KIEN 1000/2000 Industrial Ethernet Switch

User's Manual

KYLAND Telecom Technology Co., Ltd.

KIEN 1000/2000 Industrial Ethernet Switch
User's Manual

Preface

The KIEN1000 and KIEN2000 are high-performance serial industrial Ethernet switches designed and developed by KYLAND Telecom exclusively for industrial applications. They provide your systems with many protections because they have high-performance switch engines, solid and closed cases, high-efficient single-rib shape case heat dispersion surface without fans, overcurrent, overvoltage and EMC protections at current input side, good EMC protection performance of RJ45 ports, redundant functions of twisted-pair and optical fiber networks, and redundant power input.

The KIEN1000 serial industrial Ethernet switches have two models: KIEN1000 and KIEN 1000B. The KIEN2000 serial industrial Ethernet switches have two models: KIEN2000 and KIEN 2000B.

The *User's Manual for KIEN1000/KIEN2000 Industrial Ethernet Switches* mainly introduces technological theory, performance indexes, mounting and testing of KIEN1000 and KIEN2000 serial 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 and KIEN2000 serial industrial Ethernet switches.

This Manual mainly includes the following:

The Chapter 1: overview and system features;

The Chapter 2: performance indexes and business functions;

The Chapter 3: hardware structure;

The Chapter 4: mounting;

The Chapter 5: spot testing methods.

Declaration: please understand that due to continuous upgrade and improvement of products and technologies, the content of this Manual may not accord with real products completely. If you want to understand upgrade instances, please access our website or directly contact our business representatives.

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.

Contents

Chapter 1 System Overview

1.1 Product Overview

The KIEN1000 and KIEN2000 are high-performance serial industrial Ethernet switches designed and developed by KYLAND Telecom exclusively for industrial applications. They provide your systems with many protections because they have high-performance switch engines, solid and closed cases, high-efficient single-rib shape case heat dispersion surface without fans, overcurrent, overvoltage and EMC protections at current input side, good EMC protection performance of RJ45 ports, redundant functions of twisted-pair and optical fiber networks, and redundant power input.

KIEN1000 industrial Ethernet switches contain two types: KIEN1000 and KIEN1000B. The front panel of KIEN1000 has 2 uplink redundant 10Base-T/100Base-TX Ethernet RJ45 ports that can be used to build the twisted-pair redundant ring network. In case of system failure, the recovery time of the redundant ring network is less than 300ms. The front panel of KIEN1000B has 2 common uplink 10Base-T/100Base-TX Ethernet RJ45 ports.

KIEN2000 industrial Ethernet switches provide two types: KIEN2000 and KIEN2000B. The front panel of KIEN2000 has 2 pairs of uplink redundant 10Base-FX single-mode or multi-mode fiber ports that can be used to build the optical fiber redundant ring network. In case of system failures, the recovery time of the redundant ring network is less than 300ms. The front panel of KIEN2000B has 2 pairs of common uplink 10Base-FX single-mode or multi-mode fiber ports.

Besides, the front panel of KIEN1000 and KIEN2000 industrial Ethernet switches has six 10Base-T/100Base-TX Ethernet RJ45 ports. Each RJ45 port is adaptive and able to automatically adjust itself to 10Base-T or 100Base-TX mode and full-duplex or half-duplex mode. Also, it supports automatic MDI/MDI-X connection. KIEN1000 and KIEN2000 can be installed by DIN rail or wall mounting.

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℃~+75℃.

   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/KIEN2000	1
3-pin DC power terminal	2
2-pin alarm output terminal	1

User's Manual of KIEN1000/2000 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 Indexes

2.1 System Indexes

The following Table 2-1 shows system indexes of KIEN1000 and KIEN2000 industrial Ethernet switches.

System Indexes	KIEN1000/2000
RJ45 ports	6 ×10Base-T/100Base-TX
Redundant RJ 45 ports	2 ×10Base-T/100Base-TX (only KIEN1000)
Redundant fiber ports	2×100Base-FX-SM/MM (only KIEN2000)
System parameters	Standards: IEEE802.3、IEEE 802.3x、IEEE 802.3u Store and forward rate: 148810 pps Max filter rate: : 148810 pps Switching mode: store and forward System switching bandwidth: 4.8G Electromagnetic compatibility harassment: EN55022 Electromagnetic compatibility immunity: EN55022-2
RJ45 port	Physical ports: RJ-45 (shielded) RJ-45 ports: 10Base-T/100Base-TX ,auto-negotiation Port standard: IEEE802.3 Transmission distance: 100m
Fiber port parameters	Optical power: >-13dbm(SM) >-20dbm(MM) Optical sensitivity: <-28dbm(SM) <-35dbm(MM) Wavelength: 1310nm(SM) 1550nm(SM) 1310 nm(MM) Transmission distance: 20～80Km(SM) <2Km(MM) Connector type: SC/FC Transmission rate: 125Mbps
Power parameters	Input voltage: Dual ring DC24V(DC 18V～36V) Input consumption: <6W Overcurrent protection: built-in
Mechanical construction	Dimension (H x W x T): 142 ㎜×55.4 ㎜×120.5 ㎜, not including the size of the DIN rail and wall mounting part. Installation: DIN rail or wall hanging Connection mode: Service in front and power at top. Weight: 1kg
Ambient conditions	Operating temperature: -35℃～+75℃ Storage/transport temperature: -45℃ to +85℃ Relative humidity (non-condensing): 10% to 95%

2.2 Service Ports

1 . Six 10Base-T/100Base-TX Ethernet RJ45 ports. All of them are adaptive for 10M and 100M. They automatically work in half-duplex or full-duplex mode and support automatic MID/MDI-X connection. Their transmission distance is 100m Max.

2 . Uplink (redundant) 10Base-T/100Base-TX Ethernet RJ45 ports. The redundant mode supports the twisted-pair network redundant technology. The recovery time is less than 300ms. When the common direct link mode is used, they are same as common ports.

3 . Uplink (redundant) 100Base-FX single-mod or multi-mode fiber ports. The maximum rate of each fiber port is 100Mbps and ports are forced to be work in full-duplex mode. The redundant mode supports fiber optic redundant technology. The recovery time of the ring network is less than 300ms. When the common direct link mode is used, they are same as common optical ports.

4 . IEEE802.3/802.3U/802.3X.

RJ45 port indicators: yellow indicator—rate indicator, on:100M; off:10M; green indicator: connecting status indicator, on: effective network connection: flash: network activity; off: no connection.

2.3 Service Functions

Main service functions of KIEN1000 and KIEN2000 industrial Ethernet switches are as follows:

1 . Indicating

Indicators on their front panels show port status, including transmission rate, chain connection status, and system status.

2 . Two Layer Switching

There are two kinds of often-used switching techniques: 1) cut-through: when a switch receives a data frame, upon completion of receiving the head, it immediately forwards it without any check and processing. 2) store and forward: when a switch receives a data frame, it firstly store it. Upon completion of

receiving the whole data frame, it checks. If no errors are found, it forwards the data. The store and forward technique is the switching technique that is most-widely used. KEN1000 and KIEN2000 series industrial Ethernet switches employ this technology.

3．Alarming

When any power of KIEN1000 and KEIN2000 is disconnected, the alarm terminal on the switch will show signal. When there is no warning, this terminal is in open status. When warning occurs, this terminal is in close status. KIEN1000B and KIEN2000B offer no such a function.

Chapter 3   Hardware

3.1 System Structure

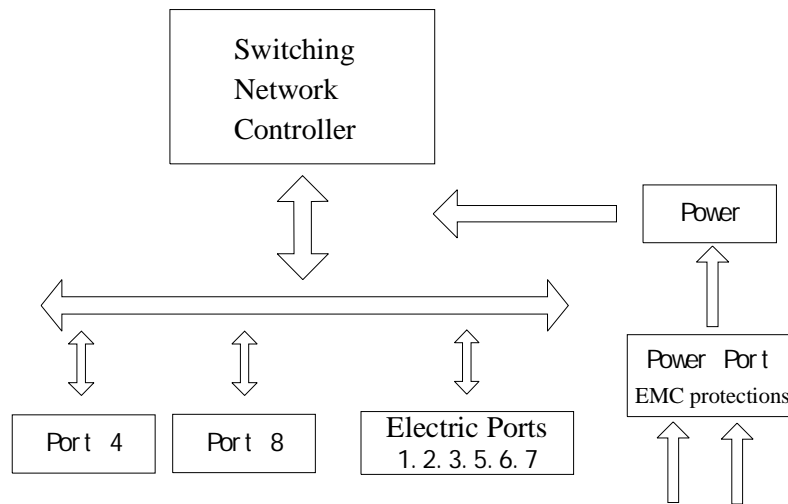The hardware structure of KIEN1000 and KIEN2000 industrial Ethernet switches is showed in the Figure 3-1.

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 . Fiber ports adopt integrated fiber optic transceiving modules and have stable performance.

3 . The power adopts the industrial power and offers overcurrent, overvoltage and EMC protections.

4 . All Ethernet ports have EMC protections.

3.2 Structure of Switch

3.2.1 Case

The case of KIEN1000 and KIEN2000 industrial Ethernet switches is 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 single-rib shape aluminum shapes and are a part of the heat dispersion system of the switch. The single-rib shape structure may increase one time the heat dispersion area. The heat in operating is dispersed arround 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 figuration of KIEN1000 and KIEN1000B is showed in the Figure 3-2 and that of KIEN2000 and KIEN2000B is showed in the Figure 3-3.
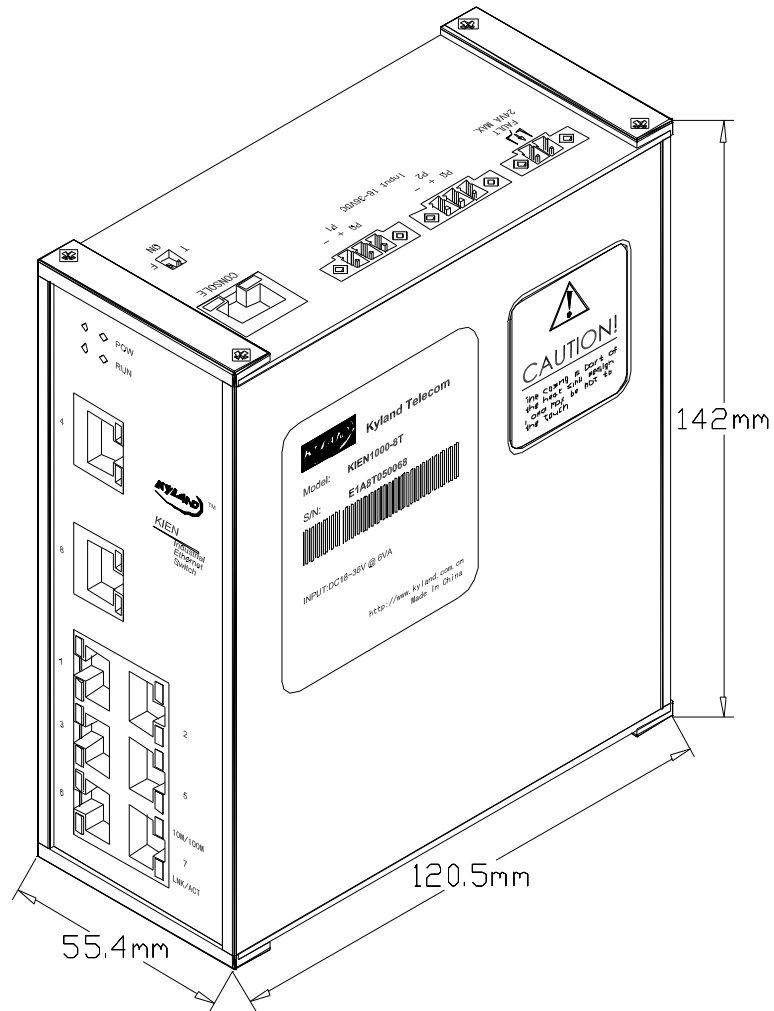
Figure 3-2   Figuration View of KIEN1000 and KIEN1000B

Its dimension, not including the size of the DIN rail or wall hanging part, is 142 ㎜ ×55.4 ㎜×120.5 ㎜ (Height × Width × Thickness).
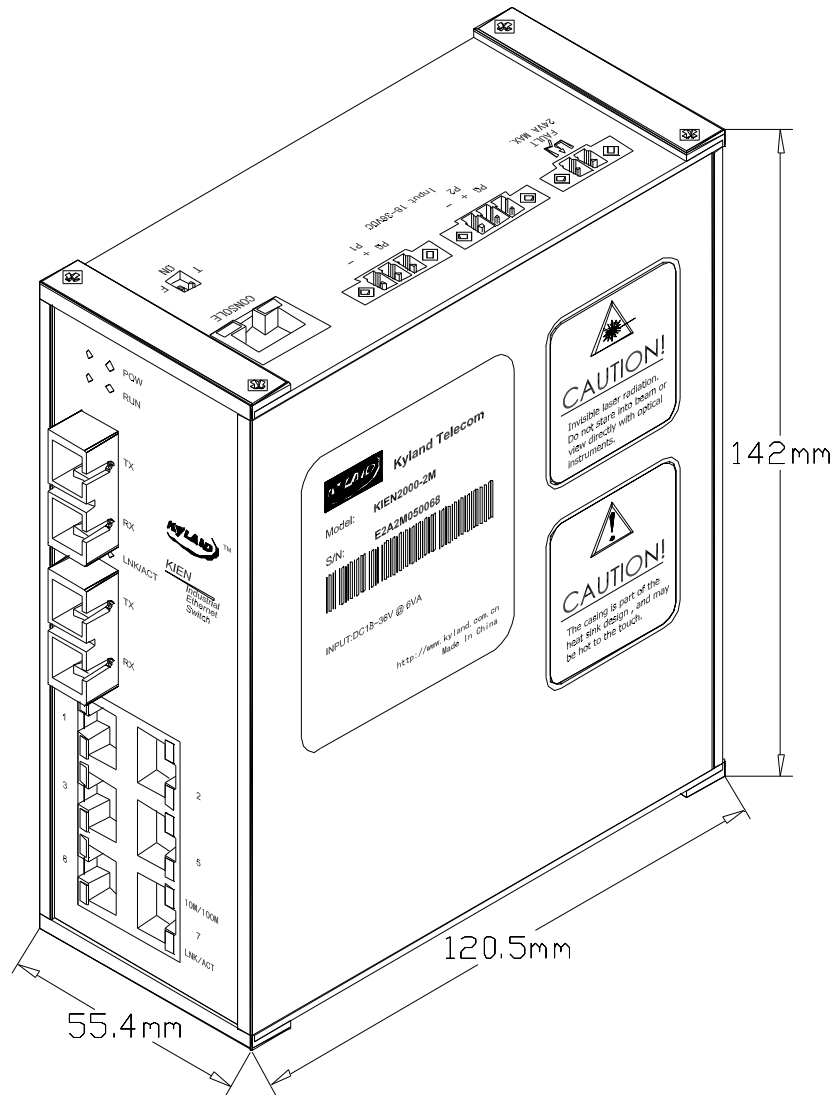
Figure 3-3　Figuration View of KIEN2000 and KIEN2000B

3.2.2 KIEN1000 Front Panel

The front panel of KIEN1000 serial industrial Ethernet switches integrates 2 uplink (redundant) 10Base-T/100Base-TX Ethernet RJ45 ports, 6 10Base-T/100Base-TX Ethernet RJ45 ports, and 4 system indicators. Its structure is showed in the Figure 3-4.
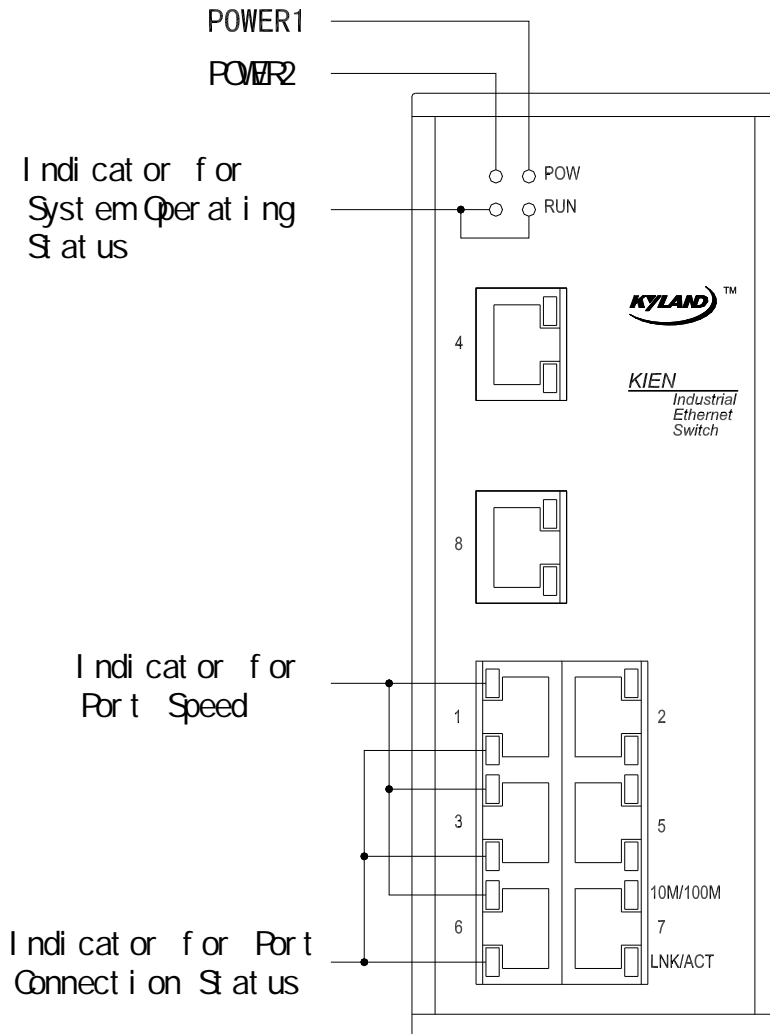
POWER1

POWER2

Indicator for
System Operating
Status

POW
RUN

KYLAND ™
KIEN
Industrial
Ethernet
Switch

4

8

Indicator for
Port Speed

1   2

3   5

10M/100M

Indicator for Port
Connection Status

6   7

LNK/ACT

Figure 3-4 Front Panel of KIEN1000

Uplink (Redundant) Ethernet RJ45 Ports

Each KIEN1000 has 2 uplink redundant 10Base-T/100Base-TX RJ45 ports. Each
KIEN1000B has 2 uplink 10Base-T/100Base-TX RJ45 ports. The port numbers
are 4 and 8. Each port is adaptive and supports automatic MDI/MDI-X
connection. Two uplink redundant Ethernet RJ45 ports can build the twisted-pair
redundant ring network. When the system has faults, the redundant recovery time
of the ring network is less than 300ms, which improves reliability of system
operation effectively.

Ethernet RJ45 Ports

Each KIEN1000 and KIEN1000B offers six 10Base-T/100Base-TX Ethernet RJ45 ports with the port number 1, 2, 3, 5, 6, and 7. Each RJ45 port is adaptvie 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.

LED Indicators

Indicators on the front panel of KIEN1000 and KIEN1000B 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

LED	Conditions	Status
System Status LED		
RUN	On	Uplink electric ports are set as the redundant mode and the unit is set as local.
	Flash	Uplink electric ports are set as the redundant mode and the unit is set as remote.
	Off	Uplink electric ports are set as common direct link mode.
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.
Status LED of Ethernet RJ45 Ports		
Each RJ45 port has two indicators: the yellow is the indicator for port rate and the green is port link status.		
10M/100M (Yellow)	On	100M running status (i.e., 100Base-TX)
	Off	10M running status (i.e., 10Base-T)
LINK/ACT (Green)	On	Ports have effective network connection
	Flash	Ports have network activity.
	Off	Ports have no effective network connection.

3.2.3 KIEN2000 Front Panel

The front panel of KIEN2000 serial industrial Ethernet switches integrates two pairs of optical fiber ports, six 10Base-T/100Base-TX Ethernet RJ45 ports, and six system and port status indicators. Its structure is showed in the Figure 3-5.
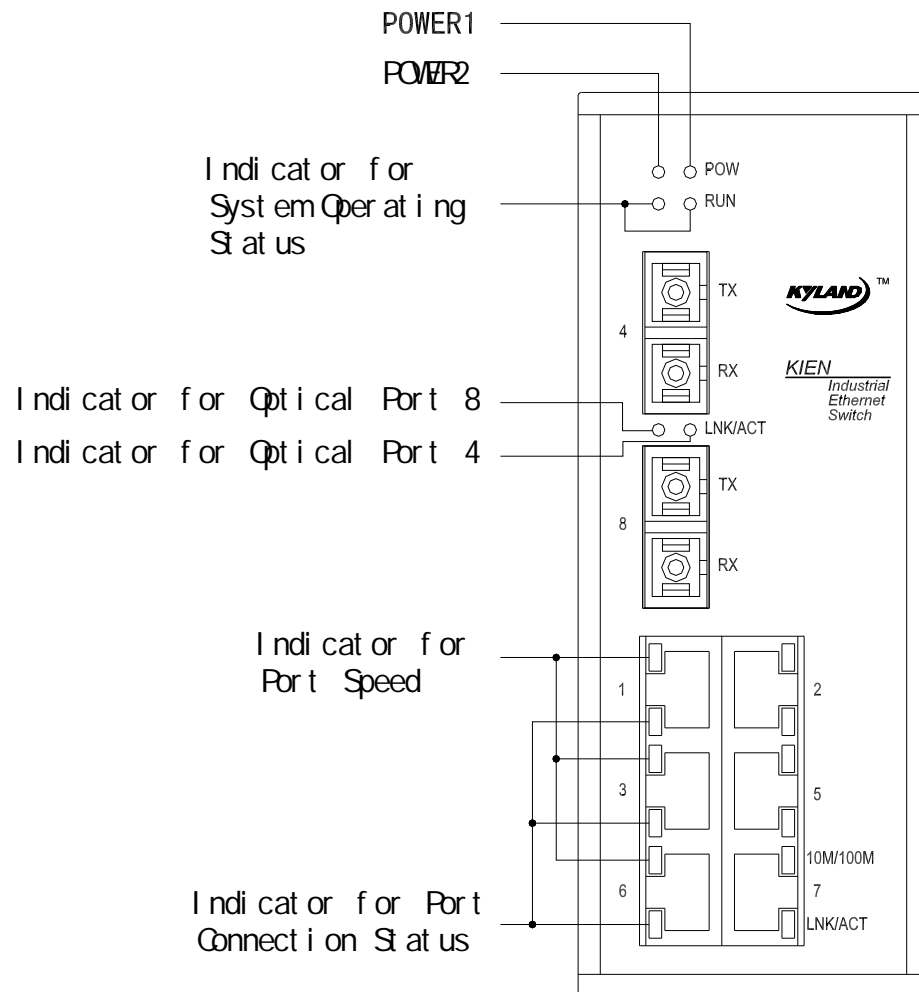

Figure 3-5 Front Panel of KIEN1000

Optical fiber interface

Each KIEN2000 has 2 pairs of uplink redundant 100Base-FX full-duplex single-mode or multi-mode fiber ports. Each KIEN2000B has 2 pairs of 100Base-FX full-duplex single-mode or multi-mode fiber ports. The port numbers are 4 and 8. The connector may be SC or FC. The fiber ports are used in pair including a TX and a RX. TX port is the optical transmitting side and

connects the optical receiving side RX of the optical port of the remote switch. The RX port in the optical receiving side and connects with the optical transmitting side TX of the same optical receiving side of the same remote switch. The two pairs of uplink redundant 100Base-FX optical fiber ports can build the optical fiber redundant ring network. In case of system failures, the redundant recovery time of the ring network is less than 300ms, which increases reliability of network running effectively.

Ethernet RJ45 Ports

Each KIEN2000 and KIEN2000B has 6 10Base-T/100Base-TX Ethernet RJ45 ports with the port number 1, 2, 3, 5, 6, and 7. 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 self-adapting function, these ports will transmit correct data with the default half-duplex transmission mode.

LED Indicators

Indicators on the front panel of KIEN2000 and KIEN2000B show the status of system operation and ports to find and correct the flaults. The Table 3-2 shows the meanings of these LED indicators on the front panel.

Table 3-2 Description for LED Indicators on the Front Panel of KIEN2000

LED	Conditions	Status
System Status LED		
RUN	On	Optical ports are set as the redundant mode and the unit is set as local.
	Flash	Optical ports are set as the redundant mode and the unit is set as remote.
	Off	Optical ports are set as common direct link mode.
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.

Status LED of Optical Ports (4 and 8)		
LINK/ACT	On	Ports have effective network connection
	Flash	Ports have network activity.
	Off	Ports have no effective network connection.
Status LED of Ethernet RJ45 Ports		
Each RJ45 port has two indicators: the yellow is the indicator for port rate and the green is port connection status.		
10M/100M（Yellow）	On	100M running status (i.e., 100Base-TX)
	Off	10M running status (i.e., 10Base-T)
LINK/ACT（Green）	On	Ports have effective network connection
	Flash	Ports have network activity.
	Off	Ports have no effective network connection.

3.2.4 Top Panel

The top panel of KIEN1000 and KIEN2000 serial industrial Ethernet switches integrates two power input terminals of the redundant power system, the output terminal of the alarm relay, and the attribute setting switch.
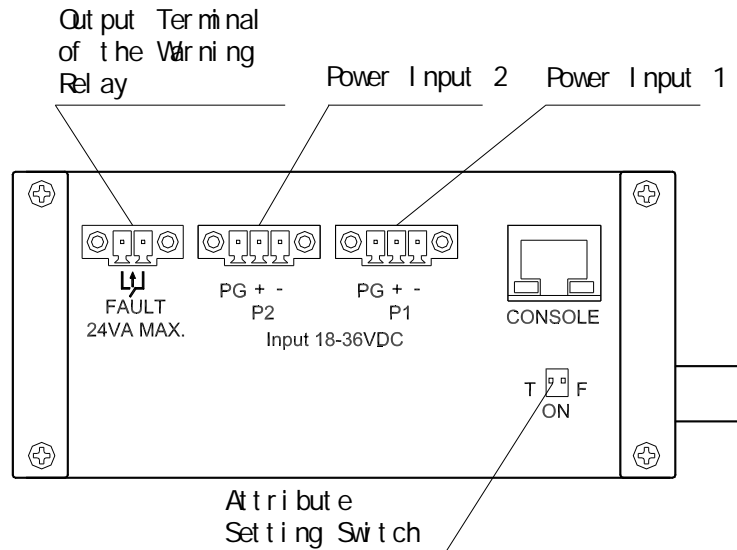

Figure 3-6 Top Panel Structure

Power Input Terminals

KIEN1000 and KIEN2000 serial industrial Ethernet switches have 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 of3.81 mm are used to connect powers and the diameter of power cables is less than 1.5mm.

Wiring is showed in the Figure 3-7. Connection and mounting steps are as follows:

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.
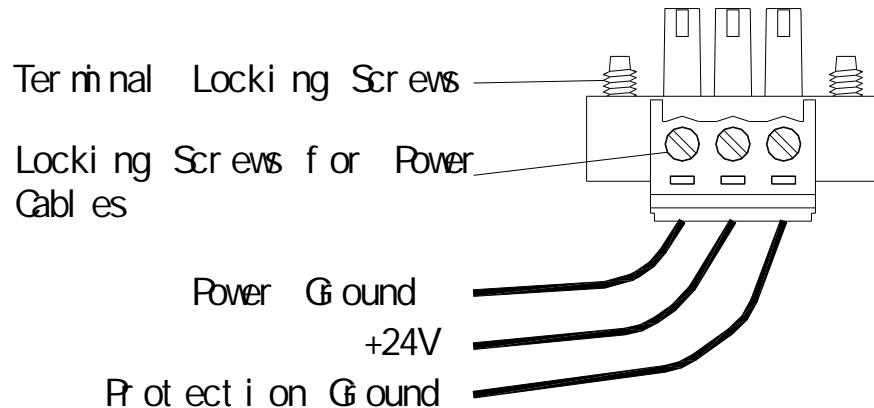
Terminal Locking Screws

Locking Screws for Power Cables

Power Ground

+24V

Protection Ground

Figure 3-7 Wiring of the DC Power Terminal

Output Terminal of the Alarm Relay

This terminal includes a group of normally open contacts and its figuration is same as the power input terminal. Under the normal status, there is no warning and this terminal is in open status. In case of failures of any one power, the

terminal is closed. It can be connected with other switching value acquisition devices or warning lights and warning buzzers, to remind operators in time. The maximum voltage of this terminal is DC30V and its maximum input power is 24VA. The Figure 3-8 is the schematic when the switch connects with an external warning indicator. The wiring of other applications is similar with this.

⚠ **Note:**

KIEN1000 and KIEN2000 have the warning output function but KIEN100B and KIEN200B have no such function.

The wiring and mounting steps are same as those of the power terminal.

Figure 3-8 The output terminal of the warning relay connects a warning light.

Property Setting Switch

The property setting switch is used to set the redundant mode and common direct link of 2 uplink redundant electric ports or fiber ports, and local and remote property of the redundant mode. Hence, this switch is effective only for KIEN1000 and KIEN2000 and is not effective for KIEN100B and KIEN200B. The switch has two positions that are defined T and F respectively. T is used to set the redundant mode and common direct link of 2 uplink redundant Ethernet
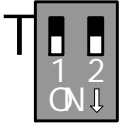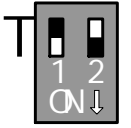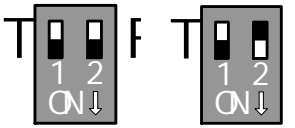
ports or fiber ports. When T is ON, the two uplink electric ports are set as common direct link mode, contrarily the common direct link mode. F is used to set local and remote preperty of the redundant mode when the uplink electric port or fiber ports are in redundant mode. When T is OFF and F is ON, the switch is local, contrarily remote. The relationship between the specific positions of the switch and its properties is listed in the Table 3-3.

⚠ **Note:**

In the twisted-pair or optical fiber redundant ring network, only one switch can be set as the local and others are set as remote.

Table 3-3 Corresponding Relationship between Positions and Attributes of the Switch

Switch Position			Attribute Meaning
Position Schematic	**Logic Position**		
	T	OFF	Uplink redundant Ethernet ports or fiber ports are the redundant mode and the switch is set as remote.
	F	OFF	
	T	OFF	Uplink redundant Ethernet ports or fiber ports are the redundant mode and the switch is set as local.
	F	ON	
	T	ON	Uplink redundant Ethernet ports or fiber ports are the common direct link mode.
	F	ON/OFF	

3.2.5 Bottom Panel

There is a grounding screw hole on the bottom panel of KIEN1000 and KEN2000 serial industrial Ethernet switches. The M3×8 grounding screw and Φ3 grounding cold pressure terminal are attached with the switch. As showed in the Figure 3-9, 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.
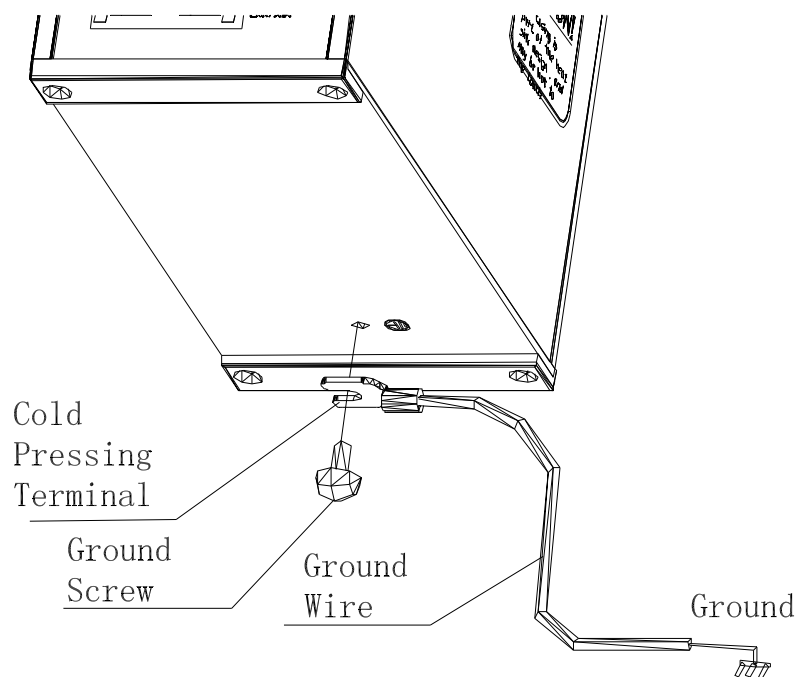
Cold Pressing Terminal

Ground Screw

Ground Wire

Ground

Figure 3-9 Case Earthing Method for KIEN1000 and KIEN2000 Series

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 and KIEN2000 serial industrial switches use the redundant 24V (18VDC～36VDC) DC power.

2． Environment temperature: -35℃～75℃

3． Grounding resistance: <5Ω

4． Check whether uplink twisted-pair wires or optical fibers are laid in place in accordance with configuration requirements under the contract.

5． Avoid direct sunshine and keep it away from heating sources or areas where have strong electromagnetic interference.

6． Standard products of EN1000 and EN2000 serial 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.

7． Check existence of cables and connectors required by mounting.

4.2 Mounting of the Main Machine

4.2.1 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 or KIEN2000. The Figure 4-1 shows the size of rail-type mounting. If you want to mount KIEN1000 or KIEN2000 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 or KIEN2000.

Figure 4-1 Size of Rail-Type Mounting for KIEN1000 and KIEN2000

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

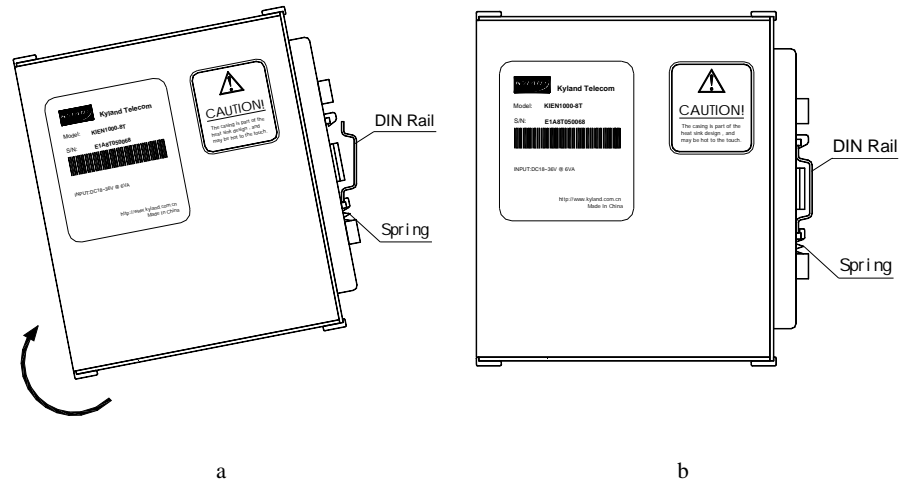a   b

Figure 4-2 Mount KIEN1000/KIEN2000 on the DIN Rail

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.

4.2.2 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 KIEN1000 and KIEN2000 serial industrial Ethernet switches. The size of wall mounting is showed in the Figure 4-3.
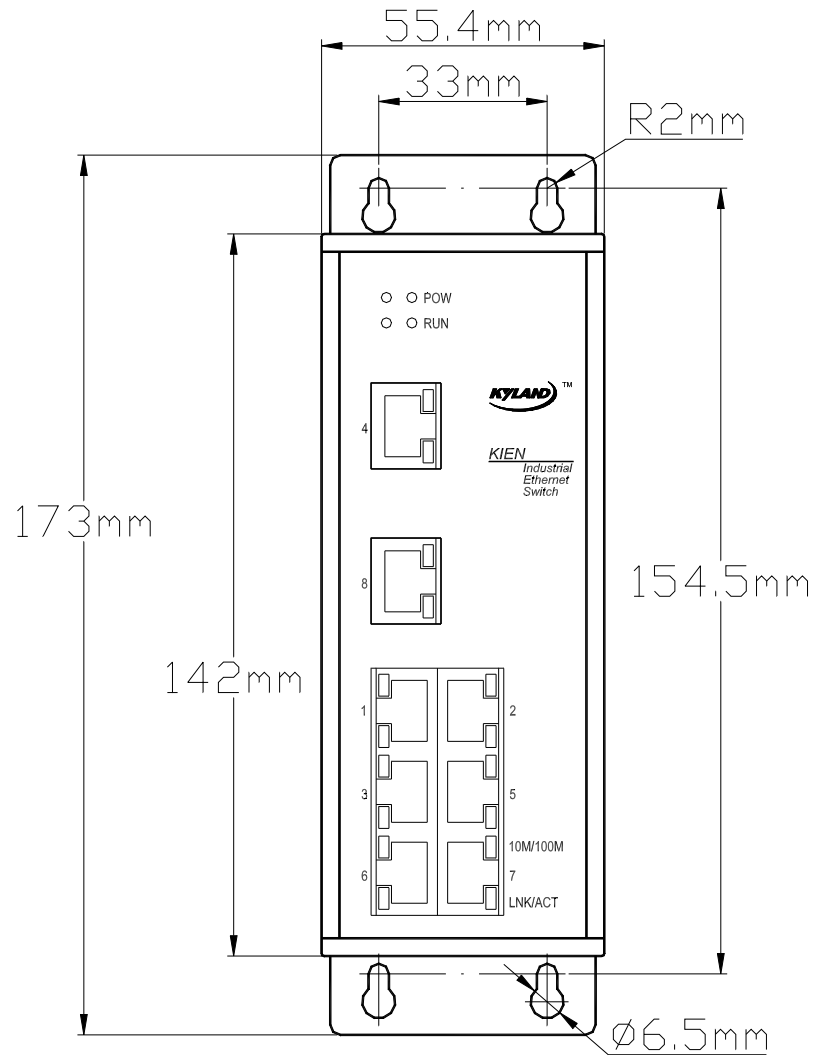
Figure 4-3 Size of Wall Hanging Mounting for KIEN1000 and KIEN2000

⚠ **Note:**

The wall mounting board is not contained in the standard configuration of KIEN1000 and KIEN2000 serial industrial Ethernet switches. If you need it, please order it additionally when you order the switch.

The steps of wall mounting of KIEN1000 and KIEN2000 serial industrial Ethernet switches are as follows:

1. Unfasten two screws t 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 that the DIN rail connecting seat is on formerly. Ensure the mounting direction of the board in accordance with the Figure 4-4.
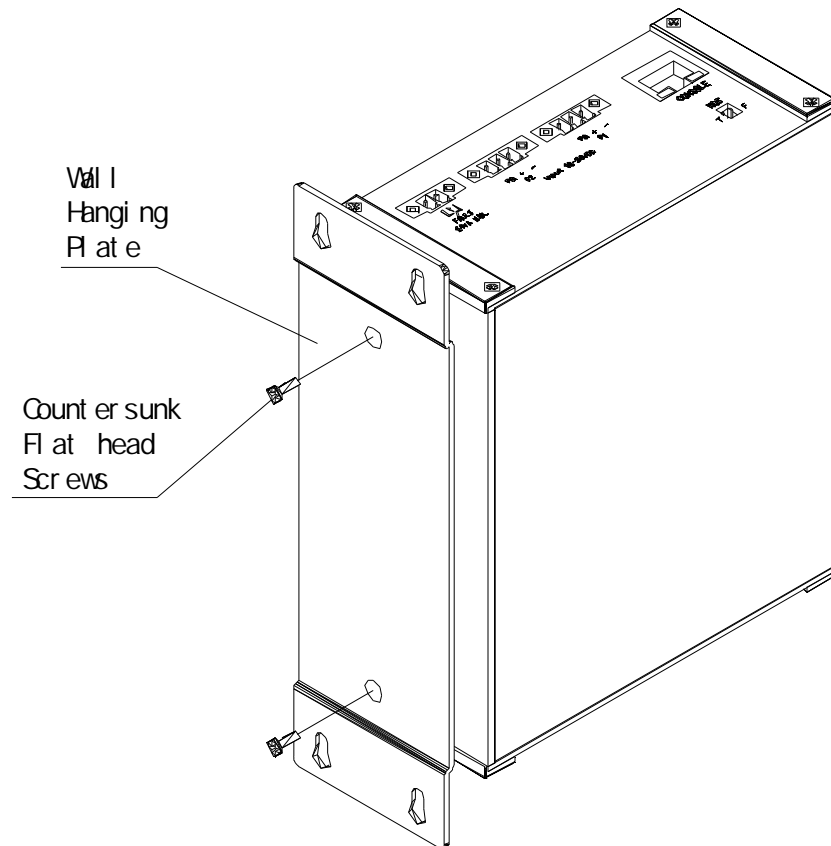

Figure 4-4 Mounting of the Wall Hanging Plate

Words in the Figure: Countersunk Flat head Screws, Wall Hanging Plate

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 Φ6 plastic expansion bolts and Φ3 taping screws. In accordance with the mounting size in the Figure 4-3, drill 4 Φ6 holes on the wall with a impact electric drill

with a depth that can completely contains the Φ 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 4Φ 4 holes with a electric portable drill on site. Screw four M3×10 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 4Φ 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.
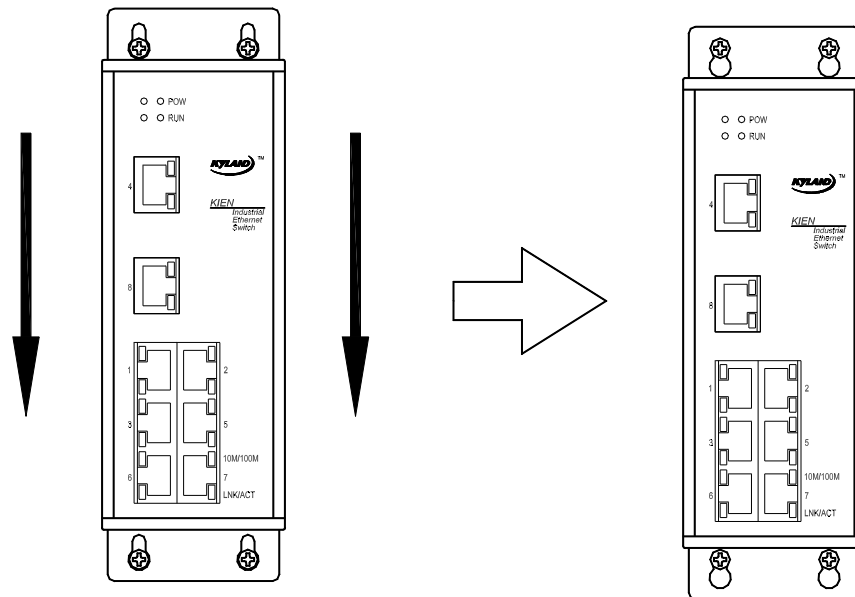

Figure 4-5 Schematic for Wall Hanging Mounting

4.3 Cables Connection

After KIEN1000 or KIEN2000 is mounted correctly, cable connection can be made,

which mainly include cable connection of the following ports:

1．Service Ports

KIEN1000 and KIEN2000 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 and KIEN2000 serial industrial Ethernet switches use the 24V DC powers. After other cables are connected, power cable can be connected.

4.4 Optical Fibers Connection

Each KIEN2000 provides 2 pairs of uplink redundant 100Base-FX full-duplex single-mode or multi-mode fiber ports that can build the optical fiber redundant ring network. In case of failures of units or optical fibers in the network, the network recovers communication within 300ms. Each KIEN2000B provides 2 pairs of uplink 100Base-FX full-duplex single-mode or multi-mode fiber ports that can build the optical fiber chain network. Fiber ports may adopt SC or FC according to requirements.

⚠ **Note:**

The switch use laser to transmit signal in optical fibers. The laser is in accordance with requirements for the Class 1 laser products. In normal operation, it is harmless to eyes. But when units are connected with powers, do not directly watch optical transmitting ports and the end surface of optical fiber terminators.

Connection steps of pluggable optical fiber modules are showed as follows:

1．Remove and keep rubber cases in SC or FC ports. When it is not working, mount the rubber cases to protect optical fiber terminators.

2．Check cleanness of optical fiber terminators. Wet clean paper towel or tampon slightly and clean plugs of optical fibers softly. Dirty optical fiber terminators will reduce optical transmission quality and affect port performance.

3．Connect one side of the optical fiber with an optical port of the switch and connect the other side with an optical port of another unit, as showed in the Figure 4-6.n
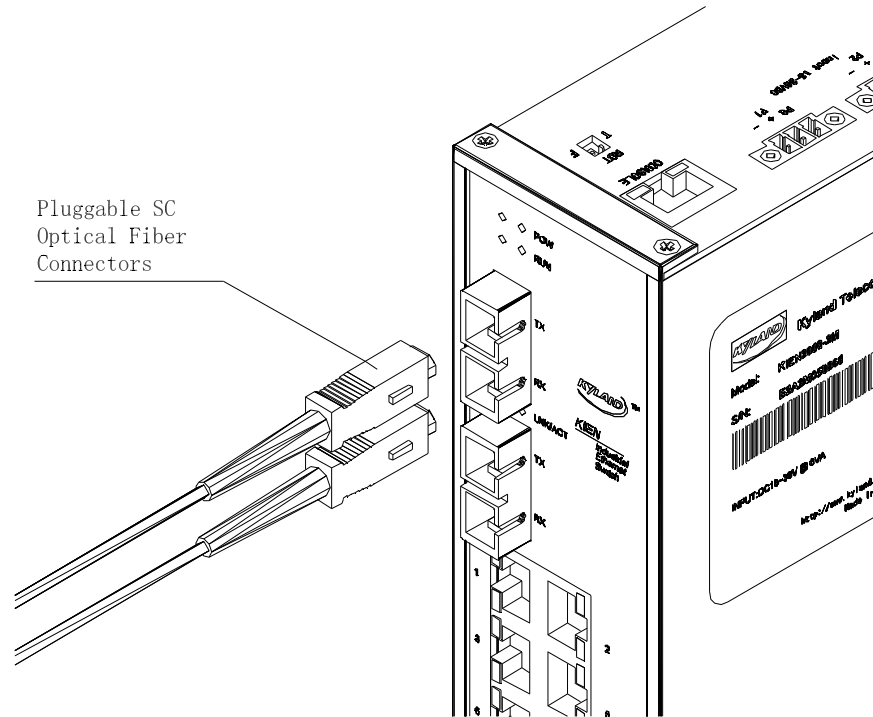

Figure 4-6 Connection of Optical Ports

4．Upon finishing connection, check the LIK/ACT indicator for the optical port on the front panel of the switch. On means effective connection.

4.5 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 . When the tail fiber is laid, ties of optical fibers shall be prevented. Bends shall be reduced to the minimum extent and their bending radius shall not be too little. Bundling shall be appropriate and shall not be too tight. When they placed on chutes, they shall be separated from others.

10 . Tow side of cables and wires shall have marks with simple and clear identification to facilitate maintenance.

⚠ **Note:**

When the tail fiber is laid, ties of optical fibers shall be prevented. Undersize radius will cause great loss of optical sign in link and affect communication quality.

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 of Ethernet Ports

As showed in the Figure 5-1, supplier power to KIEN1000 or KIEN2000 and connect any two Ethernet ports with two testing computers with direct link network wires. Send PING command each other. If the hardware of the tested Ethernet ports runs normally, any one computer is able to ping the other correctly without package loss. Also, yellow indicators of corresponding port are on when network cards of computers are in 100M status or off when in 10M status, and green indicators of corresponding ports are flash. Use the same method to test other electric ports. Please refer to the following example for specific operation of the PING command.
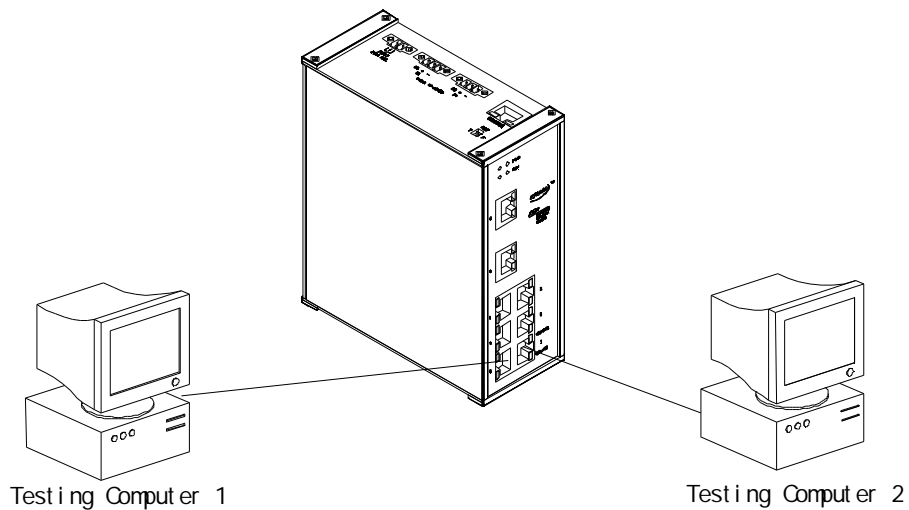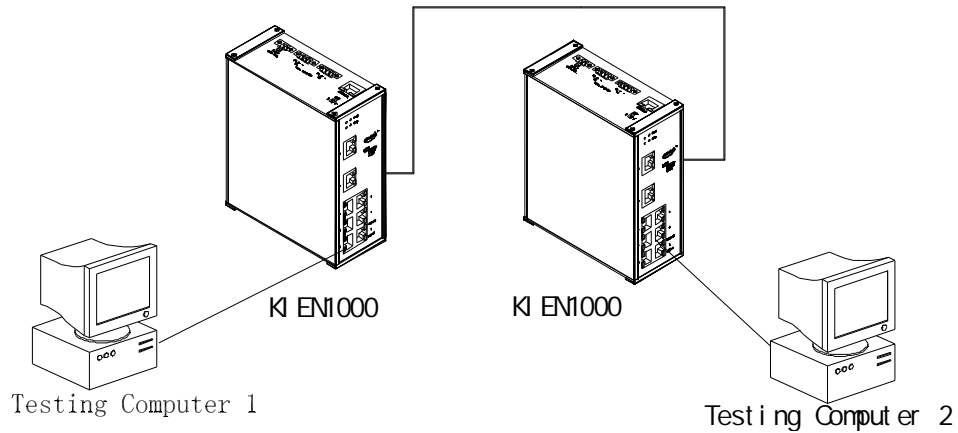

Testing Computer 1   Testing Computer 2

Figure 5-1 Testing of Electric Ports

5.3 Testing of Uplink Ethernet Ports

Use two KIEN1000 switches to build a twisted-pair recurrent network, as showed in the Figure 5-2. Connect any one Ethernet port of a switch with a testing computer with direct link network wires. Send the PING command each other. If the hardware of the tested uplink Ethernet ports runs normally, any one computer is able to PING the other without package loss. Use the same method to test the other uplink Ethernet port. Please refer to the following example for specific operation of the PING command.

Figure 5-2 Testing of Uplink Electric Ports

5.4 Testing of Uplink Fiber Ports

Use two KIEN2000 switches to build an optical fiber recurrent network, as showed in the Figure 5-3. Connect any one fiber port of a switch with a testing computer with direct link network wires. Send the PING command each other. If the hardware of the tested fiber ports runs normally, any one computer is able to PING the other without package loss and the LINK/ACT indicator of corresponding optical port is on. Use the same method to test the other uplink Ethernet port. Please refer to the following example for specific operation of the PING command
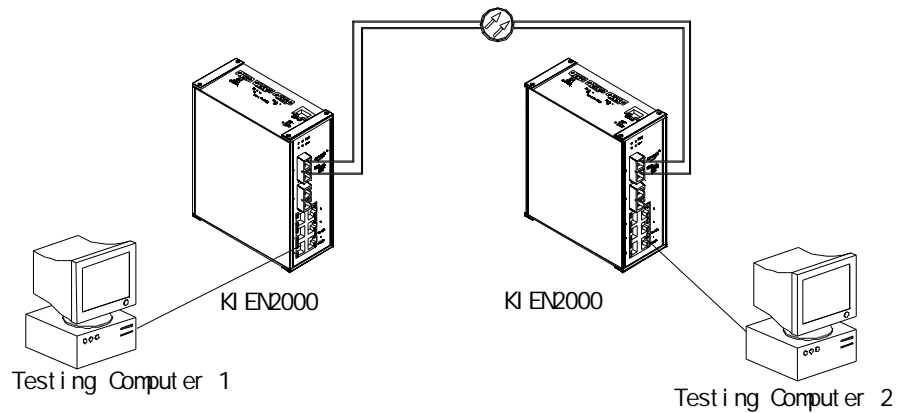
Figure 5-3 Testing of Optical Ports

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". (-1 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

Each of KIEN1000 and KIEN2000 serial industrial Ethernet switches provides 6 10Base-T/100Base-TX Ethernet RJ45 ports. Each port can be directly connected with a terminal or another industrial Ethernet switch/hub before the terminal for share link. Each of KIEN1000/KIEN2000 industrial Ethernet switches owns 2 uplink redundant Ethernet RJ45 ports or fiber ports that can build the twisted-pair or optical fiber redundant ring network. In case of system failures, the recovery time of the ring network is less than 300ms.

1..Networking Mode of KIEN1000 and KIEN2000

The most typical networking mode of KIEN1000 and KIEN2000 is the redundant ring network. The KIEN1000 builds the twisted-pair redundant ring network, as showed in the Figure 6-1 and KIEN2000 builds the optical fiber redundant ring network, as showed in the Figure 6-2. One switch is set as the local and others are set as remote. In case of breaking of twisted-pair wires or optical fibers, communication can be recovered within 300ms.

⚠ **Note:**

In networking of the redundant ring network of KIEN1000 or KIEN2000, we recommend to connect the port 4 with the port 8. In other words, the port 4 of a unit connects with the port 8 of another unit, as showed in the figure below.
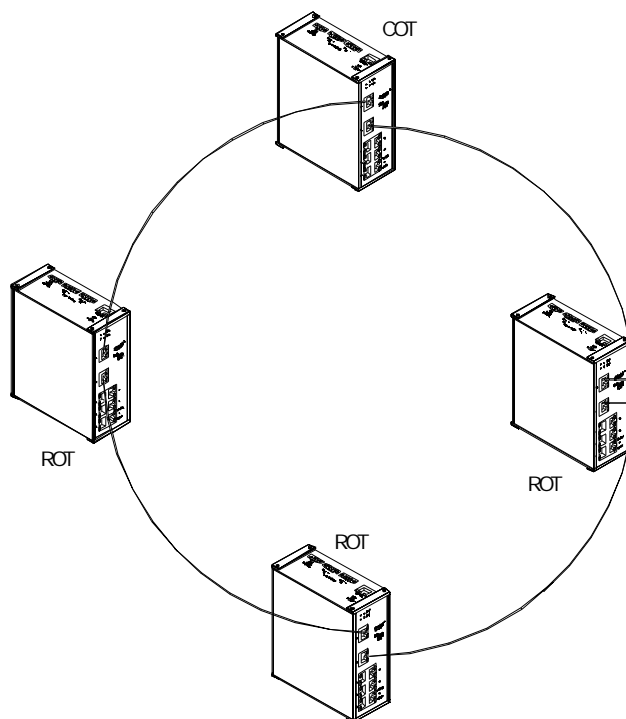
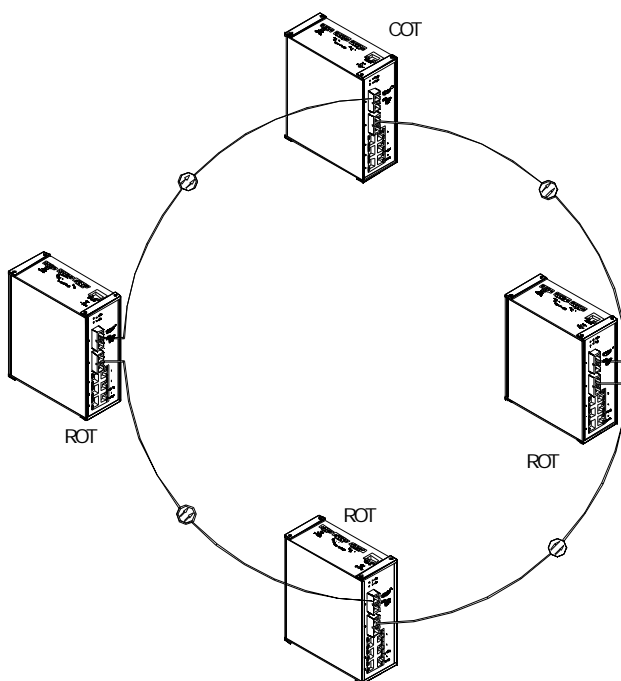Figure 6-1 Twisted-Pair Redundant Ring network of KIEN1000

Figure 6-2 Optical Fiber Redundant Ring network of KIEN2000

2..Networking Mode of KIEN1000B and KIEN2000B

Each KIEN1000B has 8 10Base-T/100Base-TX Ethernet RJ45 ports and can be used as a common switch, as the application showed in the Figure 6-3. Each KIEN2000B has two pairs of 100Base-FX single-mode or multi-mode fiber ports that can build the optical fiber chain network or connect with 100Base-FX single-mode or multi-mode fiber ports of other units, as the application in the Figure 6-4.
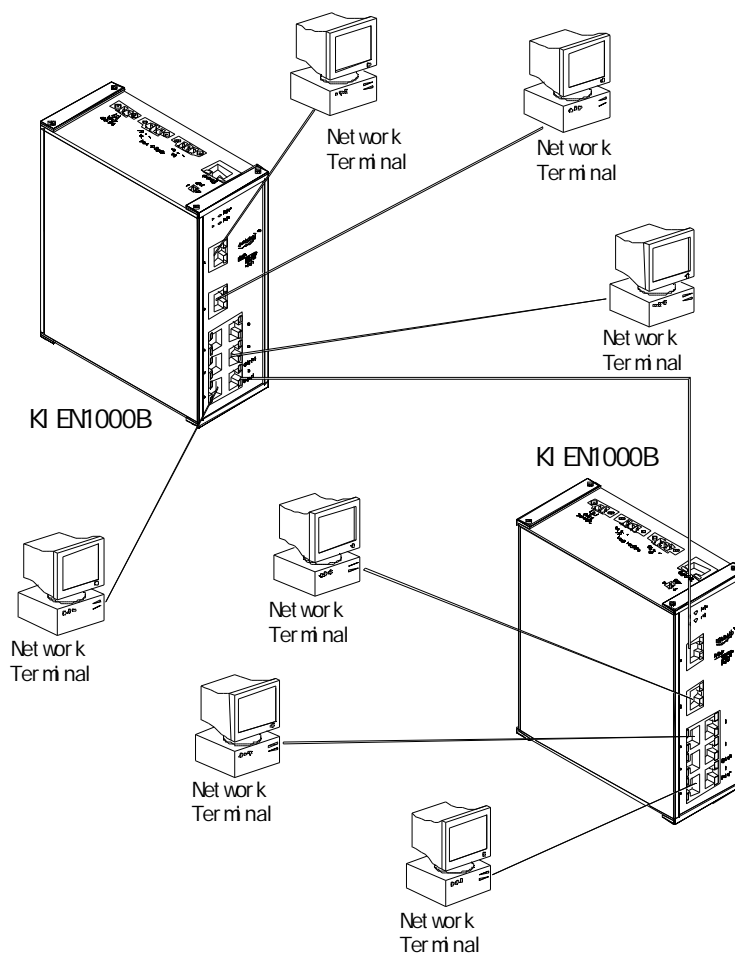

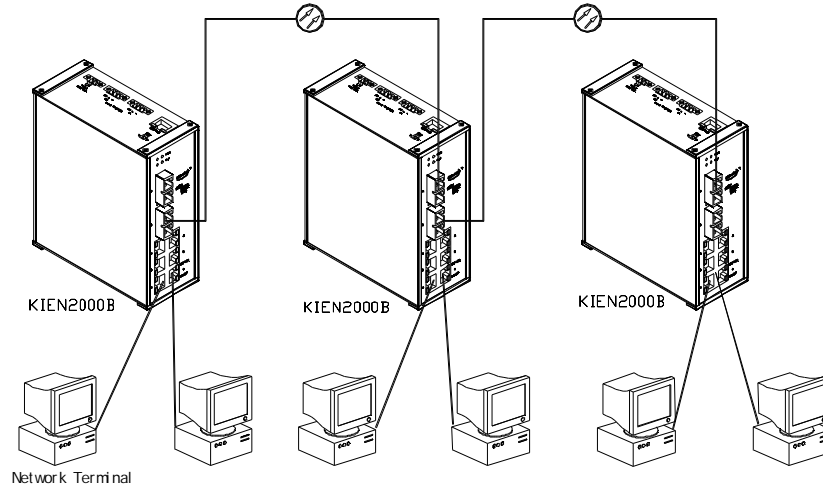Figure 6-3 Application of KIEN1000B

Figure 6-4 Optical Fiber Recurrent Network of KIEN2000B

6.2 System Configuration

The KIEN1000 and KIEN2000 serial industrial Ethernet switches adopt integrated structure with the standard configuration of six 10Base-T/100Base-TX Ethernet RJ-45 ports and the fixed power specification of DC 24V. Each KIEN1000 has 2 redundant 10Base-T/100Base-TX Ethernet RJ45 ports. Each KIEN1000B has 2 common 10Base-T/100Base-TX Ethernet RJ45 ports. Each KIEN2000 has 2 pairs of redundant 100Base-FX fiber ports with of single-mode or multi-mode setting. Each KIEN2000B has 2 pairs of common uplink 100Base-FX optical ports with the custom of single-mode or multi-mode setting. Their specific configuration and models are showed in the Table 6-1.

Configuration for KIEN1000 and KIEN2000 Serial Industrial Ethernet Switches

Switch Model	Switch Description
KIEN1000-8T	2 uplink redundant 10Base -T/100Base-TX Ethernet RJ45 ports, and 6 10Base-T/100Base-TX Ethernet RJ45 ports
KIEN1000B-8T	8 10Base-T/100Base-TX Ethernet RJ45 ports
KIEN2000-2S	2 pairs of uplink red undant 10Base-FX single-mode fiber ports, and 6 10Base-T/100Base-TX Ethernet RJ45 ports
KIEN2000-2M	2 pairs of uplink redundant 10 Base-FX multi-mode fiber ports, and 6 10Base-T/100Base-TX Ethernet RJ45 ports
KIEN2000B-2S	2 pairs of 10Base -FX single-mode fiber ports, and 6 10Base -T/100Base-TX Ethernet RJ45 ports
KIEN2000B-2M	2 pairs of 10Base -FX multi-mode fiber ports, and 6 10Base -T/100Base-TX Ethernet RJ45 ports