LNP-C501G-SFP-bt-24 Series

5-Port Industrial Compact Gigabit IEEE 802.3bt PoE++ Unmanaged Ethernet Switch, with 4*10/100/1000Tx (90W/Port) and 1*100/1000 SFP Slot; 9~55VDC Power Input

Hardware Manual

Version 1.1
(October 2023)

www.antaira.com

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FCC Warning

This equipment has been tested and found to comply with the limits for a Class-A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. It may cause harmful interference to radio communications if the equipment is not installed and used in accordance with the instructions. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

Avertissement FCC

Cet équipement a été testé et déclaré conforme aux limites d'un appareil numérique de classe A, conformément à la partie 15 des règles de la FCC. Ces limites sont conçues pour fournir une protection raisonnable contre les interférences nuisibles dans une installation résidentielle. Cet équipement génère, utilise et peut émettre de l'énergie radiofréquence. Cela peut provoquer des interférences nuisibles aux communications radio si l'équipement n'est pas installé et utilisé conformément aux instructions. Cependant, il n'y a aucune garantie qu'aucune interférence ne se produira dans une installation particulière. Si cet équipement provoque des interférences nuisibles à la réception radio ou télévision, ce qui peut être déterminé en éteignant puis en rallumant l'équipement, l'utilisateur est encouragé à essayer de corriger les interférences par une ou plusieurs des mesures suivantes:

- Réorientez ou déplacez l'antenne de réception.
- Augmentez la distance entre l'équipement et le récepteur.
- Connectez l'équipement à une prise sur un circuit différent de celui auquel le récepteur est connecté.
- Consultez le revendeur ou un technicien radio / TV expérimenté pour obtenir de l'aide.

CE Mark Warning

This is a Class-A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Avertissement de marque CE

Ceci est un produit de classe A. Dans un environnement domestique, ce produit peut provoquer des interférences radio, auquel cas l'utilisateur peut être amené à prendre des mesures adéquates.

Industrial Ethernet Switches

Industrial Grade Unmanaged Ethernet Switches

Hardware Manual
Version 1.1 (October 2023)

The manual supports the following models:

- LNP-C501G-SFP-bt-24
- LNP-C501G-SFP-bt-24-T

This document is the current official release hardware manual. Please check our website (www.antaira.com) for any updated manual or contact us by e-mail (support@antaira.com).

Table of Contents

1 Overview **1**
1.1 Product Hardware Features 1
1.2 Package Contents 1
1.3 Safety Precaution 2
2 Hardware Description **3**
2.1 Physical Dimensions 3
2.2 Front View Panel 4
2.3 LED Indicators 4
2.4 PoE Port LED Indicators 6
2.5 DIP Switch 8
2.6 Relay Contact Alarm Warning 9
2.7 Ethernet Ports 9
2.8 Cabling 10
2.9 Wiring the Power Inputs 11
2.10 Wiring the Fault Alarm Contact 12
2.11 Grounding Note 13
3 Mounting Installation **14**
3.1 Wall Mounting 14
4 Hardware Installation **16**
4.1 Installation Steps 16
4.2 Maintenance and Service 17
4.3 Troubleshooting 17

1 Overview

Antaira Technologies' LNP-C501G-SFP-bt-24 series is a compact 5-port industrial gigabit PoE++ unmanaged Ethernet switch. The small form factor of this metal IP40 rated design is 50% smaller which allows for a more versatile implementation. The LNP-C501G-SFP-bt-24 series is equipped with 4*10/100/1000Tx Ethernet ports that support IEEE 802.3bt for a maximum of 90W/port and 1*100/1000Tx SFP port. The LNP-C501G-SFP-bt-24 series can handle high bandwidth applications in tight spaces. The LNP-C501G-SFP-bt-24 series supports high EFT & ESD protection through the redundant power inputs that support reverse polarity and overload current protection. This product series supports DIN-rail as well as wall mountable orientations and provides operating temperature range models in STD: -10°C to 65°C and EOT: -40°C to 75°C. This is an industrial grade unit applicable for networking applications in factory automation, ITS, power/utility, water wastewater treatment plants, or any application that needs a compact solution.

1.1 Product Hardware Features

System Interface and Performance

- All RJ45 ports support Auto MDI/MDI-X Function
- Embedded 4*10/100/1000Tx RJ45 ports with bt PoE (90W/Port) and 1*100/1000 SFP slot
- Store-and-forward switching architecture
- 8K MAC address table

Power Input

- DC 9~55V redundant, with a 6-pin removal terminal block
- The power input specification complies with the requirements of SELV (Safety Extra Low Voltage) and the power supply should comply with UL 61010-1 & UL 61010-2-201

Operating Temperature

- LNP-C501G-SFP-bt-24: -10°C to 65°C
- LNP-C501G-SFP-bt-24-T: -40°C to 75°C

Case / Installation

- IP30 protection metal housing
- Wall-mount design
- Installation in a Pollution Degree 2 industrial environment

1.2 Package Contents

- LNP-C501G-SFP-bt-24(-T)
- Quick Installation Guide
- Wall mounting bracket set with screws

- DC cable- 18AWG & DC jack 5.5 x 2.1mm**Wire: White (+) / Black (-)
- Dust cover set

1.3 Safety Precaution

Attention: If the DC voltage is supplied by an external circuit, please use a protection device on the power supply input. The industrial Ethernet switch's hardware specs, ports, cabling information, and wiring installation will be described within this hardware manual.

Attention: Si la tension CC est fournie par un circuit externe, veuillez utiliser un dispositif de protection sur l'entrée d'alimentation. Les spécifications matérielles, les ports, les informations de câblage et l'installation du câblage du commutateur Ethernet industriel seront décrits dans ce manuel d'utilisation.

Warning Labels
The caution label means that you should check certain information on the user manual when working with the device. (Shown in *Figure 1.1*)

Étiquettes d'avertissement
L'étiquette d'avertissement signifie que vous devez vérifier certaines informations du manuel d'utilisation lorsque vous travaillez avec l'appareil. (Illustré à la *figure 1.1*)

Figure 1.1 - Caution Label
Figure 1.1 - Étiquette de mise en garde

Figure 1.2 - Hot Surface Warning Label
Figure 1.2 - Étiquette d'avertissement de surface chaude

2 Hardware Description

2.1 Physical Dimensions

Figure 2.1, below, shows the physical dimensions of this product series:

(W x D x H) is 64.9mm x 89.8mm x 110mm

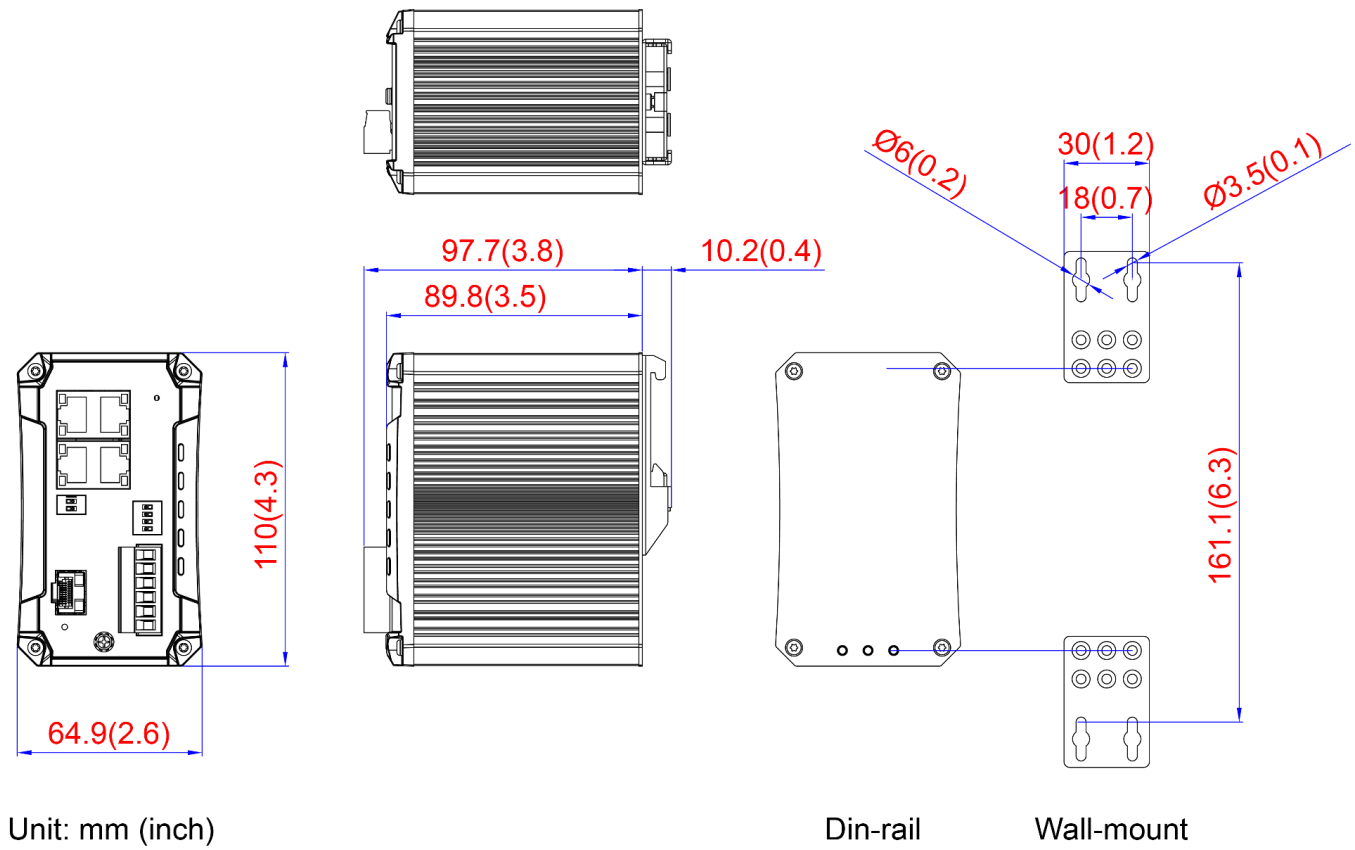


Figure 2.1 - Physical Dimensions

2.2 Front View Panel

Figure 2.2, below, shows the front panel of the product series:

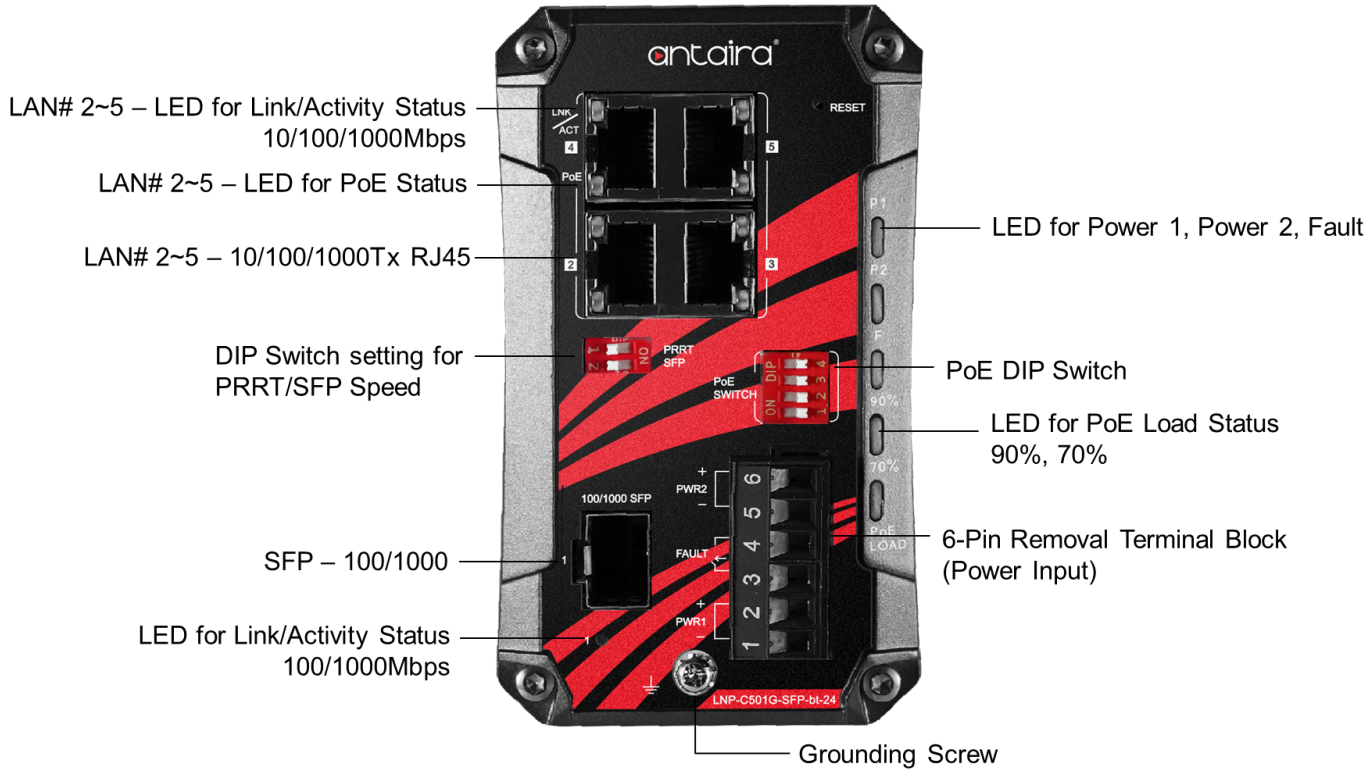


Figure 2.2 - Front View Panel

2.3 LED Indicators

There are LED light indicators located on the front panel of the industrial Ethernet switch that display the power status and network status. Each LED indicator has a different color and has its own specific meaning, see below in *Table 2.1*.

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	Any of the listed trigger events occurs, (will trigger relay) 1. Power 1 is inactive 2. Power 2 is inactive

			3. Total PoE loading is >100% PoE Budget 4. PoE over current per port 5. Cable short per port occurs in PD that has been normally powered 6. One of the channels in Dual PD fail
		Off	No events occur
PoE Load	Off	Off	PoE Load ≤50%
	Blue	On	PoE Load 51~70%
	Red & Blue	On	PoE Load 71~90%
	Blue & Red (Red flashing)	On	PoE Load 91~100%
LAN Port 2~5 LNK/ACT (Upper LED)	Green	On	Connected to network, 10/100/1000Mbps
		Flashing	Networking is active
		Off	Not connected to network
LAN Port 2~5 PoE Mode (Lower LED)	Green	On	IEEE 802.3bt connection (Single Signature PD Class 5~8/Dual Signature PD Channel Class 1~5)
		Off	No powered-device attached or power supplying fails
	Amber	On	IEEE 802.3af/at connection (Single Signature PD Class 0~4)
		Off	No powered-device attached or power supplying fails
SFP Port LNK/ACT Speed	Green	On	Connected to network, 100 or 1000Mbps
		Flashing	Networking is active
		Off	Not connected to network

Table 2.1 - LED Indicators

Note: *"P1" is the abbreviation for "Power 1", "P2" is for "Power 2", "LNK" is for "Link", and "ACT" is for "Activity".*

2.4 PoE Port LED Indicators

The LED light indicators on the PoE copper port can help the user know if and when an event immediately occurs or is happening. When the event is happening, you can verify the event from the Dual-color LED status. If the port has recovered from an event, you can verify the event from the blinking frequency of the PoE LED (5 seconds as a cycle).

Power Budget Exceeded Event

When the total PoE budget is overloaded (>100%), the PoE port of the lowest priority PoE port will be shut down. The PoE LED of the port will act cyclically as below until the port is recovered from the event:

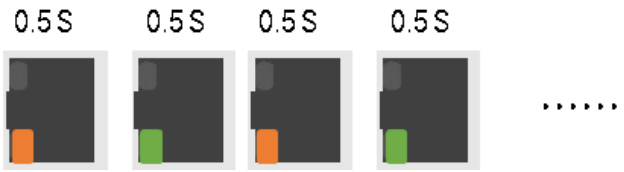


Figure 2.3 - PoE Budget Overloaded LED Sequence

After the PoE port is recovered from the PoE budget overload event, the PoE LED of the port will act cyclically as below until the event indicator is clear manually:

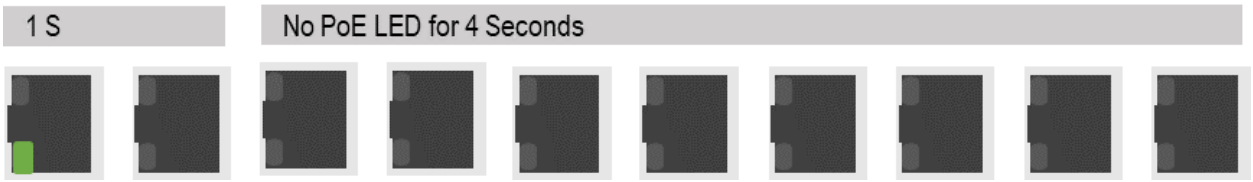


Figure 2.4 - PoE Budget Recovering LED Sequence

**IEEE 802.3af/at: Amber

**IEEE 802.3bt: Green

PoE Port Over Current Event (PoE Port Overload Event)

When the current limit of the specific PoE port is exceeded, the PoE power will be shut down. The PoE LED of the port will act cyclically as below until the port is recovered from the event:

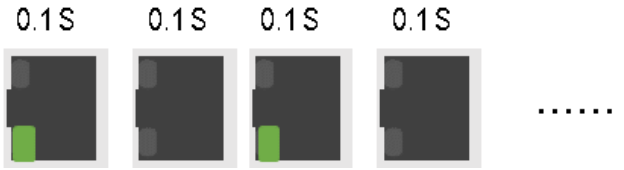


Figure 2.5 - PoE Over Current LED Sequence

**IEEE 802.3af/at: Amber

**IEEE 802.3bt: Green

After the PoE port is recovered from the PoE Port Over Current event, the PoE LED of the port will act cyclically as below until the event indicator is clear manually:

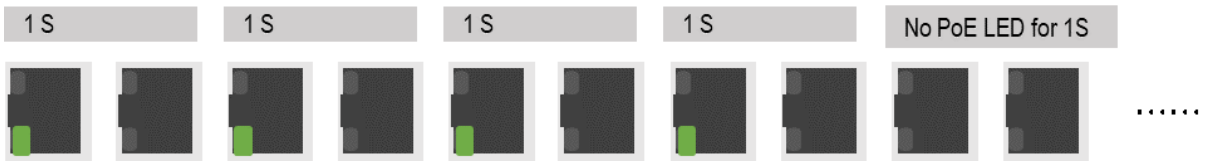


Figure 2.6 - PoE Over Current Recovering LED Sequence

**IEEE 802.3af/at: Amber

**IEEE 802.3bt: Green

Cable Short Event

When the working PD encounters a cable short event, the PoE port LED will act cyclically as below until the port is recovered from the event:

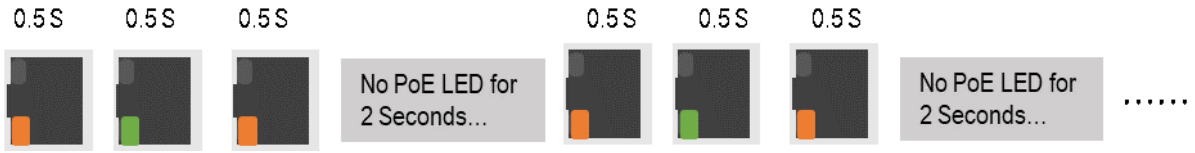


Figure 2.7 - PoE Cable Short LED Sequence

After the PoE port is recovered from the Cable Short event, the PoE LED of the port will act cyclically as below until the event indicator is clear manually:

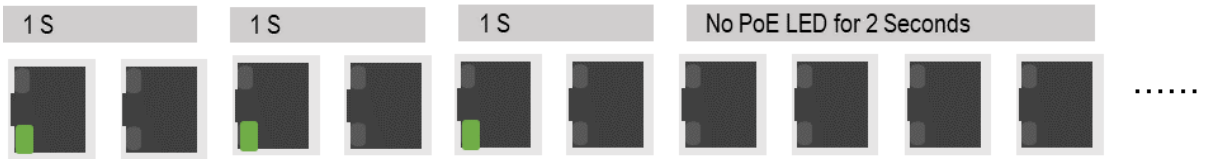


Figure 2.8 - PoE Cable Short Recovering LED Sequence

**IEEE 802.3af/at: Amber

**IEEE 802.3bt: Green

Dual PD Fail Event

When one channel of the connected dual PD is failed, the failed channel will be shut down and the active channel will still supply PoE to the connected PD. The PoE Port LED will act cyclically as below until the port is recovered from the event:

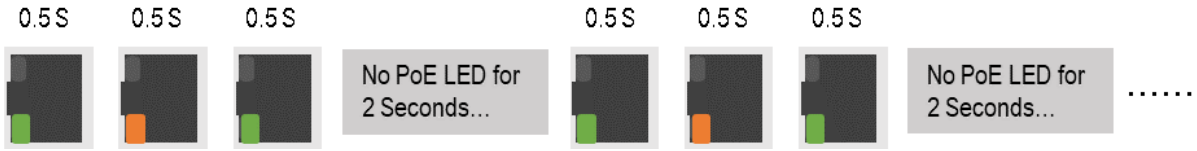


Figure 2.9 - PoE Dual PD Failed LED Sequence

After the PoE port is recovered from the Dual PD Fail event, the PoE LED of the port will act cyclically as below until the event indicator is clear manually:

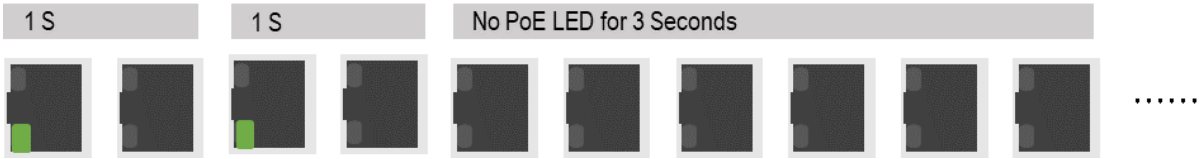


Figure 2.10 - PoE Dual PD Recovering LED Sequence

**IEEE 802.3af/at: Amber

**IEEE 802.3bt: Green

Note:

1. *The system will automatically retry to recover from the event failure every 20 seconds.*
2. *To clear the warning PoE Indicator of the recovered port, please replug the port cable or reopen the PoE function of the port via DIP switch (≥ 2 sec.)*

2.5 DIP Switch

The 4-pin DIP switch on the front panel of the Ethernet switch works as the PoE controller for PoE port 2~5.

	ON (Default)	**OFF**
DIP Switch 1	Enable Port 2 PoE function	Disable Port 2 PoE function
DIP Switch 2	Enable Port 3 PoE function	Disable Port 3 PoE function
DIP Switch 3	Enable Port 4 PoE function	Disable Port 4 PoE function
DIP Switch 4	Enable Port 5 PoE function	Disable Port 5 PoE function

Table 2.2 - PoE Switch Functions

The 2-pin DIP switch is used to enable/disable PD Remote Reset Technology (PRRT) and control SFP speed.

	ON	**OFF (Default)**
DIP Switch 1	Enable PRRT Function	Disable PRRT Function
DIP Switch 2	Control SFP speed at 100Mbps	Control SFP speed at 1Gbps

Table 2.3 - DIP Switch Functions

Note: *The device will reboot when the dip switch setting is changed.*

2.6 Relay Contact Alarm Warning

2-pin 1*24VDC@1A resistive normal open on 6-pin terminal block.

The relay contact alarm will be triggered when any one of the listed events occurs.
Key trigger event 1: Power 1 or Power 2 is inactive
Key trigger event 2: PoE total loading > 100% PoE output budget
Key trigger event 3: PoE over current per port
Key trigger event 4: Cable short per port
Key trigger event 5: One of the channels in Dual PD fail

*** Note:**
When the relay is triggered because of event 2~5, the relay contact alarm will update the status every 30 seconds. If there is no event happening for 30 seconds, the relay contact alarm will be turned off. If the user disables the failed PoE port by removing the cable or DIP switch manually, the relay will be recovered immediately.

2.7 Ethernet Ports

- **RJ45 Ports**

RJ45 Ports (Auto MDI/MDI-X): The RJ45 ports are auto-sensing for 10Base-T, 100Base-TX, or 1000Base-T connections. Auto MDI means that the switch can connect to another switch or workstation without changing the straight-through or crossover cabling. See the figures below for straight-through and crossover cabling schematics.

- **RJ45 Pin Assignments**

Crossover Cable		**Straight Through Cable**	
Pin Number / Signal	**Pin Number / Signal**	**Pin Number / Signal**	**Pin Number / Signal**
1 / RX+	3 / TX+	1 / RX+	1 / TX+

2 / RX-	6 / TX-	2 / RX-	2 / TX-
3 / TX+	1 / RX+	3 / TX+	3 / RX+
6 / TX-	2 / RX-	6 / TX-	6 / RX-

Table 2.4 - 10/100Base-T(X) RJ45 Pin Assignments

Crossover Cable		Straight Through Cable	
Pin Number / Signal	**Pin Number / Signal**	**Pin Number / Signal**	**Pin Number / Signal**
1 / TP0+	3 / TP1+	1 / TP0+	1 / TP1+
2 / TP0-	6 / TP1-	2 / TP0-	2 / TP1-
3 / TP1+	1 / TP0+	3 / TP1+	3 / TP0+
4 / TP2+	7 / TP3+	4 / TP2+	4 / TP3+
5 / TP2-	8 / TP3-	5 / TP2-	5 / TP3-
6 / TP1-	2 / TP0-	6 / TP1-	6 / TP0-
7 / TP3+	4 / TP2+	7 / TP3+	7 / TP2+
8 / TP3-	5 / TP2-	8 / TP3-	8 / TP2-

Table 2.5 - 1000Base-T RJ45 Pin Assignments

Note: *"+" and "-" signs represent the polarity of the wires that make up each wire pair.*

2.8 Cabling

Use the four twisted-pair, category 5e, or the above cabling for the RJ45 port connections. The cable between the switch and the link partner (switch, hub, workstation, etc.) must be less than 100 meters (328 ft.) in length.

The small form-factor pluggable (SFP) is a compact optical transceiver used in optical communications for both telecommunication and data communication applications.

Caution: Please employ an optional optical transceiver (SFP/Fixed Fiber) that complies with IEC 60825-1 and classified as Class 1 laser product.

Attention: Veuillez utiliser un émetteur-récepteur optique en option (SFP/fibre fixe) conforme à la norme IEC 60825-1 et classé comme produit laser de classe 1.

2.9 Wiring the Power Inputs

Caution: Please follow the steps below when inserting the power wire.

Attention: Veuillez suivre les étapes ci-dessous lors de l'insertion du câble d'alimentation.

1. Insert the positive and negative wires into the PWR1 (V1+, V1-) and PWR2 (V2+, V2-) contacts on the terminal block connector as shown below in *Figure 2.11*.

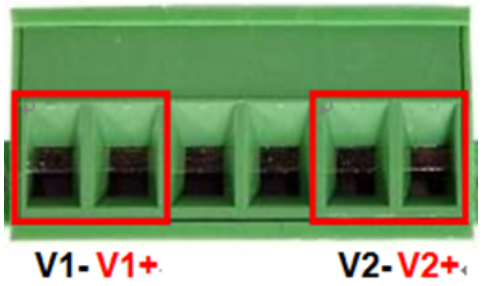


Figure 2.11 - Power Terminal Block

2. Tighten the wire-clamp screws to prevent the wires from loosening, as shown below in *Figure 2.12*.

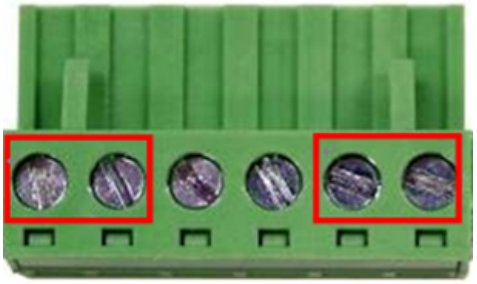


Figure 2.12 - Power Terminal Block

Caution:

*Only use copper conductors, **125°C**, tighten to **5 lbs.***

*The wire gauge for the terminal block should range between **18~20 AWG**.*

Attention:

*Utilisez uniquement des conducteurs en cuivre, **125°C**, serrez à **5 lb.***

*Le calibre des fils du bornier doit être compris entre **18** et **20 AWG.***

2.10 Wiring the Fault Alarm Contact

The fault alarm contact is in the middle of the terminal block connector as the picture shows below in *Figure 2.13*. By inserting the wires, it will detect the fault status including power failure or port link failure (managed industrial switch only), and form a normally open circuit. An example is shown below in *Figure 2.13*.

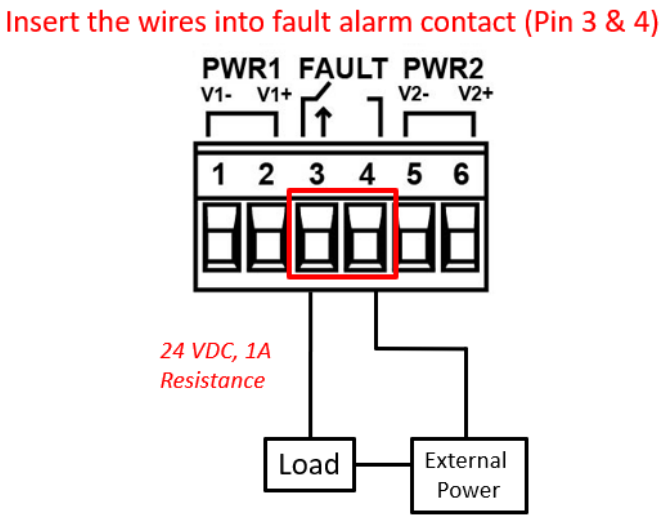


Figure 2.13 - Wiring the Fault Alarm Contact

Caution:

The wire gauge for the terminal block should range between 12 ~ 24 AWG.

If only using one power source, jumper Pin 1 to Pin 5 and Pin 2 to Pin 6 to eliminate power fault alarm.

Attention:

Le calibre des fils du bornier doit être compris entre 12 et 24 AWG.

Si vous n'utilisez qu'une seule source d'alimentation, connectez les broches 1 à 5 et les broches 2 à 6 pour éliminer l'alarme de panne de courant.

2.11 Grounding Note

Grounding and wire routing help limit the effects of noise due to Electromagnetic Interference (EMI). Run the ground connection from the ground screw to the grounding surface prior to connecting devices. The grounding screw symbol is shown below in *Figure 2.14*.

Figure 2.14 - Grounding Screw Symbol

Caution: Using a shielded cable achieves better electromagnetic compatibility.

Attention: L'utilisation d'un câble blindé permet une meilleure compatibilité électromagnétique

3 Mounting Installation

3.1 Wall Mounting

Follow the steps below to mount the industrial Ethernet switch using the wall mounting bracket as shown below in *Figure 3.4*.

Caution: “Wall” means industrial control panel wall

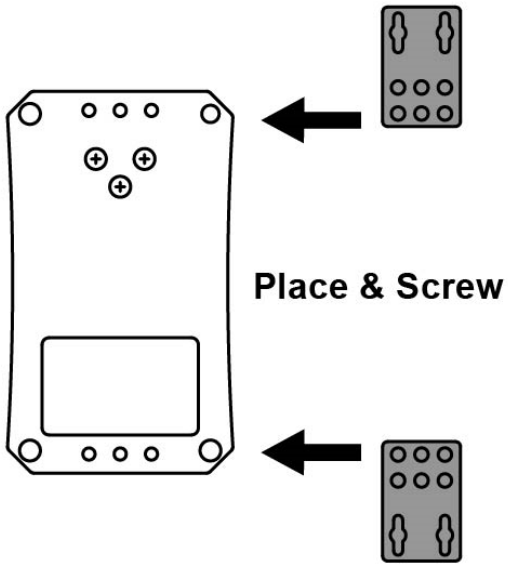
Attention: “Wall” signifie mur de panneau de commande industriel

1. Remove the DIN-Rail bracket from the industrial Ethernet switch by loosening the screws.
2. Place the wall mounting brackets on the top and bottom of the industrial Ethernet switch.
3. Use the screws to screw the wall mounting bracket on the industrial Ethernet switch.

   Caution: The torque for tightening the screws on the device is 3.5 in-lbs.

   Attention: Le couple de serrage des vis sur l'appareil est de 3.5 pouces-livres.

4. Use the hook holes at the corners of the wall mounting bracket to hang the industrial Ethernet switch on the wall.
5. To remove the wall mount bracket, do the opposite from the steps above.



Below, in *Figure 3.5* are the dimensions of the wall mounting bracket.

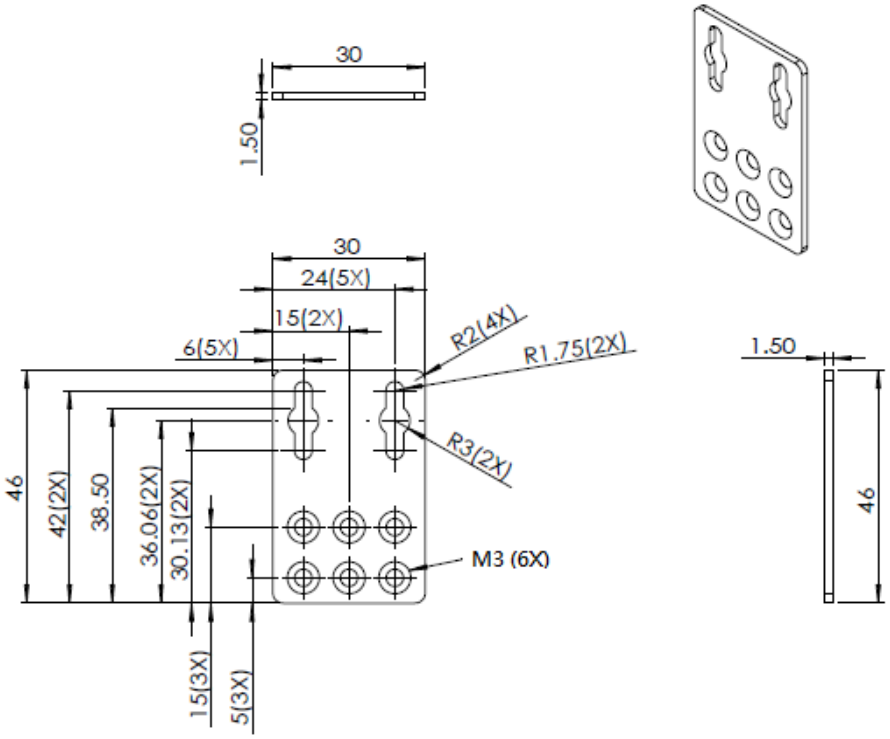


Figure 3.5 - Wall Mounting Bracket Dimensions

4 Hardware Installation

4.1 Installation Steps

This section will explain how to install the industrial Ethernet switch:

Caution: This device is intended for indoor use.

Attention: Cet appareil est destiné à une utilisation en intérieur.

Caution: The device is intended to be installed in an industrial control enclosure and panel.

Attention: L'appareil est destiné à être installé dans une armoire de commande et un panneau industriels.

Installation Steps

1. Unpack the industrial Ethernet switch from the original packing box.
2. Check if the DIN-Rail bracket is screwed on the industrial Ethernet switch.
   - If it is required to wall mount the industrial Ethernet switch, please refer to the **Wall Mounting** section for wall mounting installation.
3. To hang the industrial Ethernet switch on a DIN-Rail or wall, please refer to the **Mounting Installation** section.
4. Power on the industrial Ethernet switch and then the power LED light will turn on.
   - For the help on how to wire power, please refer to the **Wiring the Power Inputs** section.
   - Please refer to the **LED Indicators** section for LED light indication.
5. Prepare the twisted-pair, straight-through category 5 cable for Ethernet connection.
6. Insert one side of the RJ45 cable into the switch's Ethernet port and on the other side into the networking device's Ethernet port, e.g. switch PC or server.
   - The Ethernet port's (RJ45) LED on the industrial Ethernet switch will turn on when the cable is connected to the networking device.
   - Please refer to the **LED Indicators** section for LED light indications.
7. When all connections are set and the LED lights all show normal, the installation is complete.

4.2 Maintenance and Service

- If the device requires servicing of any kind, the user is required to disconnect and remove it from its mounting. The initial installation should be done in a way that makes this as convenient as possible.
- Voltage / Power lines should be properly insulated as well as other cables. Be careful when handling them so as to not trip over them.
- Do not under any circumstance insert foreign objects of any kind into the heat dissipation holes located in the different faces of the device. This may not only harm the internal layout but might cause harm to users as well.
- Do not under any circumstance open the device for any reason. Please contact your dealer for any repair needed or follow the instructions within the manual.
- Clean the device with dry soft cloth.

4.3 Troubleshooting

- Always verify the right power cord or adapter is being used. Never use a power supply or adapter with a non-compliant DC output voltage or it will burn the equipment.
- Select the proper UTP or STP cable in order to construct the network. Use an unshielded twisted-pair (UTP) or shield twisted-pair (STP) cable for RJ45 connections: 100Ω Category 5e for 10/100Mbps. Also, be sure that the length of any twisted-pair connection does not exceed 100 meters (328 feet).
- Diagnosing LED Indicators: To assist in identifying problems, the switch can be easily monitored with the LED indicators which help to identify if any problems exist.
    - Please refer to the LED Indicators section for LED light indications.
- If the power indicator LED does not turn on when the power cord is plugged in, the user may have a problem with the power cord. Check for loose power connections, power losses, or surges at the power outlet.
    - Please contact Antaira for technical support service if the problem still cannot be resolved.
- If the industrial switch LED indicators are normal and the connected cables are correct but the packets still cannot transmit, please check the system's Ethernet devices' configuration or status.

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