

Quick Start Guide

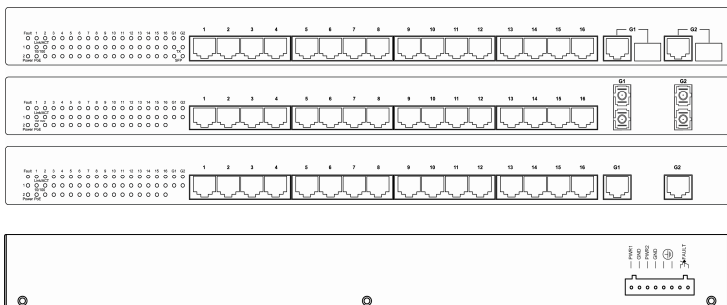
This quick start guide describes how to install and use the Hardened PoE Ethernet Switch. This is the switch of choice for harsh environments.

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 IEEE802.3at Power over Ethernet (PoE) Power Sourcing Equipment (PSE).
- 1000Mbps-Full-duplex, 10/100Mbps-Full/Half-duplex, Auto-Negotiation, Auto-MDI/MDIX.
- Supports 4096 MAC addresses. Provides 2.25M bits buffer memory.
- Alarms for power failure by relay output.
- Power Supplies: Redundant 47-57VDC Terminal Block power inputs.
- Operating voltage and Max. current consumption: 9A @ 55VDC. Power consumption: 495W Max.
- -40°C to 75°C (-40°F to 167°F) operating temperature range. Tested for functional operation @ -40°C to 85°C (-40°F to 185°F).
- Supports Rack Mounting installation.

Physical Description


The Port Status LEDs and Power Inputs



LED	State	Indication
Power1 Power2	Steady	Power on.
	Off	Power off.
Fault	Steady	Power redundant system failure occurred.
	Off	Power redundant system failure is not occurred.
10/100Base-TX		
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.
PoE	Steady	Powered device (PD) is connected.
	Off	Powered device (PD) is disconnected.

LED	State	Indication
Gigabit Ethernet		
Link/ACT	Steady	A valid network connection established.
	Flashing	Transmitting or receiving data. ACT stands for ACTIVITY.
TX	Steady	A valid TX connection established.
	Off	No valid TX connection established.
SFP	Steady	A valid SFP connection established.
	Off	No valid SFP connection established.

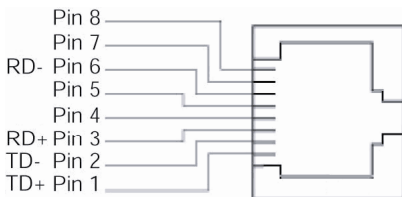
DC Terminal Block Power Inputs: There are two pairs of power inputs can be used to power up this switch. Redundant power supplies function is supported.

Power Input Assignment			
Power2	+	47-57VDC	Terminal Block
	-	Power Ground	
Power1	+	47-57VDC	
	-	Power Ground	
		Earth Ground	
Relay Output Rating			

The 10/100Base-TX (PoE) and Gigabit Ethernet Connectors

1. The 10/100Base-TX (PoE) Connections

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

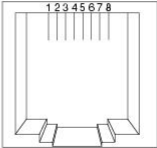


Pin	Signal Name	Signal Definition
1	TD+	Output Transmit Data +
2	TD-	Output Transmit Data -
3	RD+	Input Receive Data +
4	PoE	Positive (VCC+)
5	PoE	Positive (VCC+)
6	RD-	Input Receive Data -
7	PoE	Negative (VCC-)
8	PoE	Negative (VCC-)

2. The 1000Base-T Connections

The following lists the pinouts of 1000Base-T ports.

Pin	Label
1	TP0+
2	TP0-
3	TP1+
4	TP2+
5	TP2-
6	TP1-
7	TP3+
8	TP3-



Pin	Signal Name	Signal Definition
1	TP0+	Transmit and Receive Data 0 +
2	TP0-	Transmit and Receive Data 0 -
3	TP1+	Transmit and Receive Data 1 +
4	TP2+	Transmit and Receive Data 2 +
5	TP2-	Transmit and Receive Data 2 -
6	TP1-	Transmit and Receive Data 1 -
7	TP3+	Transmit and Receive Data 3 +
8	TP3-	Transmit and Receive Data 3 -

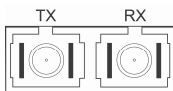
3. The SFP Socket Connections

The SFP socket for Gigabit fiber optic expansion.



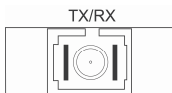
4. The 1000Base-SX/LX Connections

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.



5. The WDM 1000Base-BX Connections

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



Preface

A member of the growing family of rugged switches, this Hardened PoE Ethernet 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 $+75^{\circ}\text{C}$, this is the switch of choice for harsh environments.

Port 1 to port 16 on this Switch supports IEEE802.3at Power over Ethernet (PoE) Power Sourcing Equipment (PSE) and can detect an IEEE802.3at compliant Powered Device (PD). Using external 47~57VDC power inputs through Terminal Block, data and power can be transmitted to a Powered Device (PD) over the same twisted-pair Ethernet cable through port 1 to port 16 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:

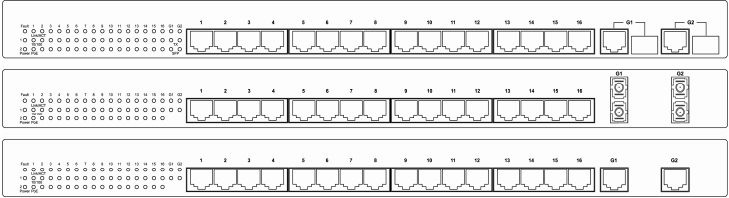
- Features on the switch
- Illustrative LED functions
- Installation instructions
- Specifications

Table of Contents

QUICK START GUIDE	1
FUNCTIONAL DESCRIPTION	1
PHYSICAL DESCRIPTION	2
<i>The Port Status LEDs and Power Inputs</i>	2
<i>The 10/100Base-TX (PoE) and Gigabit Ethernet Connectors</i>	3
PREFACE	6
TABLE OF CONTENTS	7
PRODUCT OVERVIEW	8
HARDENED PoE ETHERNET SWITCH	8
PACKAGE CONTENTS	8
PRODUCT HIGHLIGHTS	9
<i>Basic Features</i>	9
FRONT PANEL DISPLAY	10
PHYSICAL PORTS	11
INSTALLATION	12
SELECTING A SITE FOR THE SWITCH	12
CONNECTING TO POWER	13
<i>Redundant DC Terminal Block Power Inputs</i>	13
<i>Alarms for Power Failure</i>	13
CONNECTING TO YOUR NETWORK	14
<i>Cable Type & Length</i>	14
<i>Cabling</i>	15
SPECIFICATIONS	16

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.

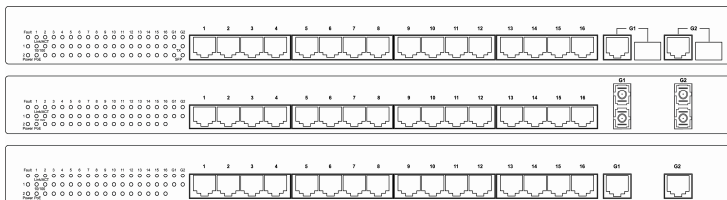
- ✓ ***This Switch***
- ✓ ***User's Manual***

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 IEEE802.3at Power over Ethernet (PoE) Power Sourcing Equipment (PSE).
- 1000Mbps-Full-duplex, 10/100Mbps-Full/Half-duplex, Auto-Negotiation, Auto-MDI/MDIX.
- Supports 4096 MAC addresses. Provides 2.25M bits buffer memory.
- Alarms for power failure by relay output.
- Power Supplies: Redundant 47-57VDC Terminal Block power inputs.
- Operating voltage and Max. current consumption: 9A @ 55VDC. Power consumption: 495W Max.
- -40°C to 75°C (-40°F to 167°F) operating temperature range. Tested for functional operation @ -40°C to 85°C (-40°F to 185°F).
- Supports Rack Mounting installation.

Front Panel Display



Status LEDs

LED	State	Indication
Power1 Power2	Steady	Power on.
	Off	Power off.
Fault	Steady	Power redundant system failure occurred.
	Off	Power redundant system failure is not occurred.
10/100Base-TX		
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.
PoE	Steady	Powered device (PD) is connected.
	Off	Powered device (PD) is disconnected.

LED	State	Indication
Gigabit Ethernet		
Link/ACT	Steady	A valid network connection established.
	Flashing	Transmitting or receiving data. ACT stands for ACTIVITY.
TX	Steady	A valid TX connection established.
	Off	No valid TX connection established.
SFP	Steady	A valid SFP connection established.
	Off	No valid SFP connection established.

Physical Ports

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

- 16 x 10/100Base-TX PoE ports + 2 x Gigabit Ethernet ports
- 12 x 10/100Base-TX PoE ports + 2 x Gigabit Ethernet ports
- 8 x 10/100Base-TX PoE ports + 2 x Gigabit Ethernet ports

CONNECTIVITY

- RJ-45 connectors
- SC or ST connector on 1000Base-SX/LX fiber port.
- SC connector on 1000Base-BX fiber port.
- SFP socket connection on 1000Base-SX/LX/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:

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.



Alarms for Power Failure

There are two pins on the terminal block are used for power failure detection. Use this as a dry contact application to send a signal for power failure detection.

Power Input Assignment			
Power2	+	47-57VDC	Terminal Block
	-	Power Ground	
Power1	+	47-57VDC	
	-	Power Ground	
		Earth Ground	
Relay Output Rating		1A @ 24VDC	

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
1000Base-T	RJ-45	2000 Mbps	4-pair UTP/STP Cat. 5	100 m
1000Base-SX	SC, ST	2000 Mbps	MMF (50 or 62.5µm)	275, 550 m
1000Base-SX	SC	2000 Mbps	MMF (50 or 62.5µm)	2 km
1000Base-LX	SC	2000 Mbps	SMF (9 or 10µm)	10, 20 km
1000Base-BX	SC	2000 Mbps	SMF (9 or 10µm)	20 km
SFP				
1000Base-SX	Duplex LC	2000 Mbps	MMF (50 or 62.5µm)	275 m, 550 m, 2 km
1000Base-LX	Duplex LC	2000 Mbps	SMF (9µm)	10, 20, 40, 70 km
1000Base-BX	Single LC	2000 Mbps	MMF (50 or 62.5µm)	550 m
1000Base-BX	Single LC	2000 Mbps	SMF (9µm)	10, 20 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 PoE ports with RJ-45 connectors, Gigabit Ethernet ports
Applicable Standards	IEEE 802.3 10Base-T IEEE 802.3u 100Base-TX IEEE 802.3ab 1000Base-T IEEE 802.3z 1000Base-SX/LX
Switching Method	Store-and-Forward
Forwarding Rate	
10Base-T:	10 / 20Mbps half / full-duplex
100Base-TX:	100 / 200Mbps half / full-duplex
1000Base-T/SX/LX:	2000Mbps full-duplex
Performance	14,880pps for 10Mbps 148,810pps for 100Mbps 1,488,100pps for 1000Mbps
Cable	
10Base-T:	4-pair UTP/STP Cat. 3, 4, 5
100Base-TX:	4-pair UTP/STP Cat. 5
1000Base-T:	4-pair UTP/STP Cat. 5 Up to 100m (328ft)
100Base-FX/BX:	MMF (50 or 62.5µm), SMF (9 or 10µm)
1000Base-SX/LX/BX:	MMF (50 or 62.5µm), SMF (9 or 10µm)
LED Indicators	Per unit – Power status (Power1, Power2), Fault Per port – 10/100TX - Link/ACT, 10/100, PoE Gigabit Ethernet - Link/ACT, TX, SFP
Dimensions	442mm (W) × 205mm (D) × 44.2mm (H) (17.4" (W) × 8.07" (D) × 1.73" (H))
Net Weight	3Kg (6.61lbs.)
Power	Terminal Block: 47-57VDC
Operating Voltage & Max. Current Consumption	9A @ 55VDC
Power Consumption	495W Max.
Operating Temperature	-40°C to 75°C (-40°F to 167°F) Tested for functional operation @ -40°C to 85°C (-40°F to 185°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5%-95% non-condensing

EMI

FCC Part 15, Class A

EN61000-6-4:

EN55022

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
