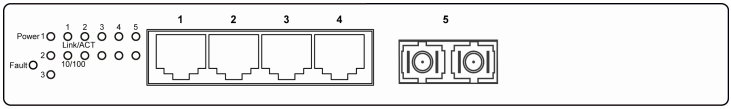
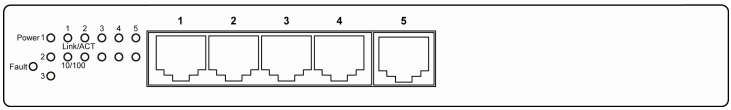
Quick Start Guide

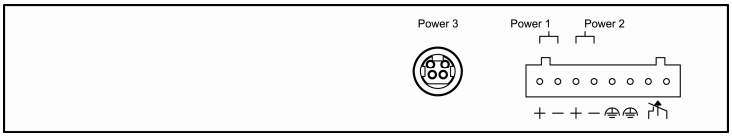
This quick start guide describes how to install and use the Hardened PoE Ethernet Switch. This is the switch of choice for harsh environments constrained by space.

Physical Description

The Port Status LEDs and Power inputs







LED	State	Indication
Power1 Power2 Power3	Steady	Power on.
	Off	Power off.
Fault	Steady	Power redundant system failure occurred.
	Off	Power redundant system failure is not occurred.
10/100Base-TX, 100Base-FX/BX		
Link/ACT	Steady	A valid network connection established.
	Flashing	Transmitting or receiving data. ACT stands for ACTIVITY.
10/100	Steady	Valid port connection at 100Mbps.
	Off	Valid port connection at 10Mbps.

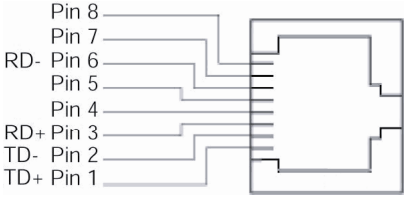
Power Input Assignment			
Power3		48VDC	DC Jack
Power2	+	48VDC	Terminal Block
	−	Power Ground	
Power1	+	48VDC	
	−	Power Ground	
⏚		Earth Ground	
Relay Output Rating			1A @ 24VDC
Relay Alarm Assignment			
FAULT	*Relay warning signal disable for following: The relay contact closes if Power1 and Power2 are both failed but Power3 on. The relay contact closes if Power3 is failed but Power1 and Power2 are both on.		

DC Terminal Block Power Inputs: There are two pairs of power inputs can be used to power up this switch. Redundant power supplies function is supported.

The 10/100Base-TX and 100Base-FX/BX Connectors

1. The 10/100Base-TX Connections

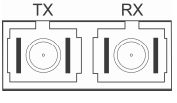
The following lists the pinouts of 10/100Base-TX ports.



Pin	PoE Ports (Port 1-4)	Non-PoE Port (Port 5)
1	Output Transmit Data +	Output Transmit Data +
2	Output Transmit Data -	Output Transmit Data -
3	Input Receive Data +	Input Receive Data +
4	Positive (VCC+)	
5	Positive (VCC+)	
6	Input Receive Data -	Input Receive Data -
7	Negative (VCC-)	
8	Negative (VCC-)	

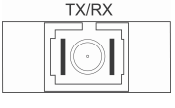
2. The 100Base-FX Connections

The fiber port pinouts: The Tx (transmit) port of device I is connected to the Rx (receive) port of device II, and the Rx (receive) port of device I to the Tx (transmit) port of device II.



3. The WDM 100Base-BX Connections

The fiber port pinouts: Only one optical fiber is required to transmit and receive data.



Functional Description

- Meets NEMA TS1 & TS2 Environmental requirements: temperature, shock, and vibration for traffic control equipment.
- Meets EN61000-6-2 & EN61000-6-4 EMC Generic Standard Immunity for industrial environment.
- Supports IEEE802.3af Power over Ethernet (PoE) Power Sourcing Equipment (PSE).
- Supports IEEE802.3/802.3u/802.3x. Auto-negotiation: 10/100Mbps, Full/Half-duplex, Auto-Negotiation, Auto MDI/MDIX.
- 100Base-FX: Multi/Single mode SC or ST type, 100Base-BX: WDM Multi/Single mode SC type.
- Supports 1024 MAC addresses. Provides 512K bits buffer memory.
- Alarms for power and port link failure by relay output.
- Power Supplies: Redundant 48VDC Terminal Block power inputs and 48VDC DC JACK with optional 100-240VAC external power supply.
- Operating voltage and Max. current consumption: 1.5A @ 48VDC. Power consumption: 72W Max.
- -40℃ to 75℃ (-40℉ to 167℉) operating temperature range. Tested for functional operation @ -40℃ to 85℃ (-40℉ to 185℉).
- Supports Desktop installation.

Preface

A member of the growing family of rugged switches, this Hardened PoE Ethernet Switch addresses a need for a smaller switch. This switch provides an affordable solution for rugged and outdoor environment, transportation road-side cabinet, industrial floor shop, multitenant dwellings or Fiber To The Home (FTTH) applications. Capable of operating at temperature extremes of -40°C to +75°C, this is the switch of choice for harsh environments constrained by space.

Port 1 to port 4 on this Switch supports IEEE802.3af Power over Ethernet (PoE) Power Sourcing Equipment (PSE) and can detect an IEEE802.3af compliant Powered Device (PD). Using external 48VDC power inputs through Terminal Block or Power Jack, data and power can be transmitted to a Powered Device (PD) over the same twisted-pair Ethernet cable through port 1 to port 4 on the Switch.

This manual describes how to install and use the hardened Ethernet Switch. This switch integrates full wire speed switching technology. This switch brings the answer to complicated hardened networking environments.

To get the most out of this manual, you should have an understanding of Ethernet networking concepts.

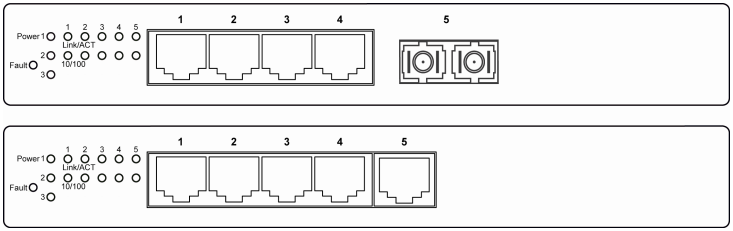
In this manual, you will find:

- Features on the switch
- Illustrative LED functions
- Installation instructions
- Specifications

Table of Contents

Product Overview

Hardened PoE Ethernet Switch



Package Contents

When you unpack the product package, you shall find the items listed below. Please inspect the contents, and report any apparent damage or missing items immediately to your authorized reseller.

- ✓ ***This Switch***
- ✓ ***User's Manual***
- ✓ ***External power adapter & Power Cord (Optional)***

Product Highlights

Basic Features

- Meets NEMA TS1 & TS2 Environmental requirements: temperature, shock, and vibration for traffic control equipment.
- Meets EN61000-6-2 & EN61000-6-4 EMC Generic Standard Immunity for industrial environment.
- Supports IEEE802.3af Power over Ethernet (PoE) Power Sourcing Equipment (PSE).
- Supports IEEE802.3/802.3u/802.3x. Auto-negotiation: 10/100Mbps, Full/Half-duplex, Auto-Negotiation, Auto MDI/MDIX.
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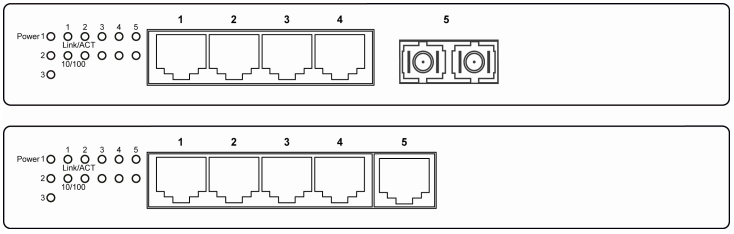
Front Panel Display



Status LEDs

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Power1 Power2 Power3	Steady	Power on.
	Off	Power off.
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Link/ACT	Steady	A valid network connection established.
	Flashing	Transmitting or receiving data. ACT stands for ACTIVITY.
10/100	Steady	Valid port connection at 100Mbps.
	Off	Valid port connection at 10Mbps.

Physical Ports

This switch series provides two different combinations of RJ-45 copper and fiber ports as below:

- Five 10/100Base-TX ports
- Four 10/100Base-TX ports + one 100Base-FX/BX port

CONNECTIVITY

- RJ-45 connectors
- SC or ST connector on 100Base-FX fiber port.
- SC connector on 100Base-BX fiber port.

<Note> Different product model supports different type of fiber connector.

Installation

This chapter gives step-by-step instructions about how to install the switch:

Selecting a Site for the Switch

As with any electric device, you should place the switch where it will not be subjected to extreme temperatures, humidity, or electromagnetic interference. Specifically, the site you select should meet the following requirements:

- The ambient temperature should be between -40 to 75 degrees Celsius.

- The relative humidity should be less than 95 percent, non-condensing.

- Surrounding electrical devices should not exceed the electromagnetic field (RFC) standards.

- Make sure that the switch receives adequate ventilation. Do not block the ventilation holes on each side of the switch

- The power outlet should be within 1.8 meters of the switch.

Connecting to Power

Redundant DC Terminal Block Power Inputs and 48VDC DC Jack:

Redundant DC Terminal Block Power Inputs

There are two pairs of power inputs can be used to power up this device. You only need to have one power input connected to run the switch.

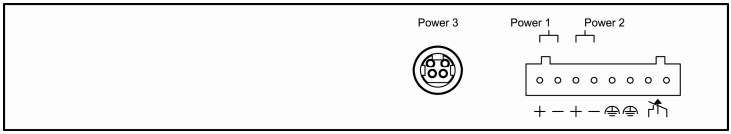
Step 1: Connect the DC power cord to the plug-able terminal block on the switch, and then plug it into a standard DC outlet.

Step 2: Disconnect the power cord if you want to shut down the switch.

48VDC DC Jack

Step 1: Connect the supplied AC to DC power adapter to the receptacle on the back side of the switch.

Step 2: Connect the power cord to the AC to DC power adapter and attach the plug into a standard AC outlet with the appropriate AC voltage.



Alarms for Power and Port Link Failure

Step 1: There are two pins on the terminal block are used for power failure detection. It provides the normally closed output when the power source is active. Use this as a dry contact application to send a signal for power failure detection.

<table>
<tr><td colspan="4">Power Input Assignment</td></tr>
<tr><td colspan="2">Power3</td><td>48VDC</td><td>DC Jack</td></tr>
<tr><td rowspan="2">Power2</td><td>+</td><td>48VDC</td><td rowspan="5">Terminal Block</td></tr>
<tr><td>—</td><td>Power Ground</td></tr>
<tr><td rowspan="2">Power1</td><td>+</td><td>48VDC</td></tr>
<tr><td>—</td><td>Power Ground</td></tr>
<tr><td colspan="2">  </td><td>Earth Ground</td></tr>
<tr><td colspan="3">Relay Output Rating</td><td>1A @ 24VDC</td></tr>
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<tr><td> 
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The relay contact closes if Power1 and Power2 are both failed but Power3 on.
The relay contact closes if Power3 is failed but Power1 and Power2 are both on.</td></tr>
</table>

Special note:
The relay output is normal open position when there is no power to the switch. Please do not connect any power source to this terminal to prevent the shortage to your power supply.

Connecting to Your Network

Cable Type & Length

It is necessary to follow the cable specifications below when connecting the switch to your network. Use appropriate cables that meet your speed and cabling requirements.

Cable Specifications

Speed	Connector	Port Speed Half/Full Duplex	Cable	Max. Distance
10Base-T	RJ-45	10/20 Mbps	4-pair UTP/STP Cat. 3, 4, 5	100 m
100Base-TX	RJ-45	100/200 Mbps	4-pair UTP/STP Cat. 5	100 m
100Base-FX	SC, ST	200 Mbps	MMF (50 or 62.5µm)	2 km
100Base-BX	SC	200 Mbps	MMF (50 or 62.5µm)	2 or 5 km
100Base-FX	SC, ST	200 Mbps	SMF (9 or 10µm)	20, 40, or 75 km
100Base-BX	SC	200 Mbps	SMF (9 or 10µm)	20 or 40 km

Cabling

Step 1: First, ensure the power of the switch and end devices are turned off.

<Note> Always ensure that the power is off before any installation.

Step 2: Prepare cable with corresponding connectors for each type of port in use.

Step 3: Consult the previous section for cabling requirements based on connectors and speed.

Step 4: Connect one end of the cable to the switch and the other end to a desired device.

Step 5: Once the connections between two end devices are made successfully, turn on the power and the switch is operational.

Specifications

Hardened PoE Ethernet Switch	10/100Base-TX auto-negotiating ports with RJ-45 connectors, 100Base-FX/BX fiber ports
Applicable Standards	IEEE 802.3 10Base-T IEEE 802.3u 100Base-TX/FX
Switching Method	Store-and-Forward
Forwarding Rate 10Base-T: 100Base-TX: 100Base-FX/BX:	 10 / 20Mbps half / full-duplex 100 / 200Mbps half / full-duplex 200Mbps full-duplex
Performance	14,880pps for 10Mbps 148,810pps for 100Mbps
Cable 10Base-T: 100Base-TX: 100Base-FX/BX:	 4-pair UTP/STP Cat. 3, 4, 5 4-pair UTP/STP Cat. 5 Up to 100m (328ft) MMF (50 or 62.5μm), SMF (9 or10μm)
LED Indicators	Per unit – Power status (Power1, Power2, Power3), Fault Per port – 10/100TX or 100FX/BX - Link/ACT, 10/100
Dimensions	220mm (W) × 134.3mm (D) × 35mm (H) (7.87” (W) × 5.29” (D) × 1.38” (H))
Net Weight	0.8Kg (1.76lbs.)
Power	Terminal Block: 48VDC DC Jack: 48VDC, External AC/DC required
Operating Voltage & Max. Current Consumption	1.5A @ 48VDC
Power Consumption	72W Max.
Operating Temperature	-40°C to 75℃ (-40℉ to 167℉) Tested for functional operation @ -40℃ to 85℃ (-40℉ to 185℉)
Storage Temperature	-40°C to 85°C (-40℉ to 185℉)
Humidity	5%-95% non-condensing

EMI
FCC Part 15, Class A
EN61000-6-4:
EN55022
EN61000-3-2
EN61000-3-3

EMS
EN61000-6-2:
EN61000-4-2 (ESD Standard)
EN61000-4-3 (Radiated FRI Standards)
EN61000-4-4 (Burst Standards)
EN61000-4-5 (Surge Standards)
EN61000-4-6 (Induced RFI Standards)
EN61000-4-8 (Magnetic Field Standards)
Environmental Test Compliance
IEC60068-2-6 Fc (Vibration Resistance)
IEC60068-2-27 Ea (Shock)
IEC60068-2-32 Ed (Free Fall)
NEMA TS1/2 Environmental requirements for traffic control equipment