KTI
NETWORKS

KFS-1640

Industrial 16-Port Fast Ethernet Switch

Installation Guide

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TRADEMARKS

Ethernet is a registered trademark of Xerox Corp.

FCC NOTICE

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including the interference that may cause undesired operation.

CE NOTICE

Marking by the symbol "CE" indicates compliance of this equipment to the EMC directive of the European Community. Such marking is indicative that this equipment meets or exceeds the following technical standards:
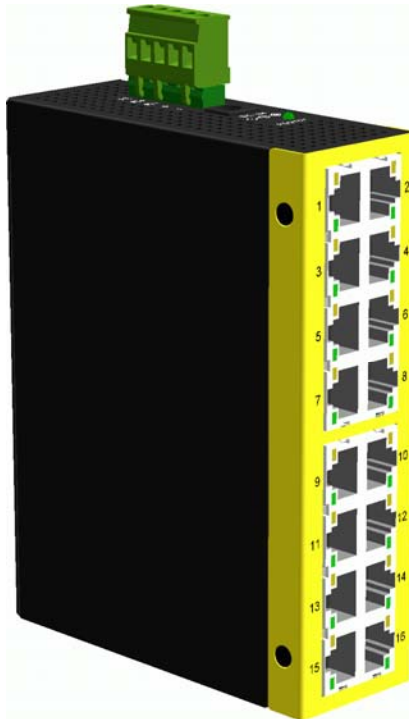
EMC Class A

EN 61000-6-3	IEC 61000-6-3
> EN 55022	CISPR 22 Class A
> EN 61000-3-2	IEC 61000-3-2
> EN 61000-3-3	IEC 61000-3-3
EN 55024	CISPR 24
> EN 61000-4-2	IEC 61000-4-2
> EN 61000-4-3	IEC 61000-4-3
> EN 61000-4-4	IEC 61000-4-4
> EN 61000-4-5	IEC 61000-4-5
> EN 61000-4-6	IEC 61000-4-6
> EN 61000-4-8	IEC 61000-4-8
> EN 61000-4-11	IEC 61000-4-11

Table of Contents

1. Introduction

The switch provides sixteen 10/100Mbps copper ports for connections to Ethernet and Fast Ethernet devices. With the featured auto-negotiation function, the switch can detect and configure the connection speed and duplex automatically. The switch also provides auto MDI/MDI-X function, which can detect the connected cable and switch the transmission wire pair and receiving pair automatically. This auto-crossover function can simplify the type of network cables used.

For industrial environment, the device is designed with the following enhanced features exceeding that of commercial Ethernet switches:

- High and wide operating Temperature
- Power input interface: Industrial screw terminal block and DC power jack for external commercial power adapter as option
- Screw panel and DIN rail mounting support for industrial enclosure
- Industrial-rated Emission and Immunity performance

1.1 Features

- Auto MDI/MDI-X crossover function on the copper port

- Support IEEE 802.3x flow control for full-duplex operation

- Support Back-pressure flow control for half-duplex operation

- Wide operating temperature range for temperature critical environment

- Support DIN-rail mounting and panel mounting

- Provide two power input types to meet more application needs

- Power saving mode for port link down

- Accept wide power input voltage range for application flexibility

- Industrial-rated Emission and Immunity performance

1.2 Product Panels

The following figure illustrates the panels of the switch:

Model: KFS-1640-L (Low DC)

Model: KFS-1640-H (High DC)

Din-Rail Mounting Bracket

DC Power Interface
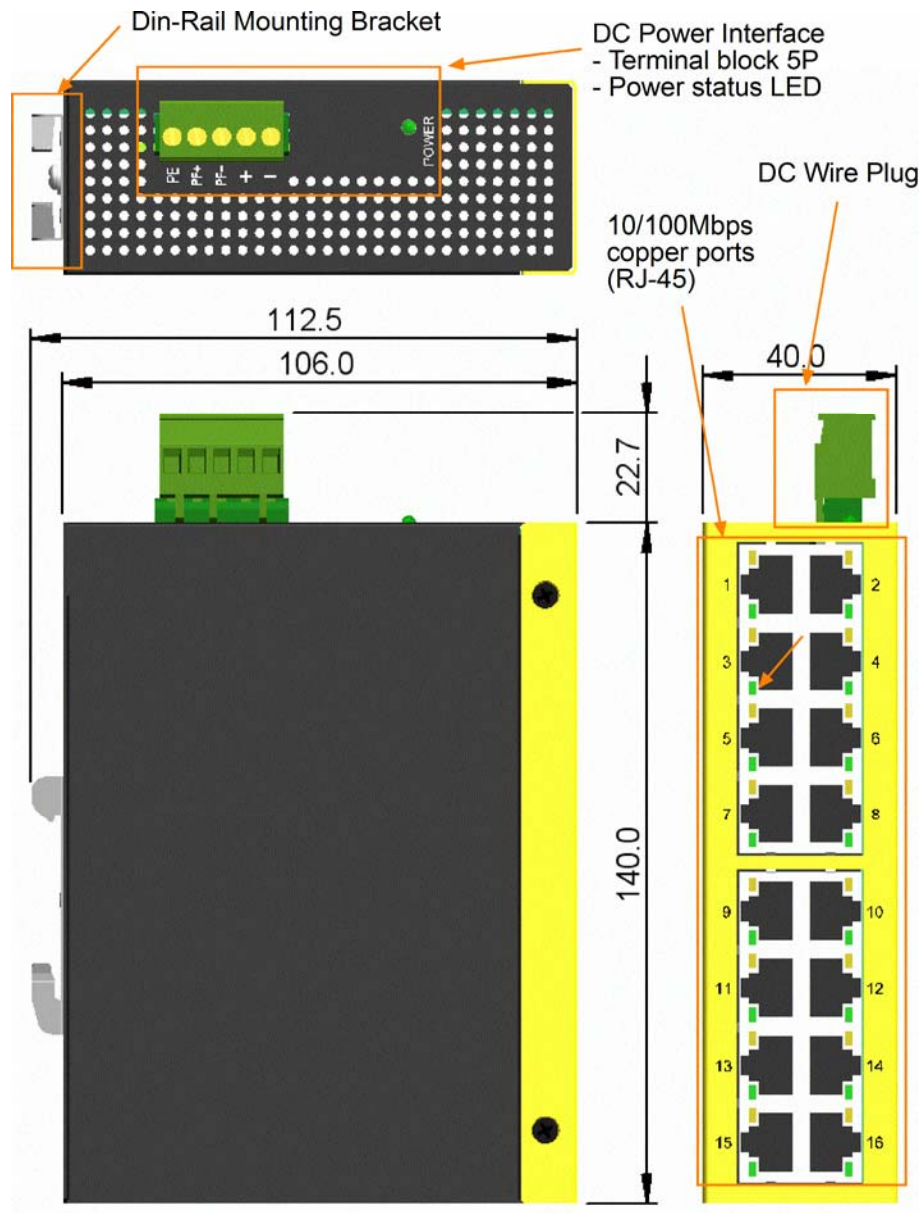- Terminal block 5P
- Power status LED

PE PP+ PP- + -

POWER

DC Wire Plug

10/100Mbps
copper ports
(RJ-45)

112.5

106.0

40.0

22.7

140.0

1 2
3 4
5 6
7 8

9 10
11 12
13 14
15 16
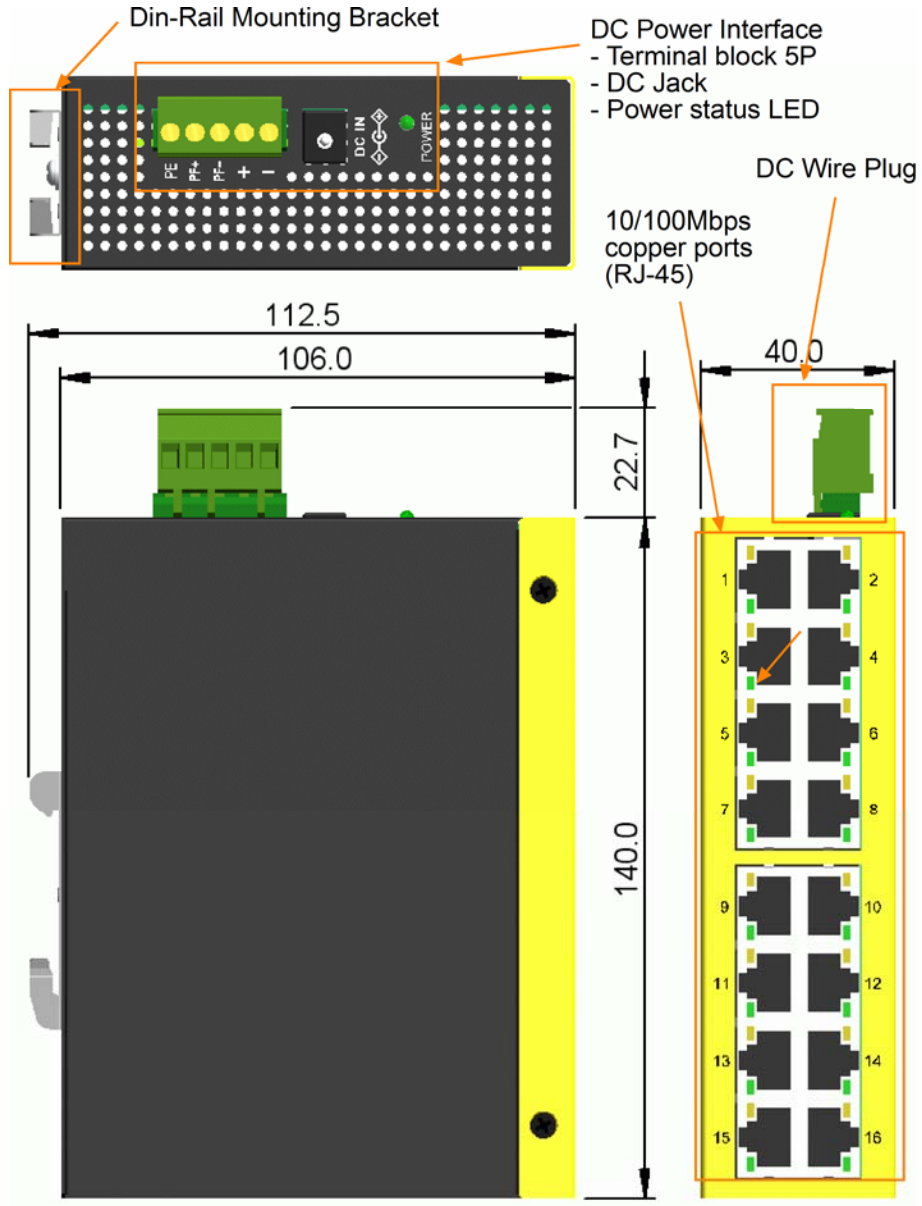
1.3 LED Indicators

LED	Function
POWER	Power status
1 - 16	Port 1 – Port 16
	LINK (Green) Link and activity status
	100M (Yellow) 100Mbps speed status

1.4 Specifications

10/100 Copper Ports

Compliance	IEEE 802.3 10Base-T, IEEE 802.3u 100Base-TX
Connectors	Shielded RJ-45 jacks
Pin assignments	Auto MDI/MDI-X detection
Configuration	Auto-negotiation or software control
Transmission rate	10Mbps, 100Mbps
Duplex support	Full/Half duplex
Network cable	Cat.5 UTP up to 100 meters

Switch Functions

Forwarding & filtering	Non-blocking, full wire speed
Switching technology	Store and forward
Maximum packet length	2K bytes
MAC Addresses Table	8K entries
Port configuration	Auto-negotiation for speed and duplex
Flow control	IEEE 802.3x pause frame base for full duplex operation
	Back pressure for half duplex operation
MAC Aging time	300 seconds
Storm control	Broadcast packets are dropped when more than 64 broadcast packets are received.

DC Power Input

Screwed terminal block	5P (5 contacts)
	- Vin+, Vin- (DC IN voltage input)
	- PF+, PF- (Power failure relay alarm output)
	- PE (Protective Earth, Frame Ground or Chassis ground)
DC Jack Connector	-D 6.3mm / + D 2.0mm (KFS-1640 Low DC Model available only)
Operating Voltages	KFS-1640-L: +4.5VDC ~ +50VDC
	KFS-1640-H: +110VDC (±10%), 90~240VAC
Power Consumption	KFS-1640-L: 3.4W max.

KFS-1640-H:	+110VDC(±10%) 4.6W max.
	90 ~ 240VAC 5.2W max.
Power Saving Mode	Total consumption when all ports link down
	KFS-1640-L: 1.1W @+5VDC

Mechanical

Dimension (base)	40 x 106 x 140 mm (WxDxH)
Housing	Enclosed metal with no fan
Mounting	Din-rail mounting
	Panel mounting (optional)

Environmental

Operating Temperature	Typical -20°C ~ +70°C
Storage Temperature	-20°C ~ +85°C
Relative Humidity	10% ~ 90% non-condensing

Electrical Approvals

FCC	Part 15 rule Class A	
CE	EMC, CISPR22 Class A	
	EN 61000-6-3	IEC 61000-6-3
	> EN 55022	
	> EN 61000-3-2	IEC 61000-3-2
	> EN 61000-3-3	IEC 61000-3-3
	EN 55024	CISPR 24
	> EN 61000-4-2	IEC 61000-4-2
	> EN 61000-4-3	IEC 61000-4-3
	> EN 61000-4-4	IEC 61000-4-4
	> EN 61000-4-5	IEC 61000-4-5
	> EN 61000-4-6	IEC 61000-4-6
	> EN 61000-4-8	IEC 61000-4-8
	> EN 61000-4-11	IEC 61000-4-11
Safety	CE/LVD	
	IEC60950-1	

2. Installation

2.1 Unpacking

The product package contains:

- The switch unit for Din-rail mounting
- One product CD-ROM

2.2 Safety Cautions

To reduce the risk of bodily injury, electrical shock, fire and damage to the product, observe the following precautions.

- Do not service any product except as explained in your system documentation.
- Opening or removing covers may expose you to electrical shock.
- Only a trained service technician should service components inside these compartments.
- If any of the following conditions occur, unplug the product from the electrical outlet and replace the part or contact your trained service provider:
  - The power cable, extension cable, or plug is damaged.
  - An object has fallen into the product.
  - The product has been exposed to water.
  - The product has been dropped or damaged.
  - The product does not operate correctly when you follow the operating instructions.
- Do not push any objects into the openings of your system. Doing so can cause fire or electric shock by shorting out interior components.
- Operate the product only from the type of external power source indicated on the electrical ratings label. If you are not sure of the type of power source required, consult your service provider or local power company.

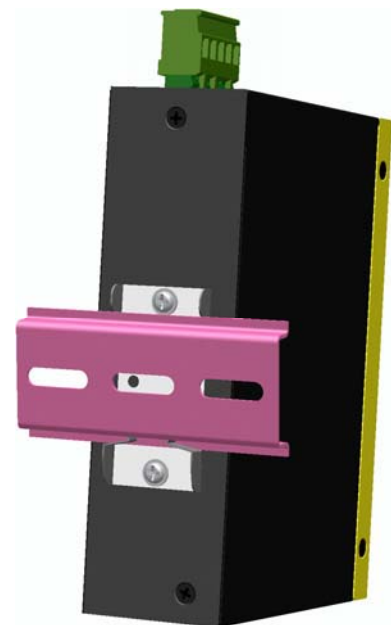## 2.3 Mounting the Switch to a Din-Rail

In the product package, a DIN-rail bracket is provided or has been installed for mounting the switch in a industrial DIN-rail enclosure.

The steps to mount the switch onto a DIN rail are:

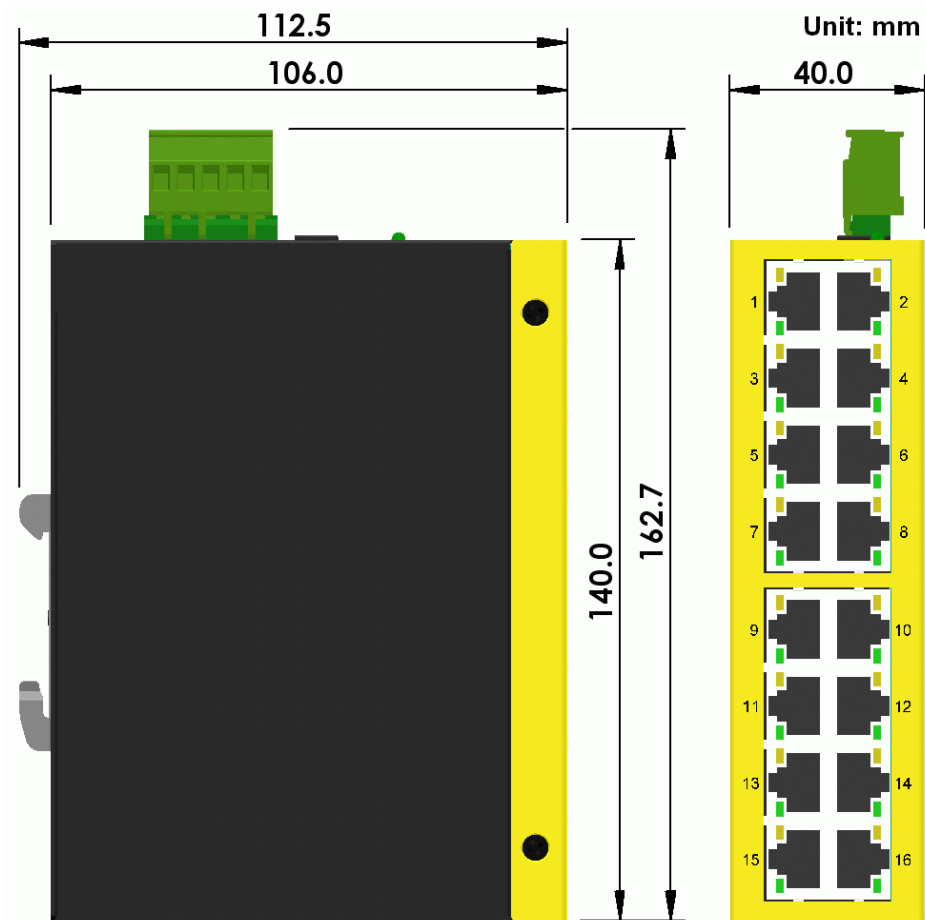1. Install the mounting bracket onto the switch unit with screws as shown below:
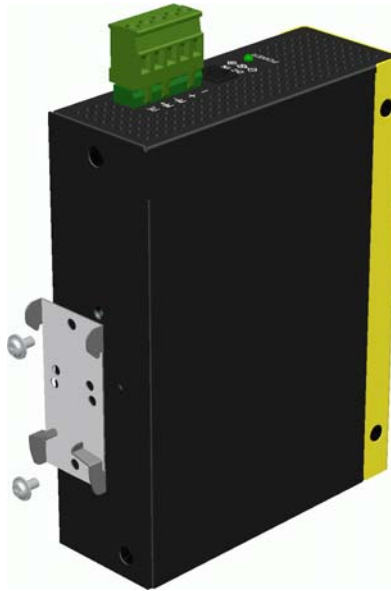
2. Attach bracket to the lower edge of the DIN rail and push the unit upward a little bit until the bracket can clamp on the upper edge of the DIN rail.

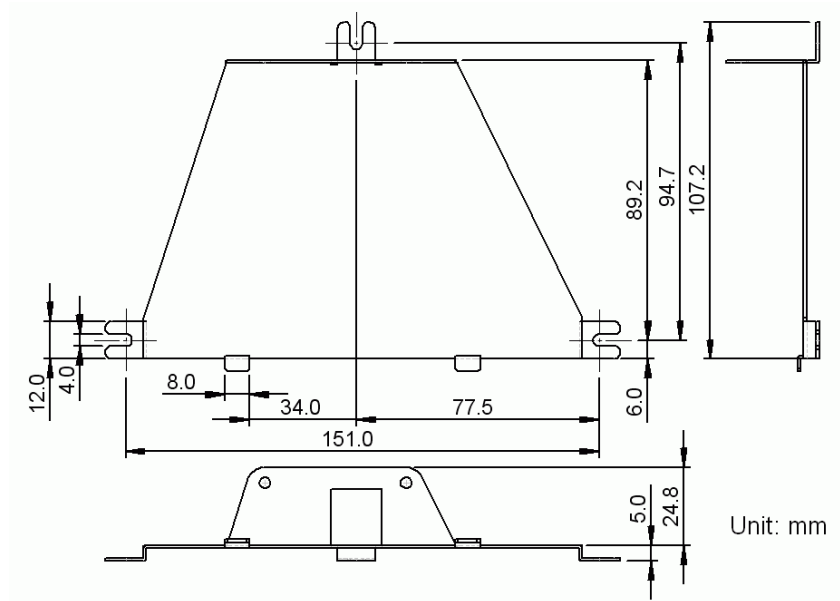3. Clamp the unit to the DIN rail and make sure it is mounted securely.

The final dimension is:

2.4 Mounting the Switch on a Panel

The switches may be provided optionally with a panel mounting bracket. The bracket supports mounting the switch on a plane surface securely.
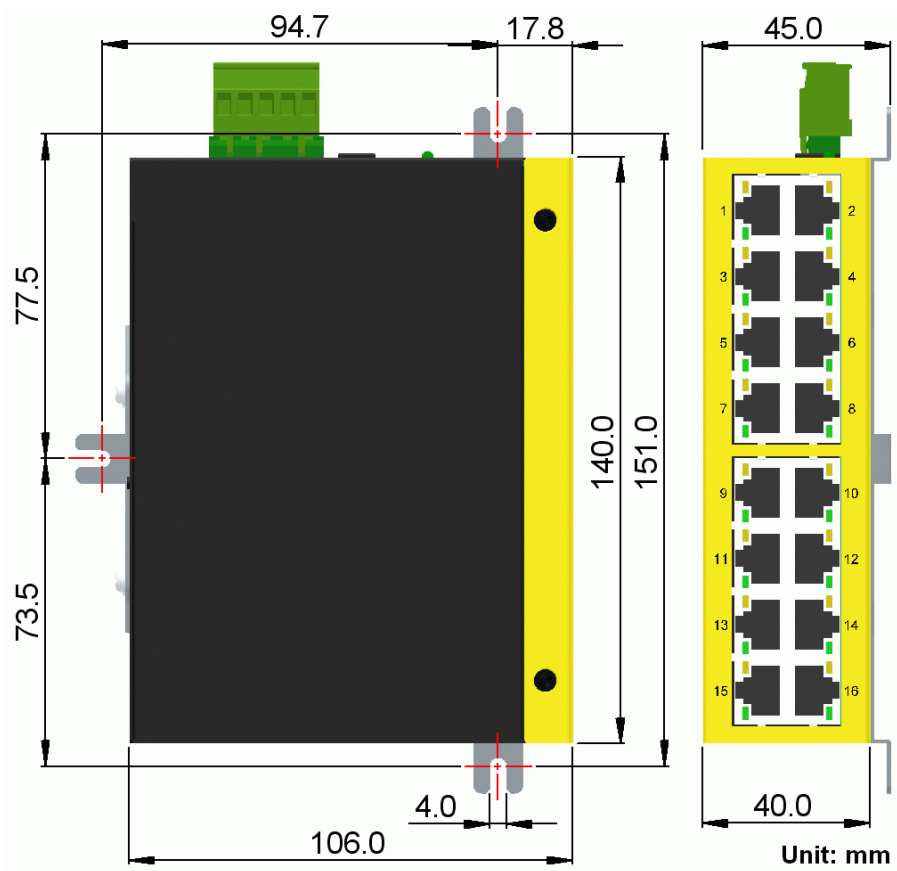

The mounting steps are:

1. Install the mounting bracket on the switch unit.
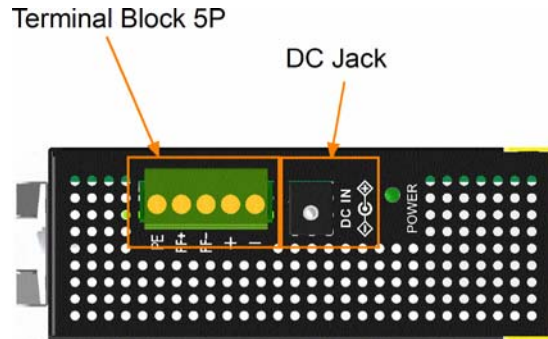
2. Screw the bracket on the switch unit.

3. Screw the switch unit on a panel and the locations for screws are shown below:

94.7   17.8   45.0

77.5

73.5

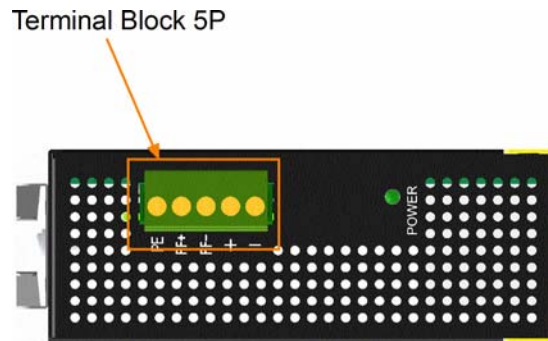140.0   151.0

4.0

106.0

40.0

Unit: mm

2.5 Applying Power

The switch provides two types of power interfaces, terminal block and DC power jack for receiving DC power input from external power supply.

KFS-1640-L (Low DC Model)

KFS-1640-H (High DC Model)

The DC IN power requirements no matter which interface is used are:

Vin Operating Voltage Range

KFS-1640-L (Low DC Model)	+4.5VDC ~ +50VDC
KFS-1640-H (High DC Model)	+110VDC (±10%), 90 ~ 240VAC

Power Consumption

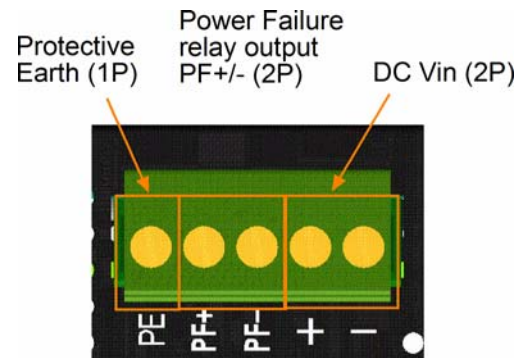|	
KFS-1640-L (Low DC Model)	3.22Watts @+7.5VDC
	3.24Watts @+12VDC
	3.21Watts @+48VDC
KFS-1640-H (High DC Model)	4.54Watts @+110VDC
	4.80Watts @240VAC

2.5.1 Using Terminal Blocks

The terminal block interface is shown below:

Note: When using terminal block connectors, put a cap on the DC jack.

3P & 2P Terminal Plugs

Two terminal plugs, 3P and 2P are provided together with the switch. The plug is shown below:

2.5.1.1 DC IN Terminals

Vin Positive (+) terminal

Vin Negative (-) terminal

Specification of the power wires for Vin terminals

24 ~ 12AWG (IEC 0.5~2.5mm^2)

Install the power source wires with the plug properly.

2.5.1.2 Power Failure Relay Output Terminals

PF+ terminal

PF- terminal

The switch provides a relay output to report failure event to a remote alarm monitoring system. The replay output is provided with two contacts in the terminal block next DC Vin interface. The function is designed as :

Alarm function

Alarm Event: Input power failure

Normal: PF+ and PF- shorted

Alarm: PF+ and PF- open

Note:

Be sure the voltage applied on PF+/- contacts is within the specification of 30VDC / 1A max. or 120VAC / 0.5A max.

2.5.1.3 Protective Earth Terminal

PE terminal

This contact connects internally the frame ground (also called chassis ground) of the switch. It is suggested to connect this terminal to the protective earth ground if the switch is not installed in a Din-Rail enclosure.
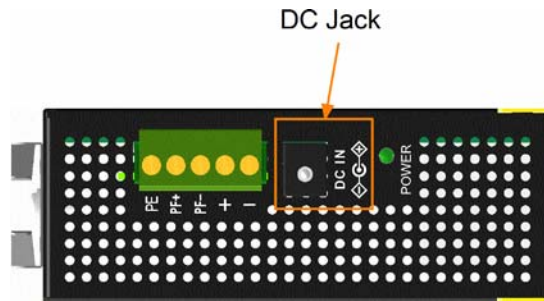
2.5.1.4 Terminal Block for AC Input

KFS-1640-H (High DC Model) only

The power connection is as follows:

Terminal	AC Input
Vin+	L
Vin -	N
PE	PE

2.5.2 Using DC Power Jack

When an external power system is not available, the switch provides a DC jack to receive power from typical AC-DC power adapter alternatively.

Interfaces

DC Jack (-D 6.3mm / + D 2.0mm)

Note:

1. The DC Jack is available on KFS-1640-L (Low DC model) only.

2. When using DC Jack, put caps on the contacts of the terminal block.

3. Before beginning the installation, check the AC voltage of your area. The AC power adapter which is used to supply the DC power for the unit should have the AC voltage matching the commercial power voltage in your area

.

3. Making LAN Connections

3.1 10/100 Copper Ports

The 10/100 RJ-45 copper ports support the following connection types and distances:

Network Cables

10BASE-T: 2-pair UTP Cat. 3, 4, 5, EIA/TIA-568B 100-ohm

100BASE-TX: 2-pair UTP Cat. 5, EIA/TIA-568B 100-ohm

Link distance: Up to 100 meters

Auto MDI/MDI-X Function

This function allows the port to auto-detect the twisted-pair signals and adapts itself to form a valid MDI to MDI-X connection with the remote connected device automatically. No matter a straight through cable or crossover cable are connected, the ports can sense the receiving pair automatically and configure themselves to match the rule for MDI to MDI-X connection. It simplifies the cable installation.

Auto-negotiation Function

The ports are featured with auto-negotiation function and full capability to support connection to any Ethernet devices. The port performs a negotiation process for the speed and duplex configuration with the connected device automatically when each time a link is being established. If the connected device is also auto-negotiation capable, both devices will come out the best configuration after negotiation process. If the connected device is incapable in auto-negotiation, the switch will sense the speed and use half duplex for the connection.

3.2 LED Indication
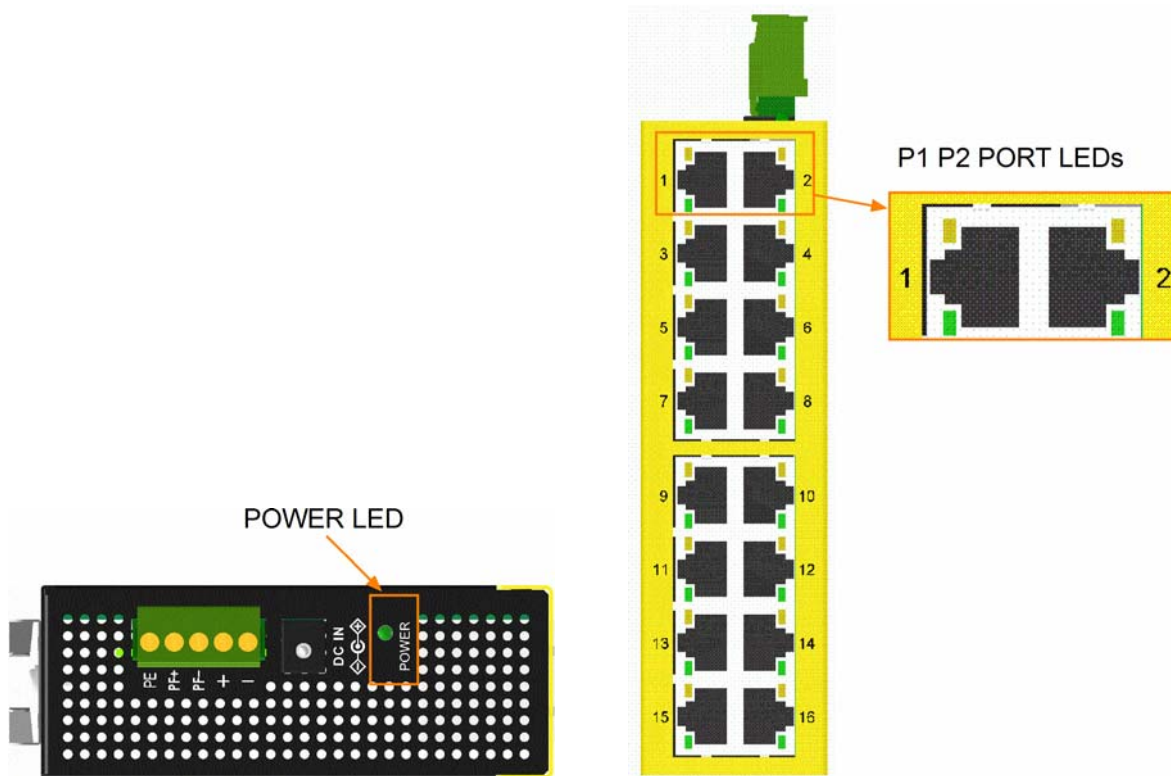
Two LEDs, green one and yellow one are provided on each port RJ-45 connector. They display the link and speed status of each individual port. Above figure shows Port 1 and Port 2 LEDs as an example.

LED Interpretations

LED	Function	State	Interpretation
POWER	Power status	ON	The power is supplied to the switch.
		OFF	The power is not supplied to the switch.
LINK (Green)	Port link status	ON	A 10M or 100Mbps link is established on the port. (No traffic)
		BLINK	Port link is up and there is traffic.
		OFF	Port link is down.
100M (Yellow)	100Mps status	ON	100Mbps speed is used on the port.
		OFF	10Mbps speed is used on the port.