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IMP-C100-XX Series

10/100TX to 100FX Industrial Media Converter
with SC/ST Connector and PoE Injector

Version 1.0

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User Manual

antaira

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FCC Notice

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.

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.

Industrial Ethernet Media Converters

User Manual

This manual supports the following models:
- IMP-C100-XX
- IMP-C100-XX-T

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

Antaira Technologies' **IMP-C100-XX series** is a compact IP30 rated Ethernet-to-fiber media converter featuring a 10/100TX Ethernet port that support IEEE 802.3at high power PoE that can supply up to 30 watts, and a fixed fiber interface supporting ST and SC connectors depending on the model. There are Multi-mode and Single-mode models to support applications with a variety of fiber distances and types. It is designed to fulfill industrial applications that require fiber optic distance extension while using minimal space.

The IMP-C100-XX series has a built-in "Link Fault Pass Through" (LFP) and "Far End Fault" (FEF) function with 48~55VDC redundant power inputs with reverse polarity and overload current protection. This product series supports DIN-rail as well as wall mountable orientations and provides two operating temperature range models in STD: -10°C to 70°C and EOT: -40°C to 80°C.

1.1 Key Features

- System Interface/Performance

  - RJ-45 ports support the auto MDI function
  - Embedded 1*10/100Tx (PSE 30W/port) and 1*100Fx SC/ST fixed fiber port with multi/single mode
  - Store-and-forward switching architecture
  - 128kbits memory buffer

- Power Input

  - DC 48~55V redundant power with a 6-pin removal terminal block

  - Max. current 0.68A

  - Max. PoE output: 30Watts

  - The power input specification is compliant with the requirements of SELV (Safety Extra Low Voltage), and the power supply should be compliant with UL 61010-1 & UL 61010-2-201.

- Operating Temperature

  - Standard operating temperature model: -10°C ~ 70°C

  - Extended operating temperature model (–T): -40°C ~ 80°C

- Case/Installation

  - IP-30 protection

  - Installation in a Pollution Degree 2 industrial environment

  - DIN-Rail and wall mount design

1.2 Package Contents

- 1 - Quick Installation Guide
- 1 - IMP-C100-XX series Industrial Media Converter
- 1 - Wall mounting bracket set with screws
- 1 - DC cable - 18 AWG & DC jack 5.5 x 2.1mm

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. Supply by UL Listed industrial use power. The industrial media converter's hardware specs, ports, cabling information, and wiring installation will be described within this user manual.

Warning Labels

The caution label means that you should check the certain information on user manual when working with the device. (Shown in *Figure 1*)

Figure 1: Caution Label

2. Hardware Description

2.1 Physical Dimensions

Figure 2.1, below, shows the physical dimensions of Antaira Technologies' IMP-C100-XX series: 10/100Tx to 1000FX compact industrial Ethernet media converter.
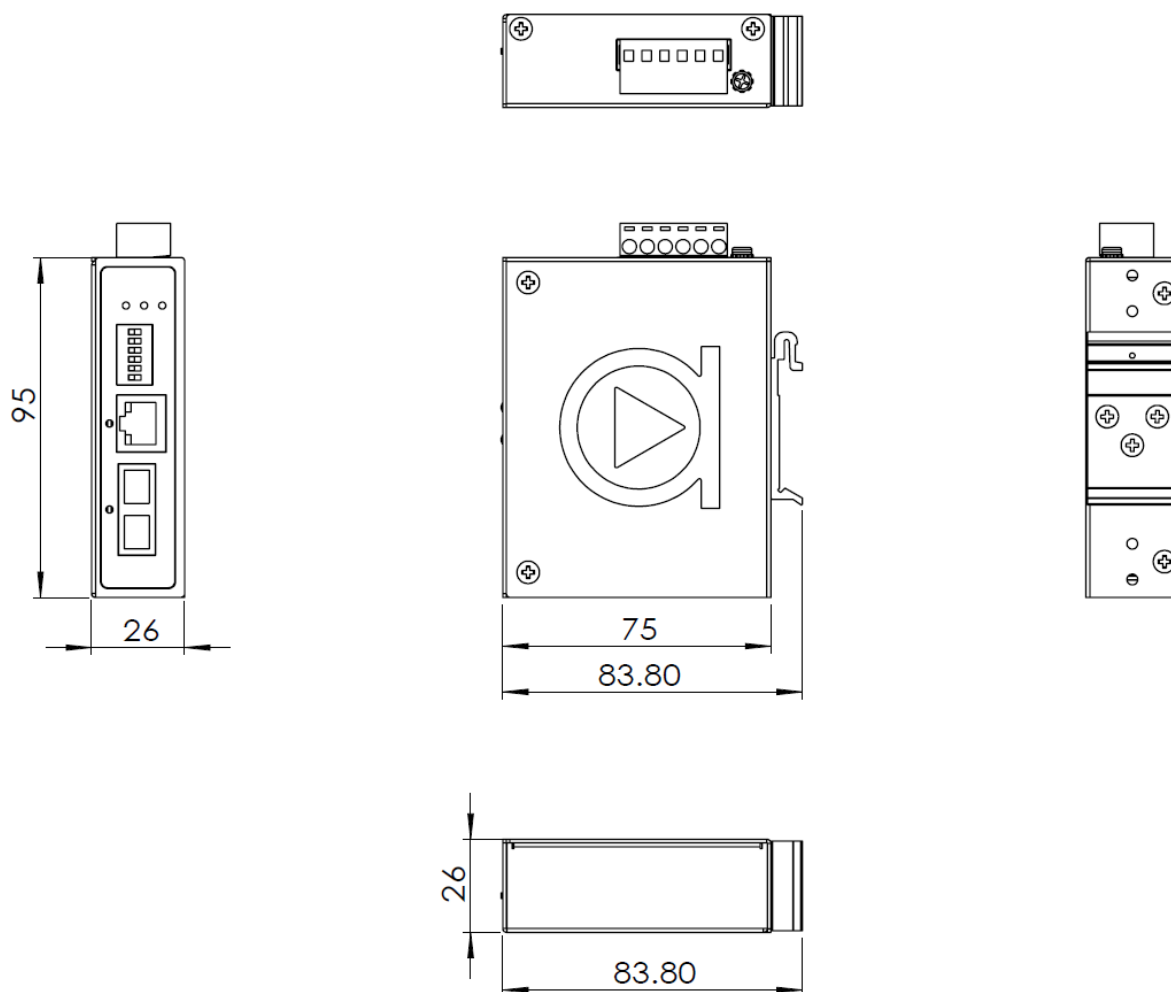
(W x H x D) is **26mm x 95mm x 75mm**

Figure 2.1

Physical Dimensions

2.2 Front Panel

The front panel of the IMP-C100-XX series can be seen below (*Figure 2.2*).

Grounding Screw

6-Pin Removal Terminal Block (Power Input)

LED for Power 1, Power 2, and Fault

DIP Switch

LAN Port – LED for Link/Activity Status

LED for PoE Status

LAN Port – LED for Speed Status

LAN Port – 10/100Tx RJ45

Fiber Port – LED for Link/Activity Status
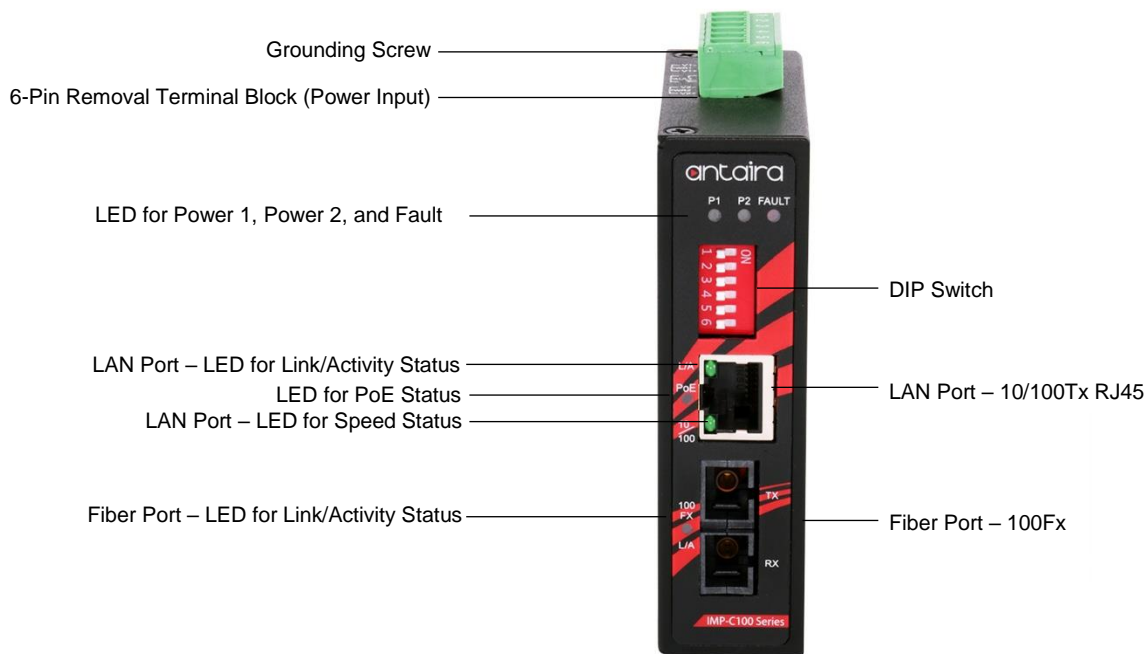
Fiber Port – 100Fx

Figure 2.2
Front Panel

2.3 Top View

Figure 2.3, below, shows the top panel of the IMP-C100-XX series media converter that is equipped with one 6-pin removal terminal block connector for dual DC power inputs (48~55VDC).
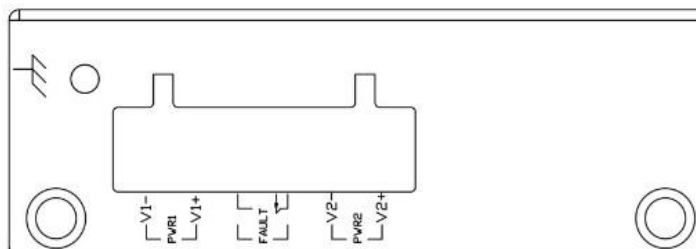

Figure 2.3
Top Panel View

2.4 LED Indicators

There are LED light indicators located on the front panel of the industrial Ethernet media converter that displays the power 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	Power input 1 or 2 is inactive or port link failed
		Off	Power input 1 and 2 are functional and port link is correct
RJ45 Port (Upper LED)	Green	On	Linked to network at 10/100Mbps
		Flashing	Networking is active
		Off	Not connected to network
RJ45 Port (Lower LED)	Green	On	Linked to network at 100Mbps
		Off	Linked to network at 10Mbps
100FX Fiber Port (L/A)	Green	On	Connected to network at 100Mbps
		Flashing	Networking is active
		Off	Not connected to network
PoE	Green	On	The port is supplying power to the powered-device
		Off	No powered-device attached or power supplying fails

Table 2.1

LED Indicators

NOTE: "P1/P2" is the abbreviation for "Power 1/Power 2", and "L/A" is for "Link/Activity".

2.5 DIP-Switch Setting

Default setting:

There are 6 pins on DIP-switch on the front panel for setting LFP (Link Fault Pass) and transmission control setup. The default setting for all DIP switches is "OFF". See *Table 2.2* below for more details.

DIP-Switch	1	2	Fiber Port Setting	Copper Port Settings		
			3	4	5	6
ON	LFP Enable	Converter Mode	Half-Duplex Mode	Auto-negotiation Disable	10Mbps	Half-Duplex Mode
OFF	LFP Disable	Switch Mode	Full-Duplex Mode	Auto-negotiation Enable	100Mbps	Full-Duplex Mode

Table 2.2

DIP-switch settings

DIP Switch 1

ON: Enable Link Fault Pass Through

OFF: Disable Link Fault Pass Through (default)

DIP Switch 2

ON: Enable "converter mode" to forward a frame immediately without storing in memory. When enabling this mode, please make sure both the Ethernet copper port and the optic fiber port work at 100Mbps and Full-Duplex

OFF: Enable "Store-and-Forward switch mode" (default)

DIP Switch 3

ON: Set fiber port at Half-Duplex

OFF: Set fiber port at Full-Duplex (default)

DIP Switch 4

ON: Disable Auto-negotiation on copper port

OFF: Enable Auto-negotiation on copper port (default)

DIP Switch 5

ON: Set copper port transmission speed at 10Mbps

OFF: Set copper port transmission speed at 100Mbps (default)

DIP Switch 6

ON: Set copper port transmission speed at Half-Duplex

OFF: Set copper port transmission speed at Full-Duplex (default)

⚠ **Caution**: If changing the current DIP-switch setting, the device should be powered off and then powered on again to make the setting effective.

2.6 Ethernet Ports

■   **RJ-45 Ports**

RJ-45 Ports (Auto MDI/MDIX): The RJ-45 port is auto-sensing for 10/100Base-Tx or 1000Base-Tx device connections. Auto MDI/MDIX means that the media converter can connect to another switch or workstation without changing the straight-through or crossover cabling. See the figures shown below for the straight-through and crossover cabling schematics.
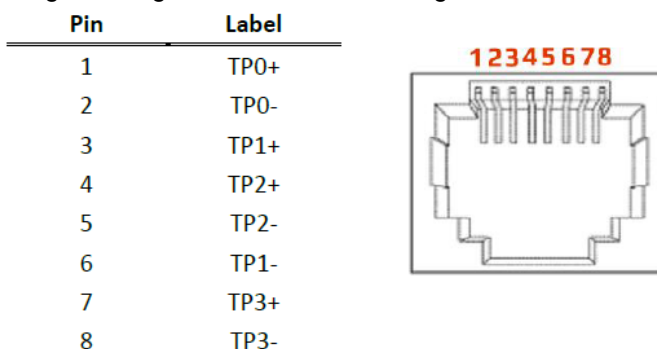
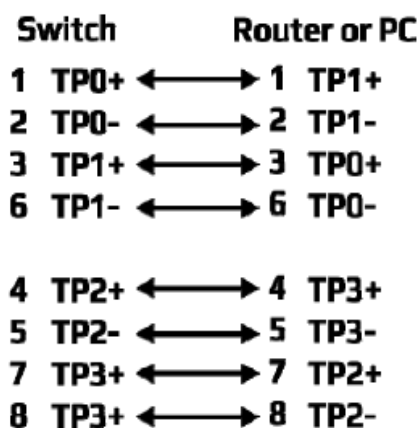| Pin	Label
1	TP0+
2	TP0-
3	TP1+
4	TP2+
5	TP2-
6	TP1-
7	TP3+
8	TP3-

Figure 2.4: RJ-45 Ethernet Port Pin

Switch   **Router or PC**

1 TP0+ ←→ 1 TP1+
2 TP0- ←→ 2 TP1-
3 TP1+ ←→ 3 TP0+
6 TP1- ←→ 6 TP0-

4 TP2+ ←→ 4 TP3+
5 TP2- ←→ 5 TP3-
7 TP3+ ←→ 7 TP2+
8 TP3+ ←→ 8 TP2-

Figure 2.5
Straight-Through Cables Schematic

Switch   **Switch**

1 TP0+ ↔ 1 TP0+
2 TP0- ↔ 2 TP0-
3 TP1+ ↔ 3 TP1+
6 TP1- → 6 TP1-

4 TP2+ ↔ 4 TP2+
5 TP2- ↔ 5 TP2-
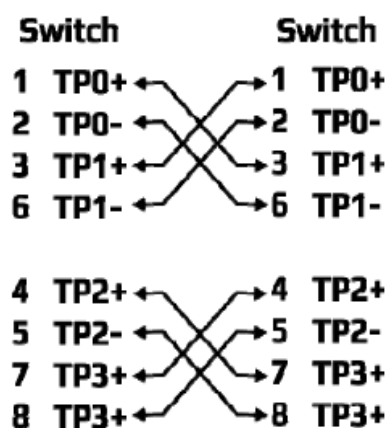7 TP3+ ↔ 7 TP3+
8 TP3+ → 8 TP3+

Figure 2.6
Crossover Cables Schematic

2.7 Cabling

■ Twisted-pair segments can be connected with an Unshielded Twisted Pair (UTP) or Shielded Twisted Pair (STP) cable. The cable between the equipment and the link partner (media converter, switch, hub, workstation, etc.) must be less than 100 meters (328 ft.) long.

■ Single-mode connector types have to use 9/125μm single-mode fiber cable, while multi-mode connector types have to use 62.5/125μm multi-mode fiber cable.

The fiber port of SC type connector can work in multi-mode or single-mode. When connecting the fiber port to another one, please follow the figure below to connect accordingly. A wrong connection will cause the port to work abnormally.
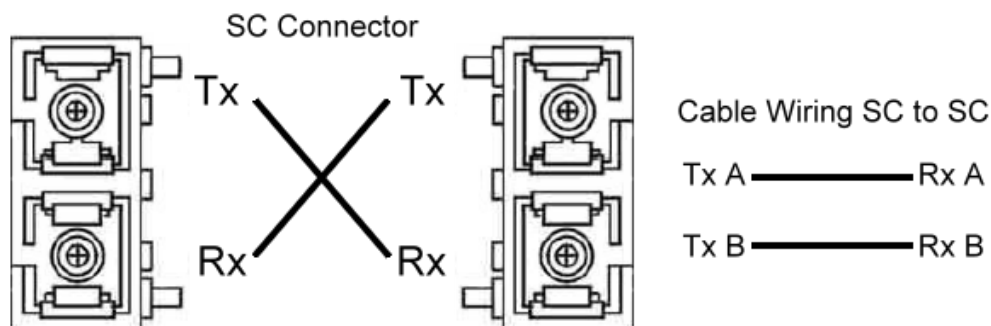
■

Figure 2.7

SC Connector

⚠ **Caution:** This is a Class 1 Laser/LED product that complies with IEC 60825-1. Don't stare into the Laser/LED Beam.

■

2.8 Wiring the Power Inputs

Please follow the steps below to insert the power wire.

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 2.8*.

Figure 2.8

Power Terminal Block

2. Tighten the wire-clamp screws to prevent the wires from loosening, as shown below in *Figure 2.9*.

Figure 2.9

Power Terminal Block

Caution: Only use copper conductors, 70/80°C, tighten to 5 in-lbs (0.56 Nm). The wire gauge for the terminal block should range between 18~20 AWG.

2.9 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 2.10*. By inserting the wires, it will detect the fault status including power failure or port link failure (managed industrial switch only) and form a normal open circuit.
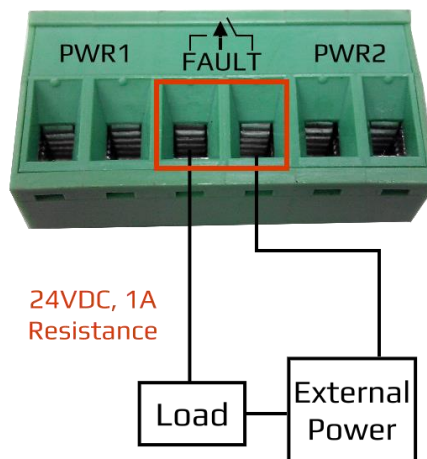

Figure 2.10: Wiring the Fault Alarm Contact

⚠ **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.

2.10 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 blow in *Figure 2.11*.


Figure 2.11
Grounding screw

⚠ **Caution:** Using a shielded cable achieves better electromagnetic compatibility.

3. Mounting Installation

3.1 DIN-Rail Mounting

The DIN-Rail is pre-installed on the industrial Ethernet media converter from the factory. If the DIN-Rail is not on the industrial Ethernet media converter, please refer to *Figure 3.1* to learn how to install the DIN-Rail on the media converter.
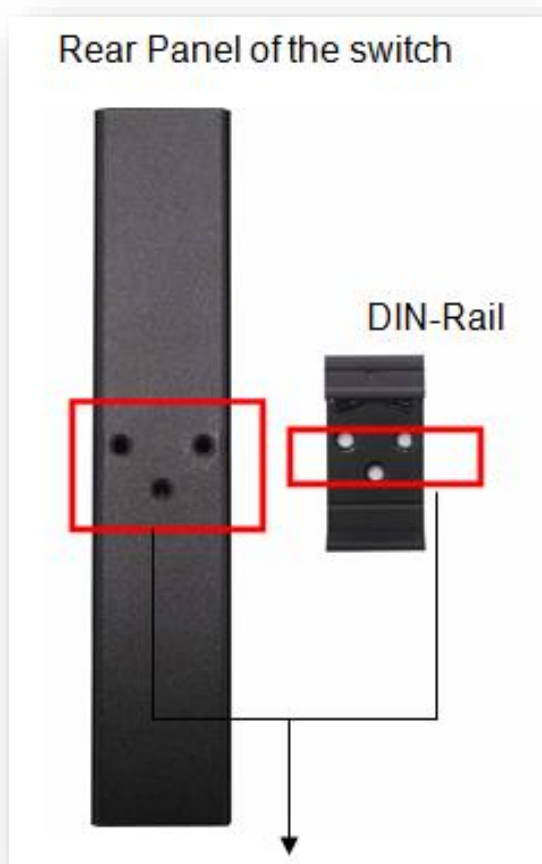
Figure 3.1

The Rear Side of the Media Converter and DIN-Rail Bracket

Follow the steps below to learn how to hang the industrial Ethernet media converter.

1. Use the screws to install the DIN-Rail bracket on the rear side of the industrial Ethernet media converter.

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

2. To remove the DIN-Rail bracket, do the opposite from step 1.
3. After the DIN-Rail bracket is installed on the rear side of the media converter, insert the top of the DIN-Rail on to the track as shown below in *Figure 3.2*.

Figure 3.2

Insert on the DIN-Rail

4. Lightly pull down the bracket onto the rail as shown below in *Figure 3.3*.
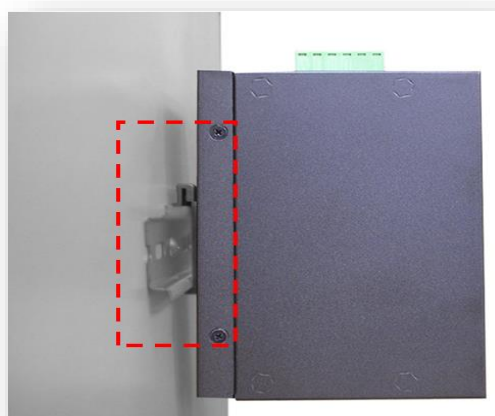
Figure 3.3

Secure onto the DIN-Rail

5. Check if the bracket is mounted tightly on the rail.

6. To remove the industrial Ethernet media converter from the rail, do the opposite from the above steps.

3.2 Wall Mounting

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

⚠️ **Caution:** "Wall" means industrial control panel wall.

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

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

4. Use the hook holes at the corners of the wall mounting bracket to hang the industrial Ethernet media converter on the wall.
5. To remove the wall mount bracket, do the opposite from the steps above.
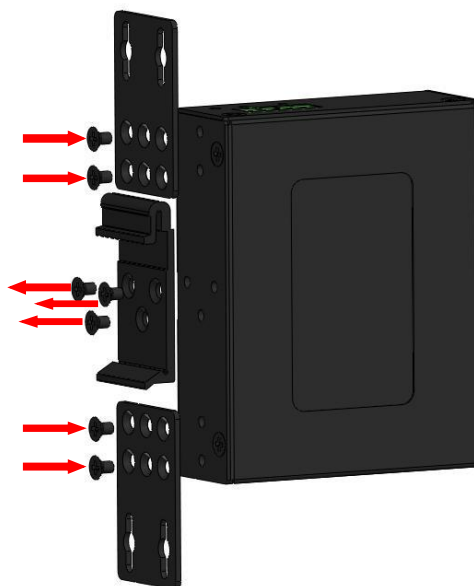
Figure 3.4

Remove DIN-Rail Bracket

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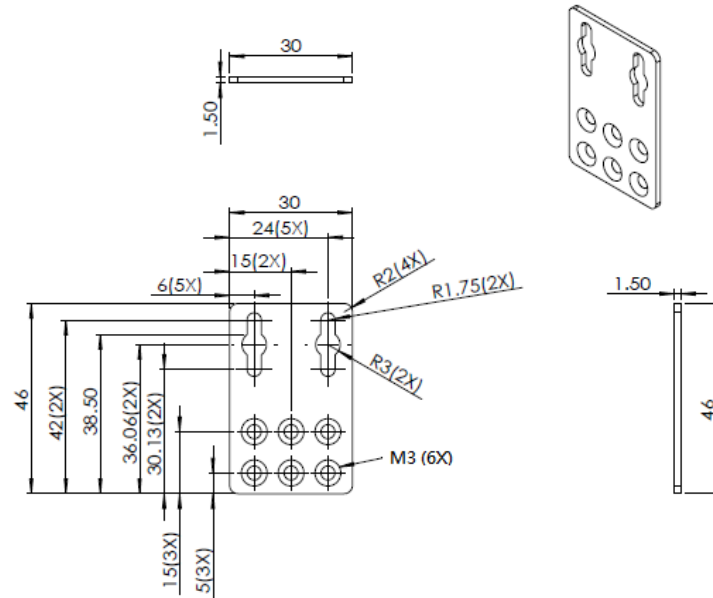
Figure 3.5

Wall Mounting Bracket Dimensions

4. Hardware Installation

4.1 Installation Steps

This section will explain how to install Antaira Technologies' IMP-C100-XX series.

⚠️ **Caution:**

1. This device is intended for indoor use and at altitudes up to 2000 meters.
2. This device is intended to be installed in an industrial control enclosure and panel.

Installation Steps

1. Unpack the industrial media converter from the original packing box.
2. Check if the DIN-Rail bracket is screwed on the industrial media converter.
   a. If the DIN-Rail is not screwed on the industrial media converter, please refer to the **DIN-Rail Mounting** section for DIN-Rail installation.
   b. For wall mounting, please refer to the **Wall Mounting** section for wall mounting installation.
3. For DIN-Rail or wall mounting, please refer to the **Mounting Installation** section.
4. Power on the industrial media converter, then the power LED light will turn on.
   a. For wiring power, please refer to the **Wiring the Power Inputs** section.
   b. 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 RJ-45 cable into the media converter'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 (RJ-45) LED on the industrial media converter will turn on when the cable is connected to the networking device.
   a. Please refer to the **LED Indicators** section for LED light indication information.
7. Insert one side of the fiber cable into the media converter's Fiber port and on the other side into the networking device's Fiber port, e.g. switch or server. The fiber port's LED on the industrial media converter will turn on when the cable is connected to the networking device.
   a. Please refer to the **LED Indicators** section for LED light indication information.
8. When all connections are set and the LED lights all show normal, the installation process 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.

- 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 user 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.

5. Network Application

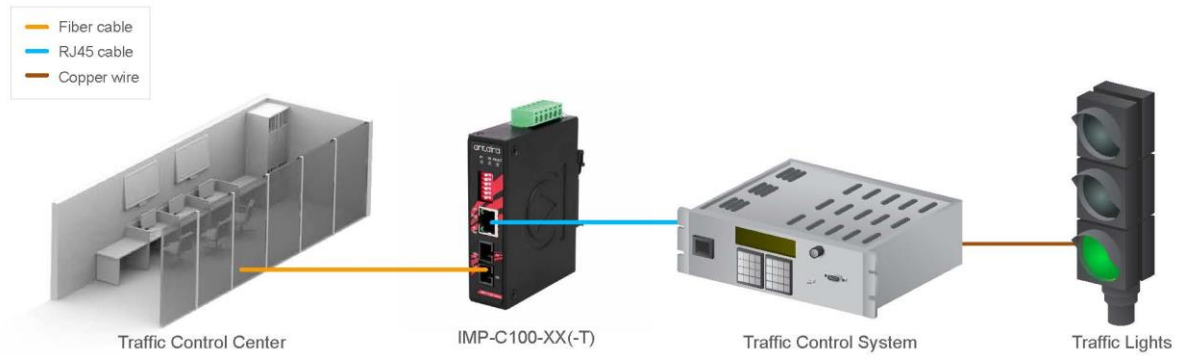This segment provides an example of an industrial Ethernet media converter application (*Figure 5.1*).

Figure 5.1

Industrial Media Converter Application

Example

6. Trouble Shooting

- 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 RJ-45 connections: 100Ω Category 5e for 10/100/1000Mbps. 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 media converter can be easily monitored with the LED indicators which help to identity if any problems exist.
  - o   Please refer to the LED indicators section for LED light indication information.

- 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.
  - o   Please contact Antaira for technical support if the problem cannot be resolved.

- If the industrial media converter 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.

7. Technical Specifications

Table 7.1 has the technical specifications for Antaira Technologies' IMP-C100-XX series:

Standards	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, Fast Ethernet
	IEEE 802.3af/at	Power over Ethernet
Technology	Protocol	CSMA/CD
	Data Process	Store and Forward
	Flow Control	IEEE 802.3x back pressure flow control
Switch Properties	Memory Buffer	128k bits
Port Interface	Ethernet (RJ45) Port	1*10/100Tx auto negotiation speed, full/half duplex mode, and auto MDI/MDI-X connection
	Fiber Port	1*100Fx SC/ST type connector Multi-mode: 50/125um or 62.5/125um Single-mode: 9/125um or 10/125um
	Fiber Wavelength	Depends on fixed fiber modules
	LED Indicator	Power 1, Power 2, Fault:: On / Off Fiber Port: Link / Act Ethernet Port: Link / Act
Mechanical Characteristics	Housing	Metal IP30 protection
	Dimension	26 x 95 x 75 mm
	Weight	Unit Weight: 0.661 lbs. Shipping Weight: 0.903 lbs.
	Mounting	DIN-Rail mounting, wall-mounting
Power Requirement	Input Voltage	48~55VDC Redundant Input
	Power Connection	1 removable 6-contact terminal block
	Power Consumption	2.4 Watts
	Max. PoE Power Budget	30 Watts
Environmental Limits	Operating Temperature	Standard: -10 to 70˚C (14 to 158˚F) EOT: -40 to 80˚C (-40 to 176˚F)
	Operating Humidity	5% to 95% (Non-Condensing)
	Storage Temperature	-40 to 85˚C (-40 ~ 185˚F)
Regulatory Approvals	EMI / EMS	FCC Part 15 Subpart B Class A, CE EN 55032 Class A, EN 61000-6-4 Class A, CE EN 55024 Class A, EN 61000-6-2 Class A, IEC61000-4-2 (ESD), IEC61000-4-3 (RS), IEC61000-4-4 (EFT), IEC61000-4-5 (Surge), IEC61000-4-6 (CS), IEC61000-4-8 (Magnetic Field)
	Stability Testing	IEC60068-2-32 (Free Fall), 27 (Shock), 6 (Vibration)
	Safety	FCC, CE, UL 61010-1 (Pending), UL 61010-2-201 (Pending)

Table 7.1

Technical Specifications

Antaira Customer Service and Support

(Antaira US Headquarter)   + 844-268-2472

(Antaira Europe Office) + 48-22-862-88-81

(Antaira Asia Office) + 886-2-2218-9733

Please report any problems to Antaira:

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