# EIR405-T

# User Manual

# EIR405 - T

Documentation Number: EIR405 - T- 0912m

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# Overview

## Introduction

The EIR405-T is an industrial DIN mount, unmanaged 5 port Gigabit Ethernet switch.

**High-Speed Transmissions**
The EIR405-T includes a switch controller that can automatically sense transmission speeds (10/100/1000 Mbps). The RJ-45 interface can also be auto-detected, so MDI or MDI-X is automatically selected and a crossover cable is not required. All Ethernet ports have memory buffers that support the store-and-forward mechanism. This assures that data is properly transmitted

**Dual Power Input**
To reduce the risk of power failure, the EIR405-T provides two 12 to 48 VDC power inputs. If the power fails, the switch will automatically switch to the secondary power input.   Also if the power goes out the corresponding P1 or P2 LED will go out and the Fault LED will light.    The contacts for the alarm output will also open.

**Flexible Mounting**
The EIR405-T can be DIN or Panel mounted.   The compact design is suitable for space-constrained environment such as a small cabinet.

**Advanced Protection**
The power line input on the EIR405-T supports up to 3,000 VDC EFT protection, which secures the equipment against unregulated voltages and makes the system safer and more reliable.    The Ethernet ports support up to 6,000 VDC ESD protections which makes the switch suitable for harsh environments.

**Wide Operating Temperature**
The operating temperature of the EIR405-T is -40 to 75$^{o}$C.    This wide range allows the switch to be used in some of the harshest industrial environments that exist.

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**Easy Troubleshooting**

LED indicators make troubleshooting quick and easy. There are 2 LED's for each port that display the link status and transmission speed.   Three LED's P1, P2 and Fault help you diagnose if power is present.

# Features

- Provides 5 x 10/100/1000Base-T Mbps Ethernet ports.
- Supports full/half duplex flow control
- Supports auto-negotiation (10/100/1000)
- Supports MDI/MDI-X auto-crossover
- Supports Jumbo Frame of 9Kbytes
- Supports surge (EFT) protection 3,000 VDC for power input
- Supports 6,000 VDC Ethernet ESD protection
- Supports redundant 12 to 48 VDC power inputs
- Provides flexible mounting:   DIN-rail or Panel Mounting
- Supports operating temperatures from -40 to 75$^{\circ}$C

# Packing List

- (1) EIR405-T, 5 Port Gigabit Industrial Ethernet Switch
- (1) Quick Start Guide
- (1) CD ROM with User Manual
- (2) Wall Mounting Bracket and Screws

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# Hardware Description

## Front Panel

The Front Panel view of the EIR405-T is shown below.



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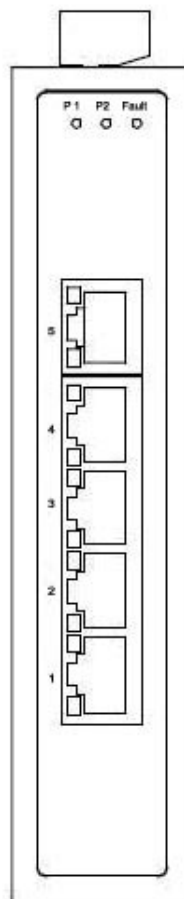
# Top View

The top panel view of the EIR405-T is equipped with one terminal block connector that consists of two 12 to 48 VDC power inputs and the fault alarm output.
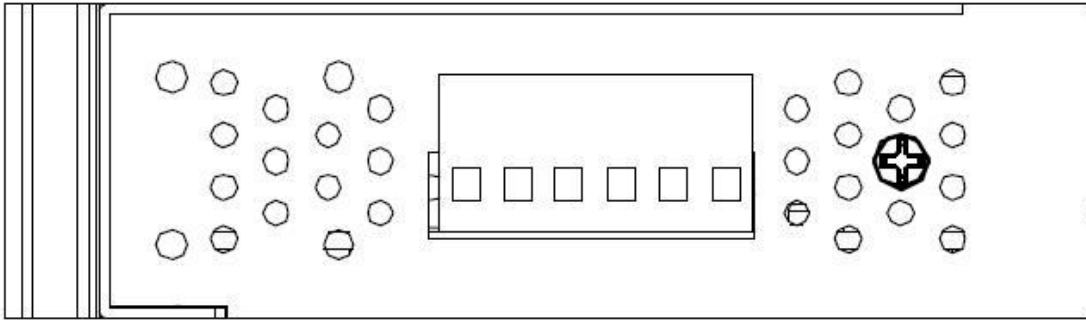


# Wiring the Power Inputs

Follow the steps below to insert the power wires.
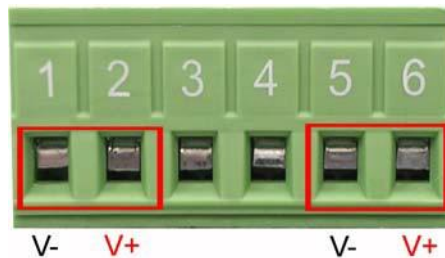


1. Insert the positive and negative wires into the V+ and V- contacts on the terminal block connector.



2. Tighten the wire-clamp screws to prevent the wires from becoming loose.

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# Wiring the Fault Alarm Contact

The fault alarm contact is in the middle of terminal block connector as the picture shows below. If one of the power sources fails a fault will be detected causing the circuit to open.
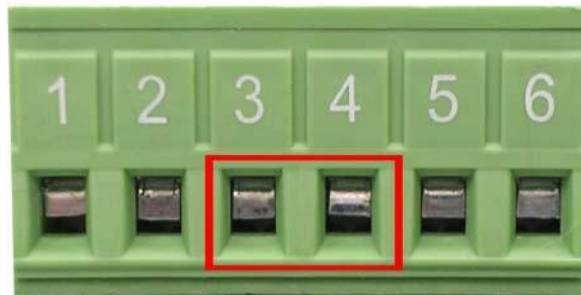


Insert the wires into the fault alarm contact (No. 3 & 4)

| | |
|---|---|
| ***Note*** | *The wire gauge for the terminal block should be 12 to 24 AWG.* |

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# LED Indicators

Below is a table that explains the status of each the power and network status LED's found on the front panel of the EIR405-T.

| LED | Color | Description | |
|---|---|---|---|
| P1 | Green | On | Power input 1 is active |
| | | Off | Power input 1 is inactive |
| P2 | Green | On | Power input 2 is active |
| | | Off | Power input 2 is inactive |
| Fault | Red | On | Power input 1 or 2 is inactive |
| | | Off | Power inputs 1 and 2 are both active, or no power is present |
| Ports 1 to 5 (Upper LED) | Green | On | Connected to network |
| | | Flashing | Networking is active |
| | | Off | Not connected to network |
| Ports 1 to 5 (Lower LED) | Green | On | Connected to network at speed of 1000Mbps |
| | | Off | Not connected to 1000Mbps network |

# Ports

**RJ-45 ports**: The RJ-45 ports auto-sense for 10, 100 or 1000 Mbps devices connections. The auto MDI/MDIX feature allows connections to switches, workstation and other equipment without changing straight through or crossover cabling.  The charts below show the cable pin assignments for straight through and crossover cables.

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④ **RJ-45 Pin Assignments**

| Pin Number | Assignment |
|:----------:|:----------:|
| 1 | Tx+ |
| 2 | Tx- |
| 3 | Rx+ |
| 6 | Rx- |

*Note        "+" and "-" signs represent the polarity of each wire pair.*

All ports on the EIR405-T support automatic MDI/MDI-X operation, you can use straight-through cables (See Figure below) for all network connections to PCs or servers, or to other switches or hubs. In straight-through cables, pins 1, 2, 3, and 6, at one end of the cable, are connected straight through to pins 1, 2, 3 and 6 at the other end of the cable. The table below shows the 10BASE-T / 100BASE-TX MDI and MDI-X port pin outs.

| Pin | MDI-X Signal Name | MDI Signal Name |
|:---:|:-----------------:|:---------------:|
| 1 | Receive Data plus (RD+) | Transmit Data plus (TD+) |
| 2 | Receive Data minus (RD-) | Transmit Data minus (TD-) |
| 3 | Transmit Data plus (TD+) | Receive Data plus (RD+) |
| 6 | Transmit Data minus (TD-) | Receive Data minus (RD-) |

```
Switch        Router or PC

3 TD+ ─────────► 3 RD+
6 TD- ─────────► 6 RD-


1 RD+ ◄───────── 1 TD+
2 RD- ◄───────── 2 TD-
```
Straight Through Cable Schematic

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```
Switch          Switch
3  TD+          3  TD+
6  TD-          6  TD-

1  RD+          1  RD+
2  RD-          2  RD-
```
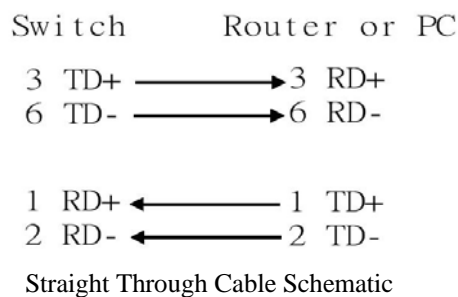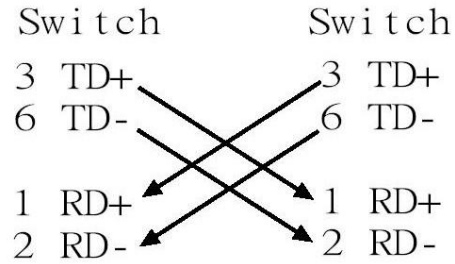
Cross Over Cable Schematic

# Cabling

Use unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cable.

10Mbps:   Use category 3, 4, 5 or greater cable

100Mbps:   Use category 5 or greater

1000Mbps:   Use category 5e or greater cable

Cable distances should be less than 100 meters (328 ft.) long.

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RJ-45 Male
Plug

87 6 5 4 3 2 1      1 2 3 4 5 6 7 8                1 2 3 4 5 6 7 8

RJ-45
Female
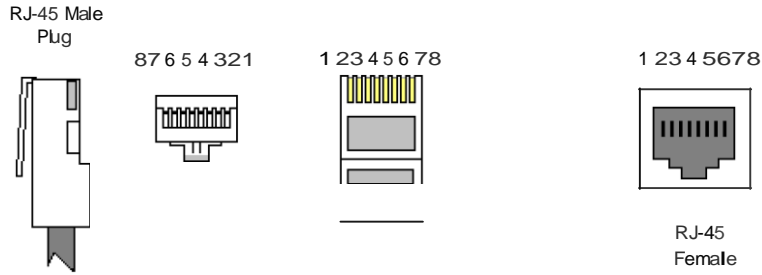
Color standard
EIA!TIA T568A                    Ethernet Patch Cable

Tx+
Tx-
RX+ It27ZI

RX- c=::J

| RJ45 Pin# | | | | Pin# RJ45 | | |
|---|---|---|---|---|---|---|
| Green!White Tracer | 1 | | | 1 | Green!White Tracer | PR 3 |
| Green | 2 | | | 2 | Green | |
| Orange!White Tracer | 3 | | | 3 | Orange!White Tracer | PR 2 |
| Blue | 4 | | | 4 | Blue | PR 1 |
| Blue!White Tracer | 5 | | | 5 | Blue!White Tracer | |
| Orange | 6 | | | 6 | Orange | PR 2 |
| Brown!White Tracer | 7 | | | 7 | Brown!White Tracer | PR 4 |
| Brown | 8 | | | 8 | Brown | |
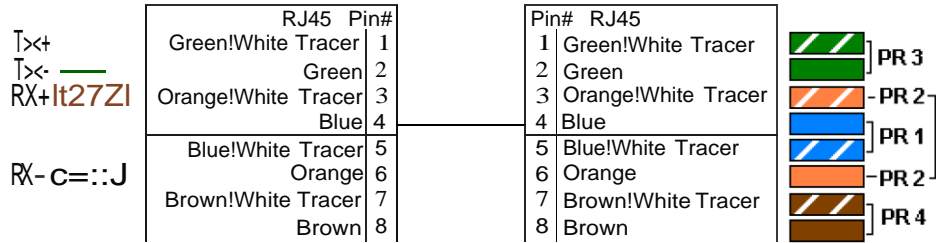
Color standard
EIA!TIA T568A                    Ethernet Crossover Cable

| RJ45 Pin# | | | | Pin# RJ45 | |
|---|---|---|---|---|---|
| Green!White Tracer | 1 | | | 1 | Orange!White Tracer |
| Green | 2 | | | 2 | Orange |
| Orange!White Tracer | 3 | | | 3 | Green!White Tracer |
| Blue | 4 | | | 4 | Brown!White Tracer |
| Blue/White Tracer | 5 | | | 5 | Brown |
| Orange | 6 | | | 6 | Green |
| Brown!White Tracer | 7 | | | 7 | Blue |
| Brown | 8 | | | 8 | Blue/White Tracer |
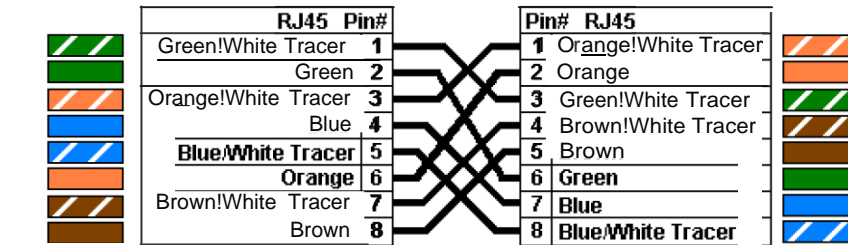
"A" is earlier

Color standard
EIA!TIA T568B

Ethernet Patch Cable

TX+ [?ZZI]
TX- c=::J
RX+ PJiilll"...

PJiilll"...
RX- —
PJiilll"...

| RJ45 Pin# | | Pin# RJ45 | |
|---|---|---|---|
| Orange!White Tracer | 1 | 1 | Orange!White Tracer |
| Orange | 2 | 2 | Orange |
| Green!White Tracer | J | J | Green!White Tracer |
| Blue | 4 | 4 | Blue |
| Blue!White Tracer | 5 | 5 | Blue!White Tracer |
| Green | 6 | 6 | Green |
| Brown!White Tracer | 7 | 7 | Brown!White Tracer |
| Brown | 8 | 8 | Brown |

PR 2
-PR 3⌐
PR 1
-PR 3⌐
PR 4
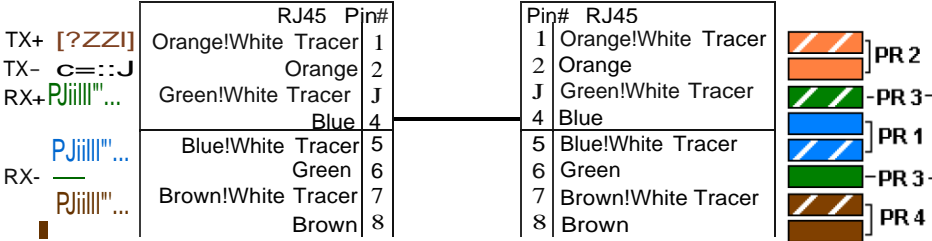
Color standard

Ethernet Crossover Cable

Green!White Tracer  J          J  Orange!White Tracer  It'llZl
                    7          7  Blue

EIA!TIA T568B

| RJ45 Pin# | | Pin# RJ45 | |
|---|---|---|---|
| Orange!White Tracer | 1 | 1 | Green!White Tracer |
| Orange | 2 | 2 | Green |
| Blue | 4 | 4 | Brown!White Tracer |
| Blue!White Tracer | 5 | 5 | Brown |
| Green | 6 | 6 | Orange |
| Brown!White Tracer | | | |
| Brown | 8 | 8 | Blue!White Tracer |

PJiilll"...

PJiilll"...

c=::J

PJiilll"...
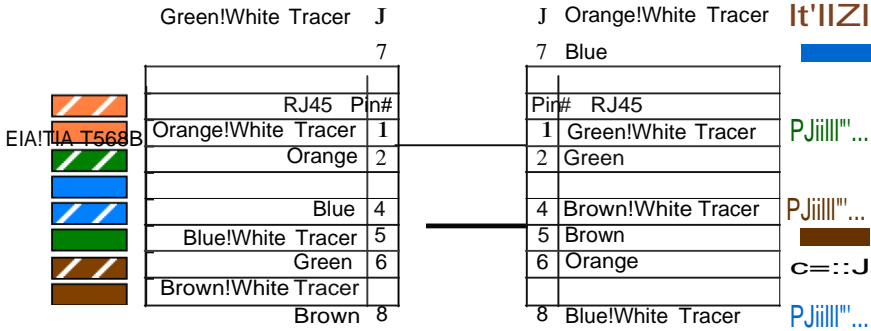
"B" is most recent

Common Ethernet Crossover Cables may only
cross connect the Orange & Green pairs

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# Mounting Installation

## DIN-Rail Mounting

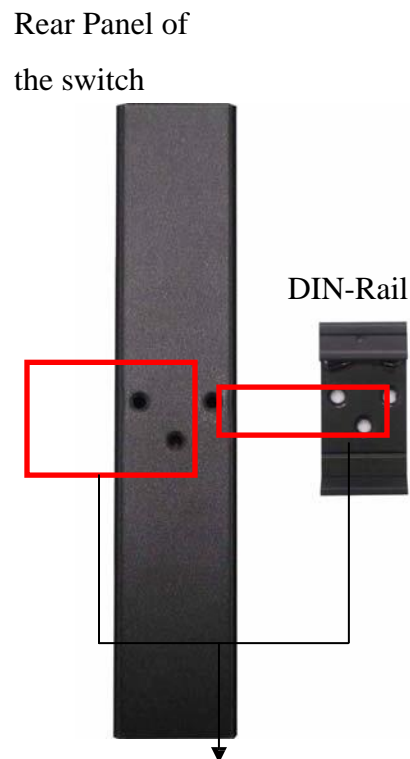The DIN rail clip comes screwed on to the switch, from the factory. If the DIN rail clip is not screwed on the switch, please see the following figure to re-attach the DIN-Rail clip. Then follow the steps below to hang the switch onto a DIN rail.

Rear Panel of
the switch

DIN-Rail

1. Use the screws to screw the DIN rail clip onto the switch.
2. To remove the DIN rail clip, reverse step 1.

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3. First, insert the top of DIN rail clip onto the piece DIN rail track.



4. Then, lightly push the bottom of the switch so it can snap the rest of the way onto the DIN rail track.
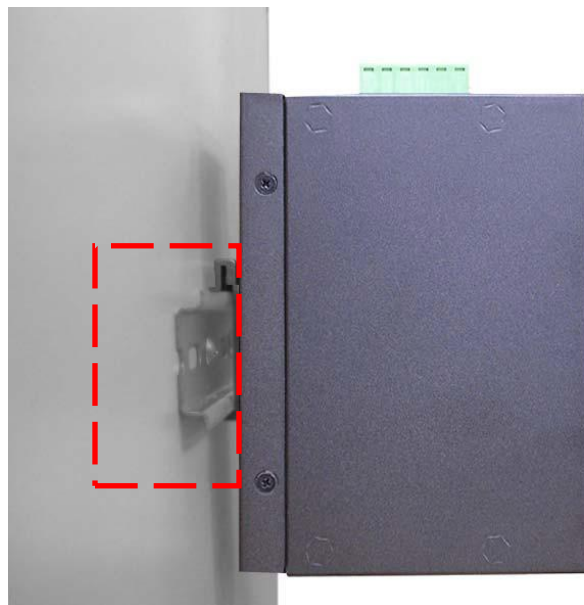


5. Check that the switch is held tightly to the DIN rail track.

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6. To remove the switch from the track, reverse the steps above.

- First pushing down lightly on the switch will give enough room for the bottom of the switch to clear the bottom of the DIN rail track.

- Pulling slowly at the bottom of the switch will bring the switch out so that the switch can now be carefully lifted off the DIN rail track.

# Wall or Panel Mount Plate Mounting

Follow the steps below to mount the switch with the wall mount plates.

1. Remove the DIN rail clip from the switch; loosen the screws to remove the DIN rail clip.
2. Place the wall mount plate on the side panels of the switch.
3. Use the screws to screw the wall mount plate onto the switch.
4. Use the hook holes at the corners of the wall mount plates to hang the switch on the wall.
5. To remove the wall mount plate, reverse steps above.

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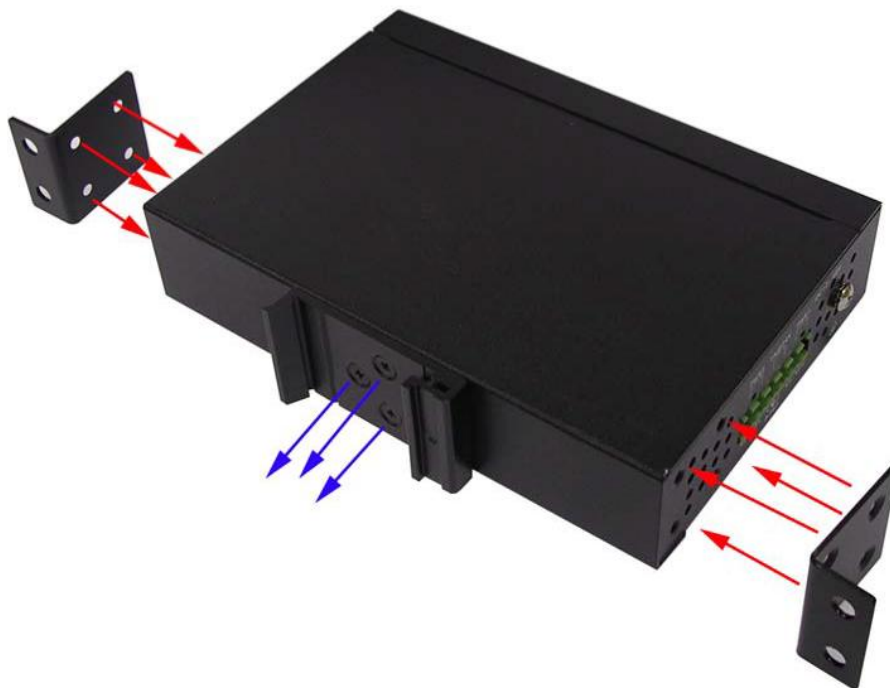
# Hardware Installation

The diagram below shows a typical switch installation for the EIR405-T.
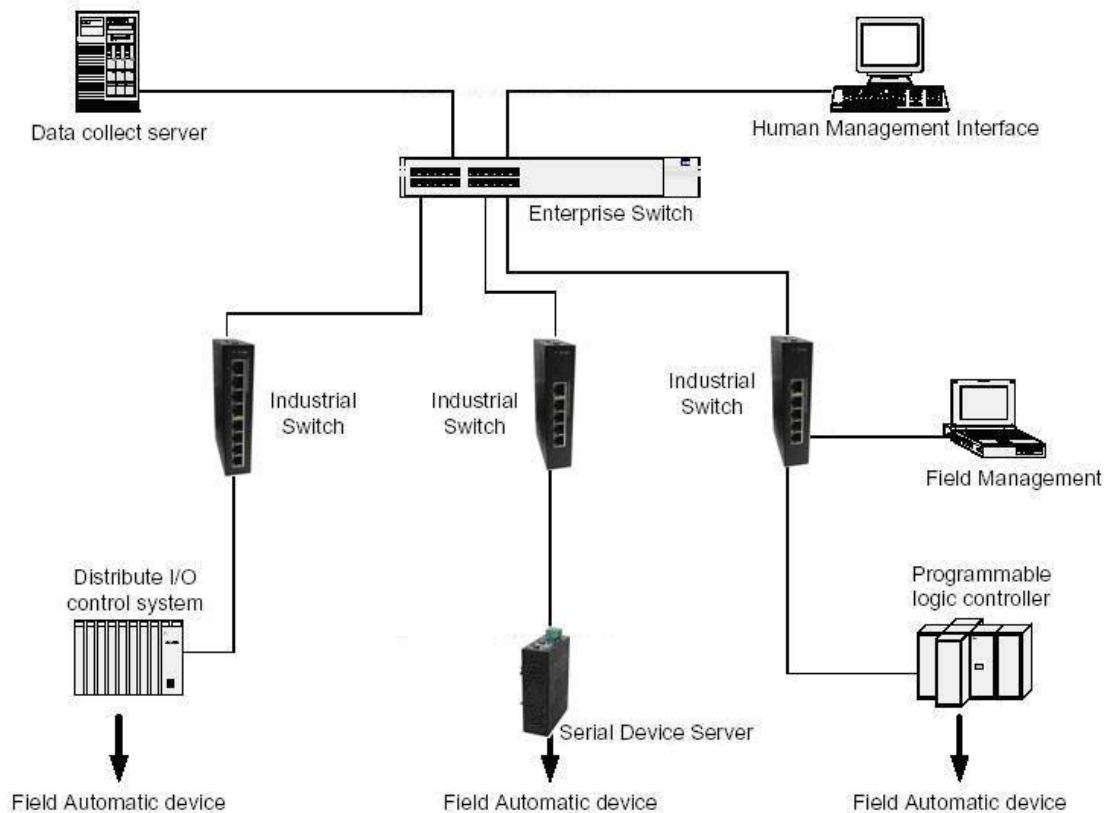


## Installation Steps

1. Unpack the switch.
2. Check that the DIN rail is screwed onto the switch. If the DIN rail clip is not screwed onto the switch. Please refer to **DIN-Rail Mounting** section for DIN-Rail installation. If you want to wall or panel mount the switch, then please refer to **Wall or Panel Mount Plate Mounting**.

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3.  Apply power to the switch.   If you need help with this please refer to the **Wiring the Power Inputs** section. The power LED on the switch will light up. Please refer to the **LED Indicators** section for meaning of LED lights.

4.  Prepare the twisted-pair, Ethernet cable for connection.

5.  Insert one side of cable into one of the switches Ethernet ports and the other side of the cable to the network device you want connected ex: switch, PC or Server. The port LED on the Industrial switch will light up when the cable is connected to the network device. Please refer to the **LED Indicators** section for LED light meaning.

6.  When all connections are made and the LED lights show normal activity the installation is complete.

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# Troubleshooting

- Verify that you are using a power supply ranging from 12 to 48VDC. Applying more than 48VDC could cause damage to the switch.

- Be sure the proper cable is used in your network. Refer to the **Cabling** section of this manual for help.

- **Diagnosing LED Indicators:** The switch can be monitored through the LED indicators on the front panel of the switch. The LED's can help describes common problems you may encounter and where you may find possible solutions, to assist in identifying problems.

- If the power indicators do not light on when power is applied, you may have a problem with the power supply. Check for loose power connections, power losses or surges at the power outlet.

- If the switch LED's represent normal operating mode and the cable connections are correct and no data is transmitted or received through the switch, contact your Network Administrator for network configuration and status help.

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# Technical Specification

## Communications

| | |
|---|---|
| **Compatibility** | IEEE 802.3, 802.3u, 802.3ab |
| | IEEE 802.3x |
| **LAN** | 10/100/1000Base-T |
| **Transmission Distance** | Up to 100 m |
| **Transmission Speed** | Up to 1000 Mbps |
| **Broadcast Storm Rate Limit** | 7,926pps (default) |

## Interface

| | |
|---|---|
| **Connectors** | 5 x RJ-45 (5-port 10/100/1000TX) |
| | 6-pin removable screw terminal (power input & fault relay output) |
| **LED Indicators** | Unit: P1, P2, Fault |
| | Ethernet port: Link/Active (100Mbps) |
| | Link (1000Mbps) |

## Power

| | |
|---|---|
| **Power Consumption** | 4.6 W |
| **Power Input** | 2 x Unregulated 12 to 48 VDC |
| **Fault Output** | 1 Relay Output |

## Mechanism

| | |
|---|---|
| **Dimensions (WxDxH)** | 30 x 95 x 140 mm |
| | (1.2 x 3.7 x 5.5 inches) |
| **Enclosure** | IP30, Metal shell with solid mounting kits |

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# Protection

| | |
|---|---|
| **ESD (Ethernet)** | 6,000 VDC |
| **Surge (EFT for power)** | 3,000 VDC |
| **Reverse Power** | Yes |

# Environment

| | |
|---|---|
| **Operating Temperature** | -40 to 75$^{o}$C (-40 to 167$^{o}$F) |
| **Operating Humidity** | 5% to 95% (non-condensing) |
| **Storage Temperature** | -40 to 85$^{o}$C (-40 to 185$^{o}$F) |

# Certifications

| | |
|---|---|
| **Safety** | UL, cUL, CE EN60950-1 |
| **EMC** | FCC Class A, |
| | CE EN61000-4-2 (ESD) |
| | CE EN61000-4-3 (RS) |
| | CE EN61000-4-4 (EFT) |
| | CE EN61000-4-5 (Surge) |
| | CE EN61000-4-6 (CS) |
| | CE EN61000-4-8 |
| | CE EN61000-4-11 |
| | CE EN61000-4-12 |
| | CE EN61000-6-2 |
| | CE EN61000-6-4 |
| **Free Fall** | IEC60068-2-32 |
| **Shock** | IEC60068-2-27 |
| **Vibration** | IEC60068-2-6 |

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