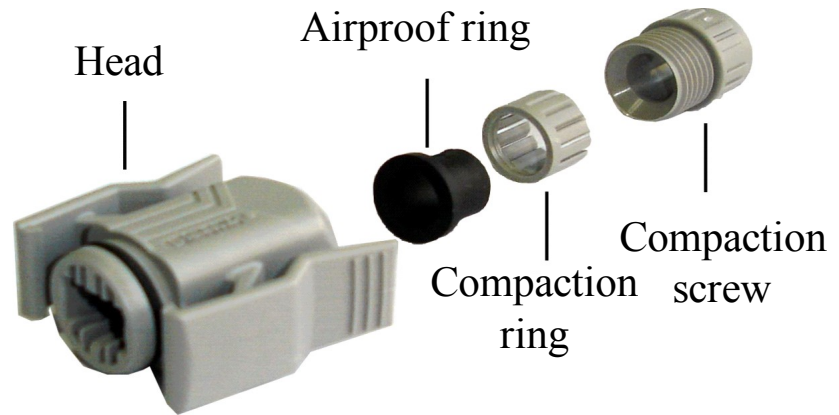


Figure 3-10 RJ45 Connector Disassembled

- Put the Cat5 or Cat5+ TP cables through screw, rings, terminal header, and finally push down the crystal head of cables, as shown in Figure 3-11:



Figure 3-11 RJ45 Connector and Crystal Head

- Press the crystal head into the terminal and keep the rings closely as shown in Figure 3-12:

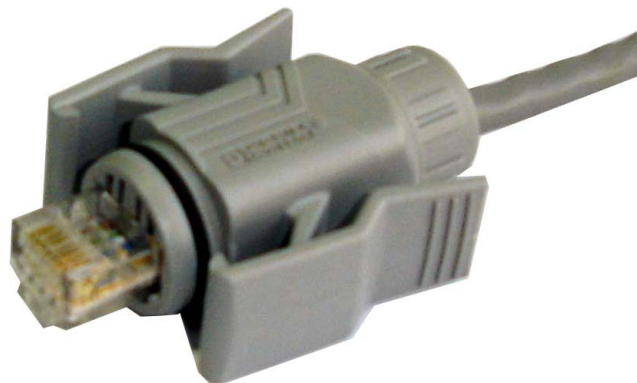


Figure 3-12 Assembled RJ45 Connector

- Press the assembled RJ45 connector into the RJ45 socket of KIEN8000-

RJ45(P) as shown in Figure 3-13. Make sure of reliable connection.



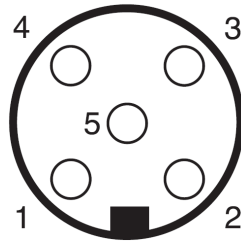
Figure 3-13 RJ45 Connector Into RJ45 Socket

1.8.4M12 Ethernet Port

KIEN8000-M12(P) offers 8 M12 ports of 10Base which may be power sourcing or not. Each port is adaptive and support for auto MDI/MDI-X connection. The switch can be connected to terminal device or other switches by straight-through or cross-over cables. Each port can automatically select half-duplex or full-duplex according to the transmission mode of connecting devices.

Each M12 Ethernet of the power sourcing KIEN8000 offers DC24V power supply for remote Ethernet device or PD with max 300MA current. Ethernet M12 terminal is exactly the same as power M12 terminal. The M12 terminal's pin is defined as shown in Figure3-14. The cable wiring way is the same as power M12 terminal

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Ethernet M12 Terminal Pin Definition :

- pin 1 : TX+ , (Sourcing DC24V+)
- pin 3 : TX- , (Sourcing DC24V+)
- pin 2 : RX+ , (Sourcing DC24V-)
- pin 4 : RX- , (Sourcing DC24V-)

picture3-14 Ethernet M12 Terminal Pin

Section 4 :Hardware Mounting

1.9 Installation Requirements

The switch is single-body structured and can be directly 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.

Before mounting the switch, firstly make sure of 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 requirement: standard products of KIEN8000 uses DC24V (18VDC ~ 36VDC).
- 2 . Ambient Conditions: operation temperature: -35°C ~ 75°C , relative humidity: 10% ~ 100%
- 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 KIEN8000 only provides 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 availability of cables and connectors required for mounting.

1.10 Main Unit Installation

1.10.1 DIN-Rail 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

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find that the green plastic DIN rail-connecting position has already been fixed on the rear panel of KIEN8000. The Figure 4-1 shows the size of rail-type mounting. If you want to mount the switch on the DIN rail, please check mounting of the DIN rail before mounting 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 the switch.

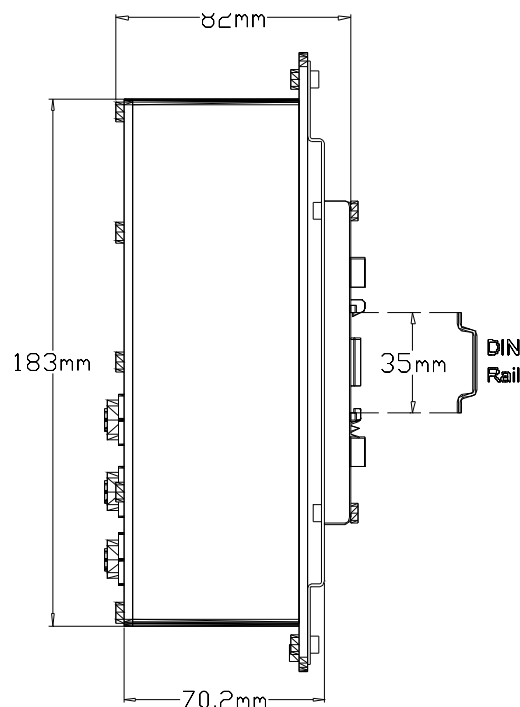


Figure 4-1 KIEN8000 DIN-Rail Mounting Dimensions

After determining 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.

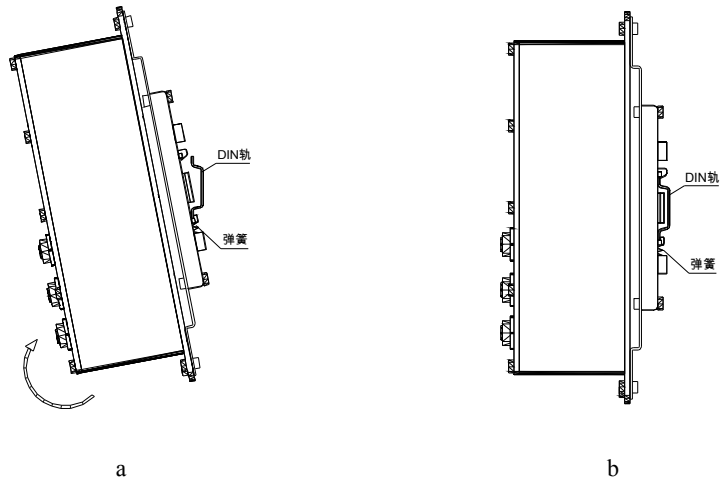


Figure 4-2 KIEN8000 DIN-Rail Mounting

1.10.2 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 KIEN8000. The size of wall mounting is shown in the Figure 4-3 and 4-4.

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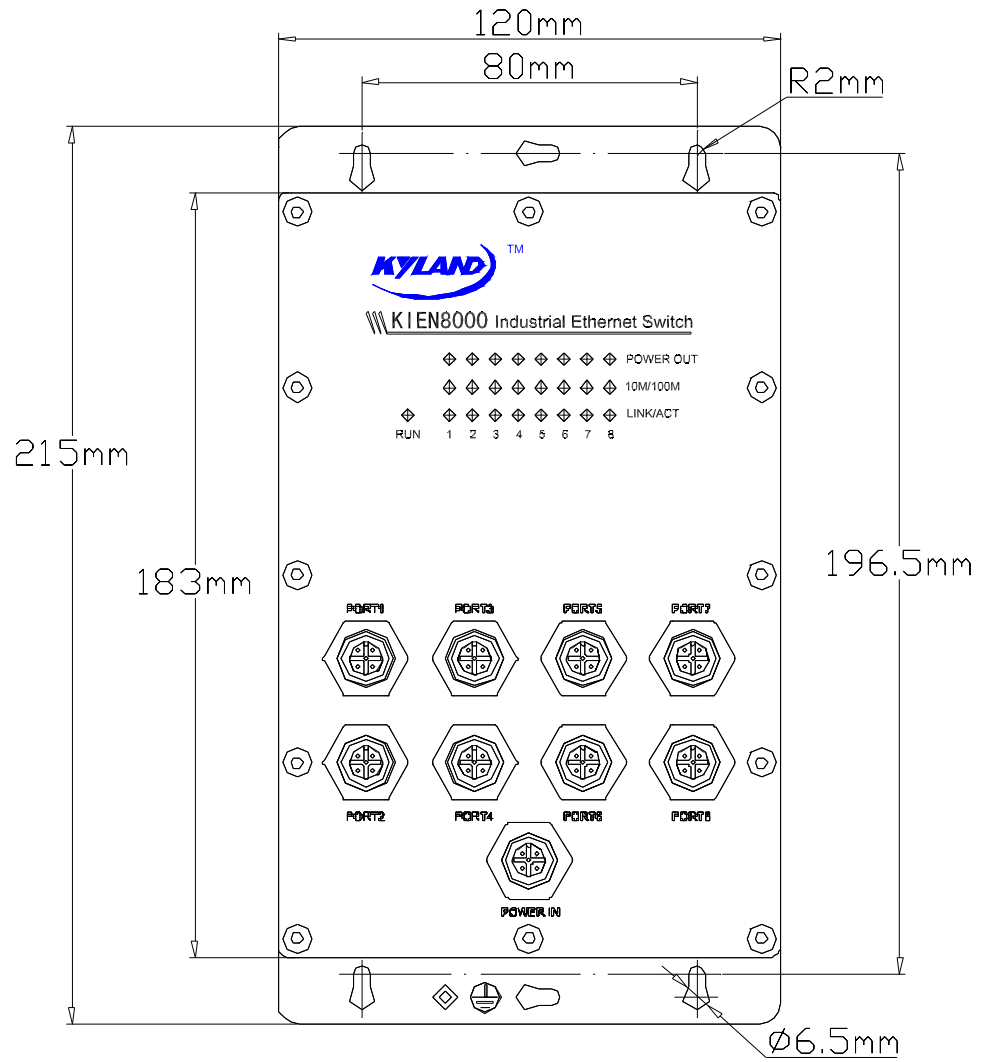


Figure 4-3 KIEN8000's 1st wall-mounting dimensions

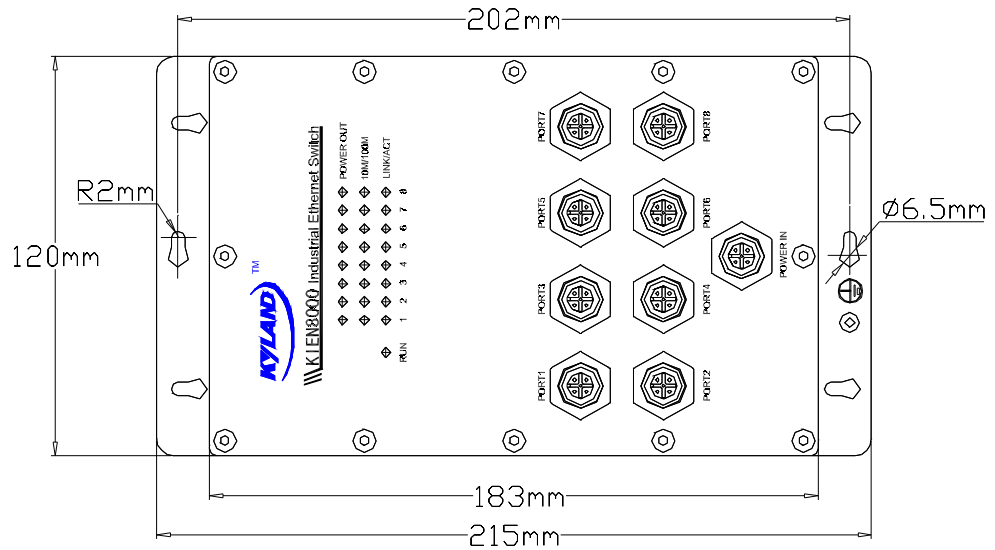


Figure 4-4 KIEN8000's 2nd wall-mounting dimensions

The steps of wall mounting of KIEN8000 are as follows:

- 1 . Unfasten four 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 . 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 or 4-4, 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 4-4. 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.

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- 3 . After screws are fixed on the wall, mount the switch on the selected position and make 4 screws pass through 4 Φ 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.

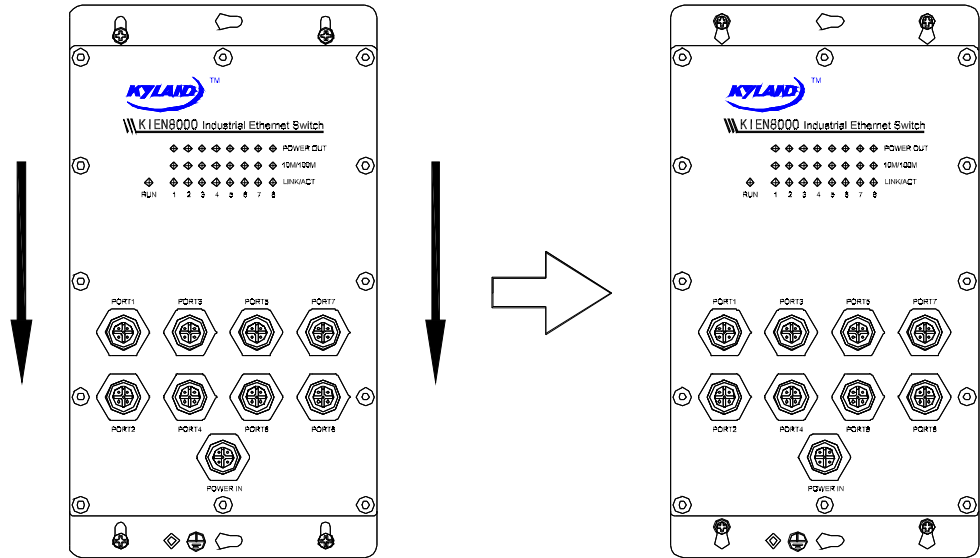


Figure 4-5 Wall Mounting Method

1.11 Connecting Cable

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

- 1 . Service Ports

The service ports of KIEN8000 are power sourcing RJ45 or M12 Ethernet ports offering DC24V to terminal Ethernet devices via straight-through cable or to powered devices via cross-over cable.

- 2 . Power Connection

KIEN8000 uses the 24V DC power supply. After other cables are connected, power cable can be connected.

1.12 Cables Wiring

Wiring shall accord with following conditions:

- 1 . Before laying, verify accordance of the specification, model and quantity of all cables and wires with construction drawings and requirements under the contract.
- 2 . Before 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 . Two ends of the cable should be marked briefly to be maintained easily.

Section 5: Testing Methods

1.13 Self-Check

When the power is connected, all service indicators(except for POWER OUT) on the front panel will flash one time, which means normal running of these ports. Later on, the RUN indicator is on.

1.14 Testing Ethernet Ports

As shown in Figure 5-1, KIEN8000 is powered up and any two Ethernet ports are connected to the uplink Ethernet ports of KIEN1000-PD(powerd 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 10/100M light of KIEN8000 should be always on and LNK/ACT light is blinking, POWER OUT is always on. All these can prove the tested hardware is working normally. The same way is used for other Ethernet ports (Please refer to the example for PING command operation).

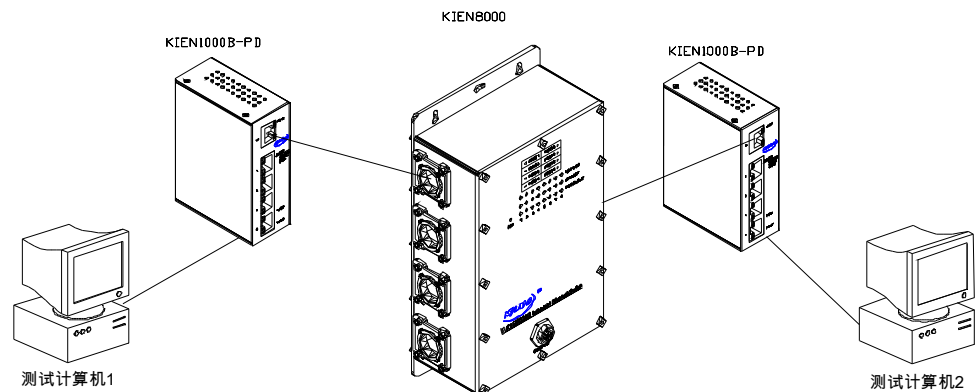


Figure 5-1 Testing Ethernet Ports

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 2: Networking Modes and System Configuration

1.15 Networking

KIEN8000 offers 8 power-sourcing or not RJ45 ports 10Base-T/100Base-TX or 8 power-sourcing or not M12 ports 10Base-T, each port can be connected to remote Ethernet devices offering max 300MA current or to the uplink port of KIEN1000B-PD (powered device) to form a star topology. It can be used widely in power, transportation, energy, water treatment or factory automation etc.

KIEN8000's typical application is shown in Figure 6-1:

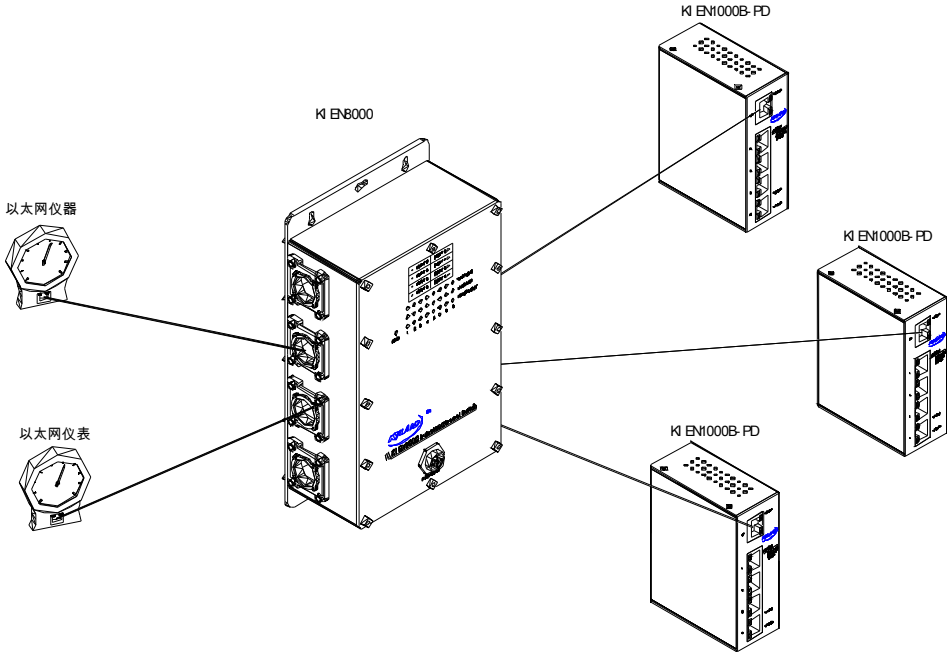


Figure 6-1 KIEN8000's application

1.16 System Configurations


KIEN8000 is structured integrative. 8 RJ45 or M12 Ethernet ports are fixed and can be power sourcing or not. Power supply is fixed at DC24V. The detailed model and description is shown as figure 6-1:

Figure 6-1 KIEN8000 Configurations

Model	Description
KIEN8000-RJ45	8 x 10Base-T/100Base-TX, RJ45, no power sourcing
KIEN8000-RJ45P	8 x 10Base-T/100Base-TX, RJ45, power sourcing
KIEN8000-M12	8 x 10Base-T, RJ45, no power sourcing
KIEN8000-M12P	8 x 10Base-T, RJ45, power sourcing

Appendix A Twisted-pair and Pin Distribution

For the 10Base-T/100Base-TX, the twisted-pair should present two pair of wires. Each pair is differentiated by different colors. For instance, the one is green and the other is the green and white interleaved. There should be the RJ-45 connector at both sides of cables.

 Warning:

Don't plug the telephone jacket into any one RJ-45 port. Only the twisted-pair which complies with the FCC standard is used. Furthermore, both sides present the RJ-45 connectors.

Fig.A-1 illustrates how to number the RJ-45 connector, please confirm the consistence of the direction when it is inserted.

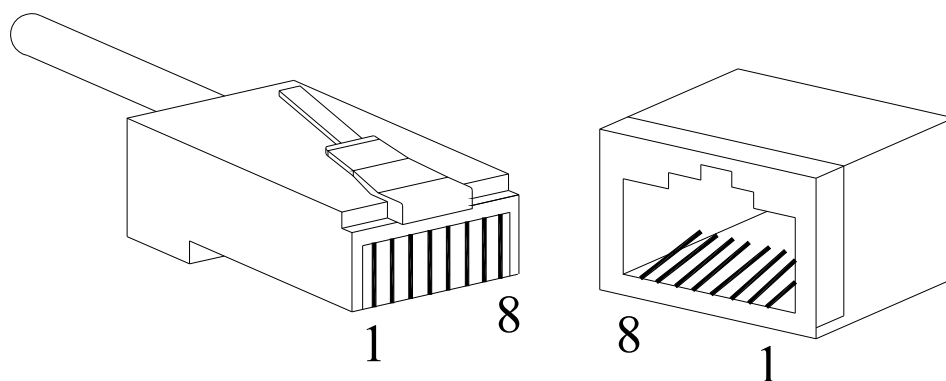


Fig.A-1 RJ-45 Connector

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

RJ-45 connection adopts the Unshielded Twisted Paired (UTP) or the Shielded Twisted Pair (STP): the 10Mbps connection adopts the 100ohm of Cat3, Cat4 and Cat5, while the 100Mbps connection adopts the 100ohm of Cat5. Furthermore, keep in mind that the connection length of any twisted-pair should no be more than 100m.

The RJ-45 port supports the automatic MDI/MDI-X operation, and can use the direct connection wire to connect the PC or server, or connect other switches or hubs. In the direct connection wire, pin 1, 2, 3 and 6 are at the same end of the cable and are connected to the pin 1, 2, 3 and 6 at the other end of the connection cable. If it is necessary to connect to the switches or hubs with MDI-X port, it needs to use the crossover wire. For the concrete condition on the 10Base-T/100Base-TX pin assignment, refer to table A-1.

Table A-1 10Base-T/100Base-TX Pin Assignment

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: "+" and "-" represent the polarity of cable.

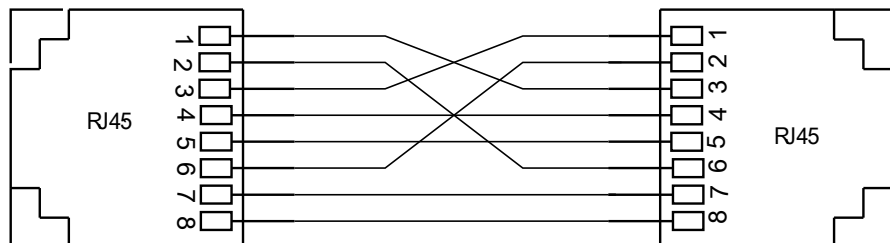
Definition for Direction Connection Cable from RJ45 (8-pin) to RJ45 (8-pin)



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

Fig.A-2 Order of Straight-through Cable

Definition for Cross Connection 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

Fig.A-3 Order 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.
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
Power Over Ethernet(PoE)	PoE is short for Power over Ethernet. To offer power supply(normally DC) to low-consumption devices in different network part by using the networking system.
Power Sourcing Equipment(PSE)	Power Source Equipment short as PSE is a PoE-enabled switch and is normally used in the root of topology.
Powered Device(PD)	Power Devic, short as PD, is the powered devices in the end of structured system.