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STM-601C/602C/604C(-T) Series

1/2/4 Port Modbus Gateway

![antaira]

www.antaira.com

Version 1.1
Hardware Manual

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.

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 Serial to Ethernet Modbus Gateways

Industrial Grade Serial to Ethernet hardened Devices

Hardware Manual

Version 1.1 (November 2018)

This manual supports the following models:

- STM-601C
- STM-601C-T
- STM-602C
- STM-602C-T
- STM-604C
- STM-604C-T

This document is the current official release 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. Introduction

The STM-60XC series Modbus gateways are bi-directional gateways for integrating new and existing Modbus/RTU and Modbus/ASCII serial devices to newer TCP/IP networked-based devices. The STM-601C/602C/604C feature two independent Ethernet ports and MAC addresses to provide redundancy and reliability. They provide a simple and cost-effective way to bring remote management and data accessibility to thousands of devices that cannot connect to a network. STM-601C/602C/604C provide a feature that can allow users to select either master or slave operation mode for each serial port. They not only allow an Ethernet master to control serial slaves, but also allow serial masters to control Ethernet slaves.

1.1 Product Overview

Antaira's STM-60XC series of Modbus Gateways are a robust, feature-rich, and cost-effective way to integrate Ethernet and Serial Modbus devices. The STM-60XC series provides one, two, or four serial ports, two Ethernet ports, a wide range of power inputs, and a compact slim design, making them an ideal solution for connecting multiple Modbus/RTU and Modbus/ASCII serial devices to Modbus TCP (Ethernet).

Originally developed for PLCs in industrial automation and manufacturing control applications, Modbus is one of the most popular open standard protocols in use today. The communication mode can be Modbus RTU/ASCII (Serial) or Modbus TCP (Ethernet). Many industrial devices use Modbus as their communication standard. However, the Ethernet-based Modbus protocol is different from the original serial-based protocols in that a Modbus Gateway is needed to be a bridge for integration.

The two Ethernet ports allow the STM-60XC series to establish two separated Ethernet connections to two Ethernet domains or two Ethernet switches in the same domain. Through a dual Ethernet connection, the STM-60X series greatly improves the device connectivity reliability, increases system stability, and simplifies the redundant configuration.

The Modbus/RTU and Modbus/ASCII protocols define how a "master" device pulls one or more "slave" devices and writes real-time data over RS-232, RS-422, or RS-485 serial data communication. The STM-60XC series provides a feature that can allow users to select either master or slave operation for each serial port. The STM-60XC series not only allows Ethernet masters to control serial slaves, but also allow serial masters to control Ethernet or serial slaves. Furthermore, the STM-60XC series can allow both Ethernet and serial slaves to be controlled by both Ethernet and serial masters.

The STM-60XC series supports various operating modes: RTU Master, RTU Slave, ASCII Master, and ASCII Slave

1.2 Product Features

■ Provides 2*10/100 Mbps Ethernet ports for LAN redundancy

■ Integration of Modbus TCP and Modbus RTU/ASCII networks

■ Supports up to 921.6 kbps, and any baud rate setting

■ Supports up to 16 connections and 32 requests simultaneously

■ Auto searching slave ID over configuration utility

■ Software selectable RS-232/422/485 communication

■ Mounts on DIN-rail and Wall mount

■ Built-in 15 KV ESD protection for all serial signals

■ Automatic RS-485 data flow control

■ Supports surge protection for D.C. power ports with line-to-line 2 KV and line-to-earth 4 KV for signal ports to 4KV

1.3 Product Hardware Features

■ System Interface and Performance

- RJ-45 ports support Auto MDI Function

- Embedded 2*10/100Tx RJ45

- Power line EFT protection: 2,000VDC; Ethernet ESD protection: 6,000VDC

■ Power Input

- DC 12~48V redundant with a 6-pin removal terminal block

- One user programmable alarm relay contact

■ Operating Temperature

- Standard operating temperature models: -10°C to 60°C

- Extended operating temperature models: -40°C to 70°C

■ Case/Installation

- IP-30 protection metal housing

- DIN-Rail and wall mount design

1.4 Package Contents

- ■ 1– STM-60XC series: Industrial Modbus TCP to X port(s) Serial (232,422,485) RTU/ASCII Gateway

- ■ 2-Wall mounting brackets and screws

1.5 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 user manual.

Warning Labels

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

Figure 1.1 - Caution Label

This warning label is on the device, and means that the surface of the device is hot. (Shown in *Figure 1.2*)

Figure 1.2 - Hot Surface Warning Label

2. Hardware Description

2.1 Physical Dimensions

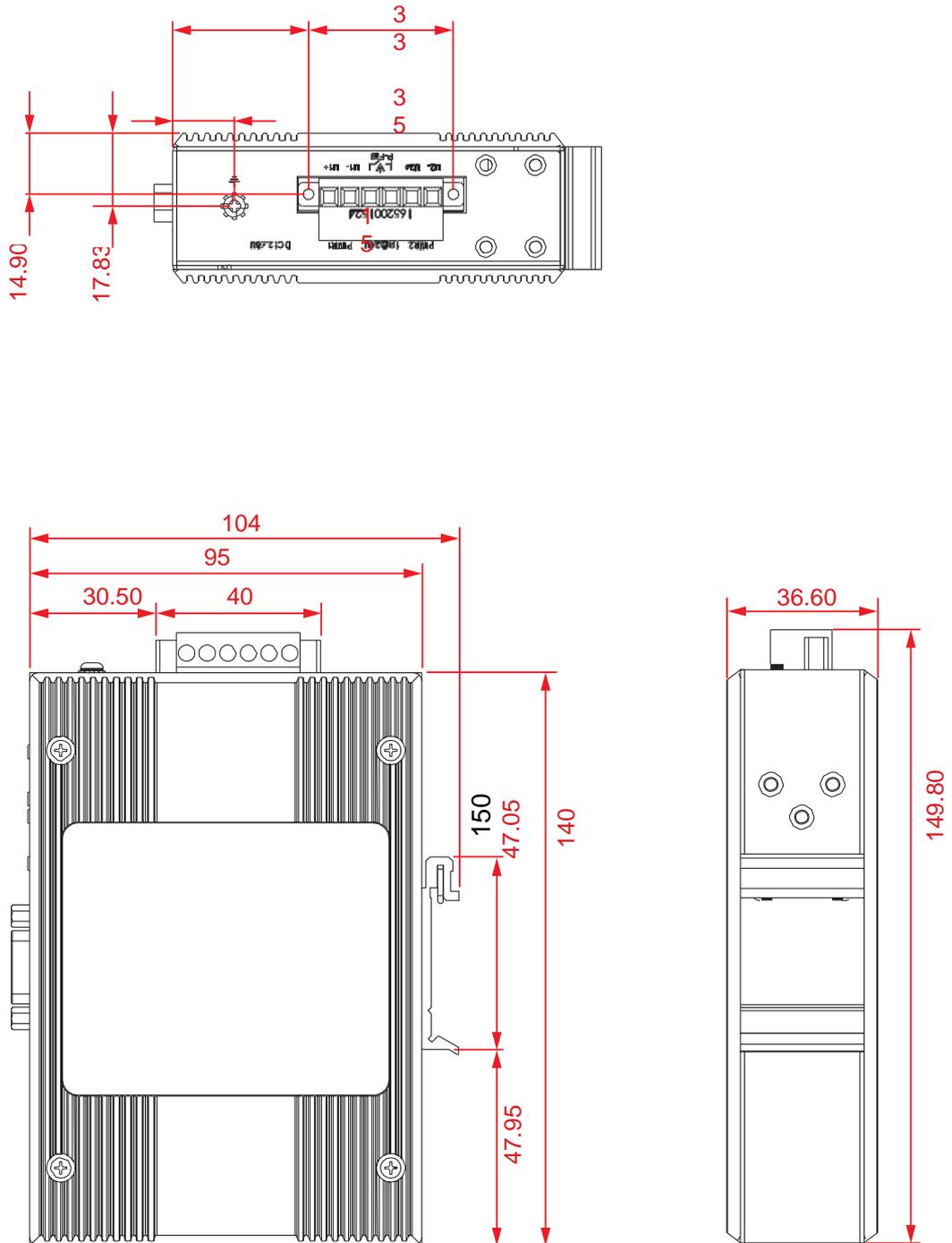The following view in *Figure 2.1* shows the STM-601C and STM-602C.

Figure 2.1
STM-601C and STM-602C
Dimensions

The following view in *Figure 2.2* shows the STM-604C.
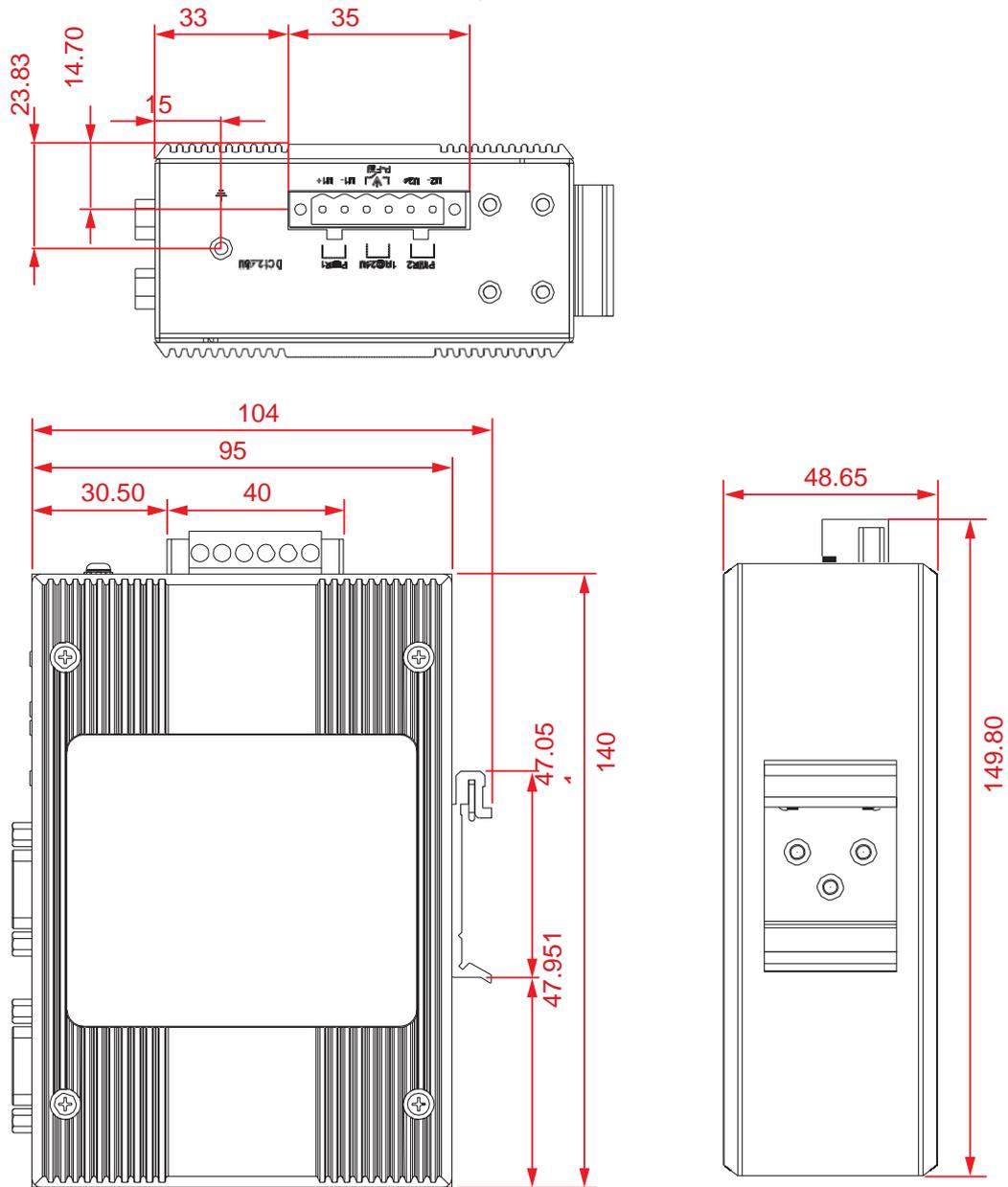
Figure 2.2
STM-604C Dimensions

2.2 Front Panel

The front panel of the STM-601C(-T) series industrial Modbus Gateway is shown below in *Figure 2.3*.
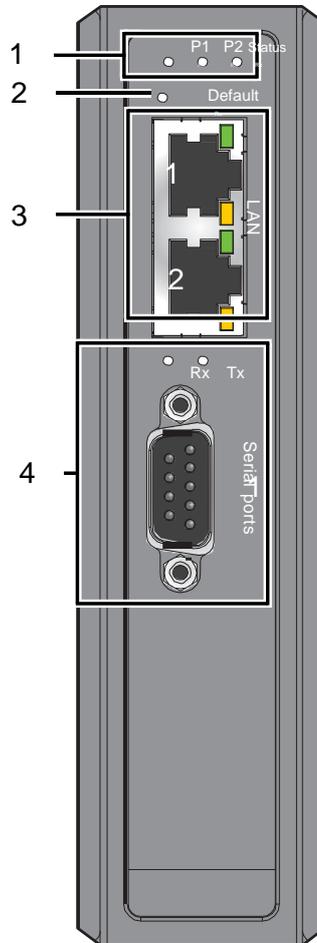
Figure 2.3

The Front Panel of STM-601C(-T) Series

No.	Item	Description
1	System LED panel	See "LED Indicators" on page 13 for further details.
2	Default Button	Press for at least 10 secs. to reset device to default settings
3	ETH port	RJ45 x 2
4	Serial port	DB9 pinout, supports 232/422/485

The following view in *Figure 2.4* shows the STM-602C(-T) Series.
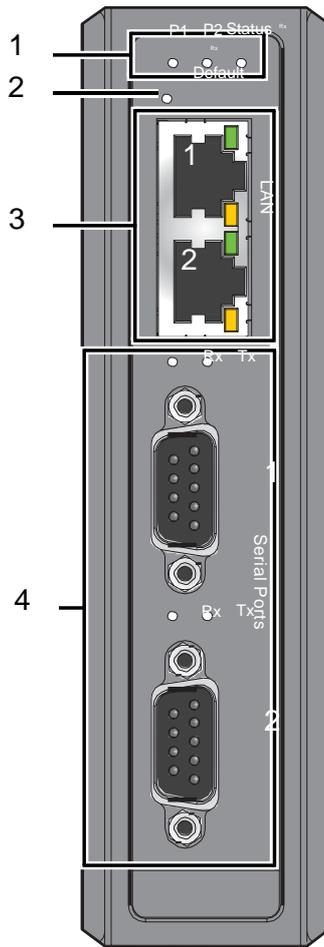
Figure 2.4

The Front Panel of STM-602C(-T) Series

No.	Item	Description
1	System LED panel	See "LED Indicators" on page 13 for further details.
2	Default Button	Press for at least 10 secs. to reset device to default settings
3	ETH port	RJ45 x 2
4	Serial port	DB9 pinout ports x 2, supports 232/422/485

The following view in *Figure 2.5* shows the STM-604C(-T).
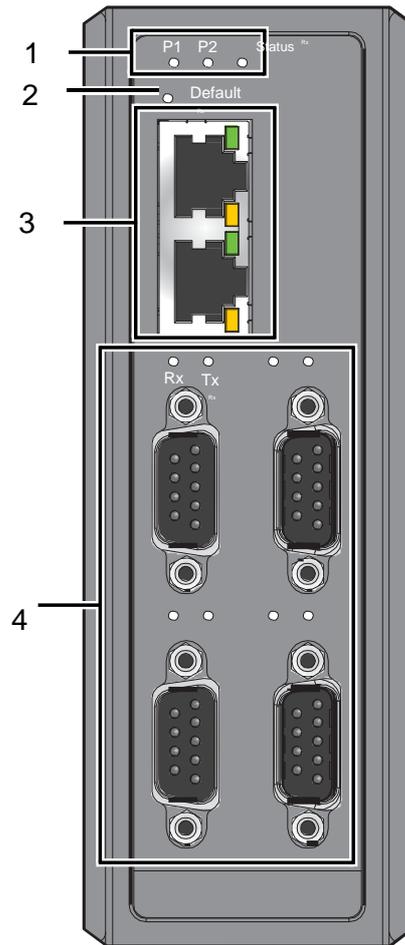
Figure 2.5

The Front Panel of STM-604C(-T) Series

No.	Item	Description
1	System LED panel	See "LED Indicators" on page 13 for further details.
2	Default Button	Press for at least 10 secs. to reset device to default settings
3	ETH port	RJ45 x 2
4	Serial port	DB9 pinout ports x 4, supports 232/422/485

2.3 Top View
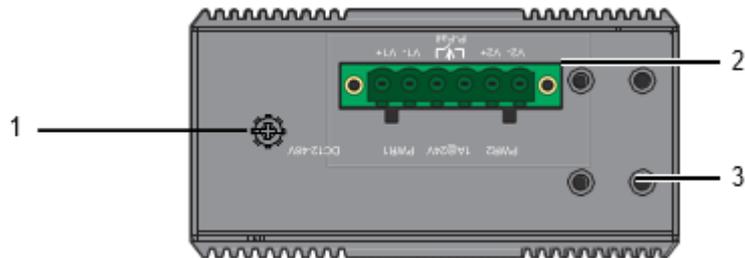
Figure 2.6

Top Panel View of STM-60XC Series

No.	Item	Description
1	Ground Terminal	Screw terminal used to ground chassis
2	Terminal block	Connect cabling for power and alarm wiring
3	Wall mounting holes	Screw holes (top x4, bottom x4) used in the installation of a wall mounting plate

2.4 Rear View

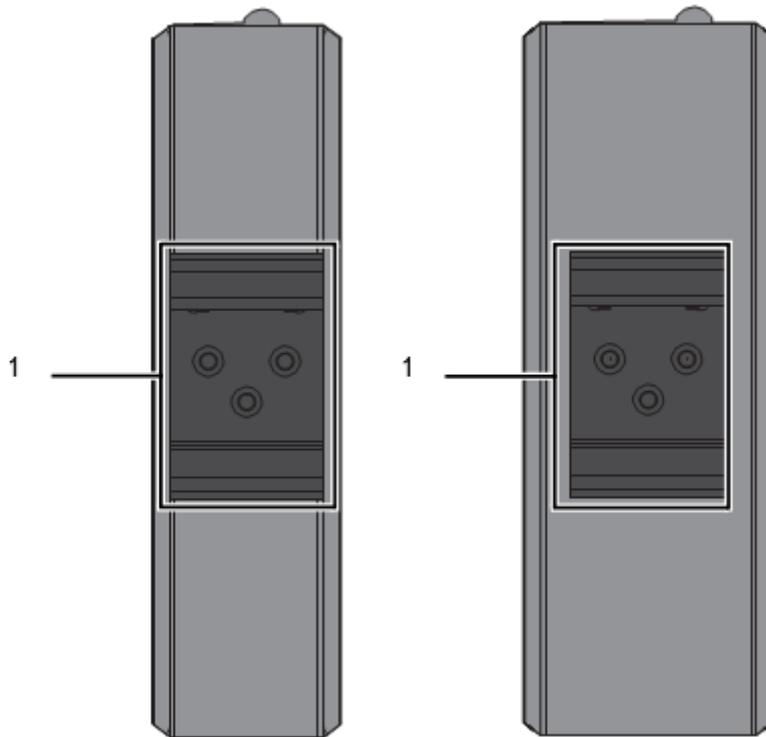The following view in *Figure 2.7* shows the STM-60XC (-T) series.

Figure 2.7

The Rear Panel of STM-60XC (-T) Series

No.	Item	Description
1	DIN-Rail mounting	Mounting plate used for the installation to a standard DIN rail plate.

2.5 LED Indicators

There are LED light indicators located on the front panel of the industrial Modbus

Gateway that display the power status and status of the device. Each LED indicator

has a different color and has its own specific meaning, see below in *Table 2.1*.

No.	LED Name	LED Color	Description
1	P1	Green	Power 1 is on
		Off	Power 1 is off, or power error condition exists
2	P2	Green	Power 2 is on
		Off	Power 2 is off, or power error condition exists
3	Status	Amber	The device server has been located by Antaira's Gateway utility location function

		Amber, blinking	System is ready (1cycle/sec.)
		Off	System is not working

Table 2.1 – LED Indicators for STM-60XC Series

2.6 Power Connection

⚠ *Warning! Power down and disconnect the power cord before servicing or wiring   the serial device server.*

⚠ *Caution! Do not disconnect modules or cabling unless the power is first switched off. The device only supports the voltage outlined in the type plate. Do not use any other power components except those specifically designated for the serial device server.*

⚠ *Caution! Disconnect the power cord before installation or cable wiring. The STM-60XC series supports dual 12 to 48 VDC power inputs and power-fail relay output.*

The following figure, *Figure 2.8*, illustrates a P-Fail alarm application example. The P-Fail alarm contacts are visible on the front view of the terminal block.
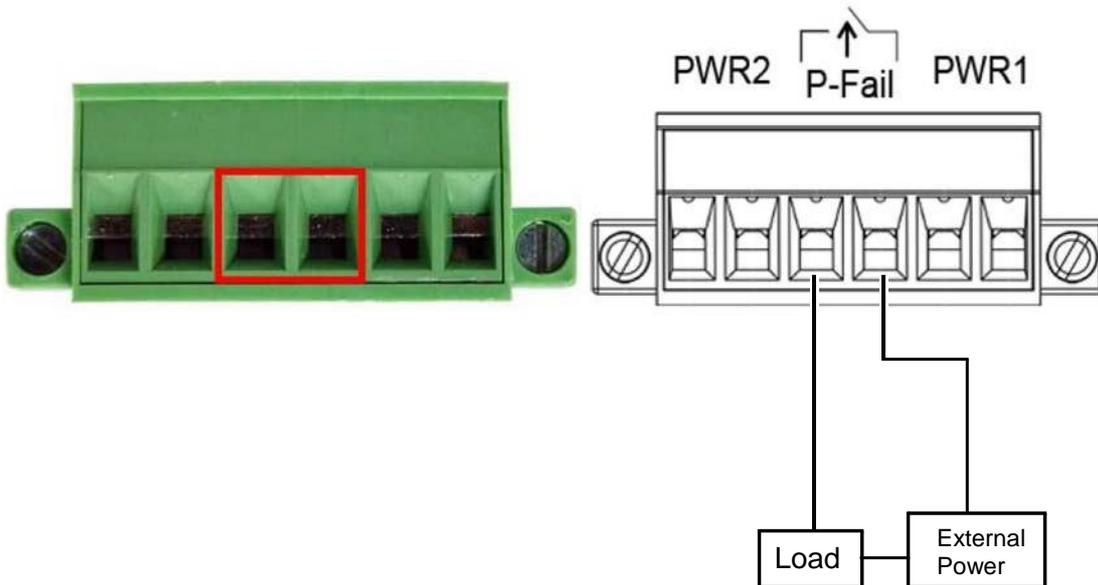

Figure 2.8

Power Wiring for STM-60XC Series

You can connect an alarm indicator, buzzer, or other signaling equipment through the relay output. The relay opens if power input 1 or 2 fails. In a wiring example where an LED is connected to the relay output, the LED would be off in an open state

3. Mounting Installation

3.1 DIN-Rail Mounting

The DIN-Rail mount option is the quickest installation option. Additionally, it optimizes the use of rail space. The metal DIN-Rail kit is secured to the rear of the serial device server. The device can be mounted onto a standard 35mm (1.37") x 75mm (3") height DIN-Rail. The devices can be mounted vertically or horizontally. Refer to the following guidelines for further information.

Installing the DIN-Rail Mounting Kit

1.   Insert the top back of the mounting bracket over the DIN-Rail.
2.   Push the bottom of the server towards the DIN-Rail until it snaps into place.

Figure 3.1
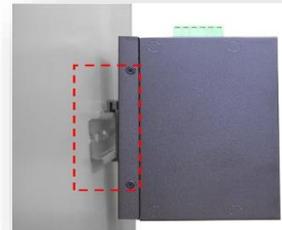*Insert the Modbus Gateway on the DIN-Rail*

Figure 3.2
Stabilize the Modbus Gateway on the DIN-Rail

Removing the DIN-Rail Mounting Kit

1.   Push the server down to free the bottom of the plate from the DIN-Rail.
2.   Rotate the bottom of the device towards you and away from the DIN-Rail.
3.   Once the bottom is clear of the DIN-Rail, lift the device straight up to unhook it from the DIN-Rail.

3.2 Wall Mounting

The wall mounting option provides better shock and vibration resistance than the DIN rail vertical mount.

Note!   *When installing, make sure to allow for enough space to properly install the cabling.*

Before the device can be mounted on a wall, you will need to remove the DIN-Rail plate.

1.   Rotate the device to the rear side and locate the DIN mounting plate.
2.   Remove the screws securing the DIN mounting plate to the rear panel of the server.
3.   Remove the DIN mounting plate. Store the DIN mounting plate and provided

screws for later use.

4. Align the wall mounting plates on the rear side. The screw holes on the device and the mounting plates must be aligned, see the following illustration *Figure 3.3.*

5. Secure the wall mount plates with M3 screws, see the following figure.
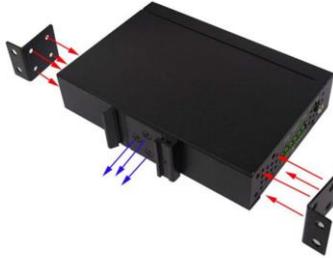

Figure 3.3
Installing Wall Mount Plates

Once the wall mounting plates are secure on the device, you will need to attach the wall screws (x8).

6. Locate the installation site and place the server against the wall, making sure it is the final installation location.

7. Use the wall mount plates as a guide to mark the locations of the screw holes.

8. Drill four holes over the four marked locations on the wall, keeping in mind that the holes must accommodate wall sinks in addition to the screws.

9. Insert the wall sinks into the walls.

10. To mount the wall plate, use screws of the size shown in the following illustration.
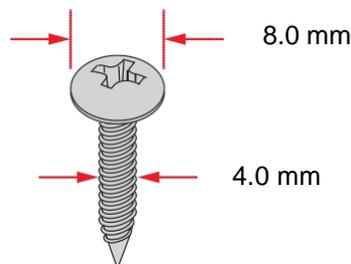

8.0 mm

4.0 mm

Figure 3.4
Wall Mounting Screw Dimensions

Note!
☐ *Make sure the screws' dimensions are suitable for use with the wall mounting plate.*

☐ *Do not completely tighten the screws into the wall. A final adjustment may be needed before fully securing the wall mounting plates on the wall.*

11. Align the wall mount plate over the screws on the wall.

12. Install the wall mount plate on the screws and slide it forward to lock in place, see the following figure – *Figure 3.5.*
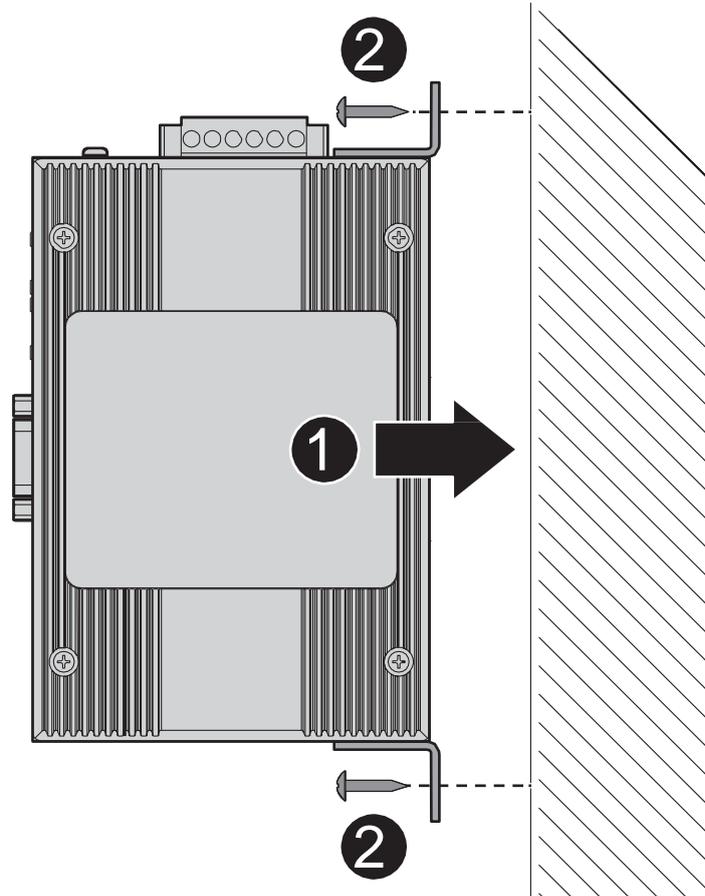
Figure 3.5
Wall Mount Installation

13. Once the device is installed on the wall, tighten the screws to secure the device.

4. Serial Connection

STM-60XC series provides up to four ports DB9 (male) connectors. RS-232/422/485 pin assignments as below:

Figure 4.1
DB9 Pin Assignment
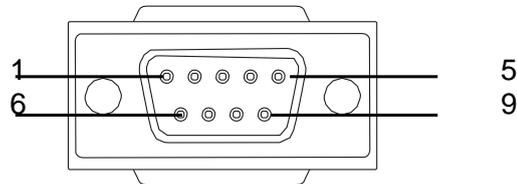
Pin	1	2	3	4	5	6	7	8	9
RS-232	DCD	RX	TX	DTR	GND	DSR	RTS	CTS	RI
RS-422	TX-			TX+	GND		RX+		RX-
RS-485	DATA-			DATA+	GND				

5. 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.

6. Technical Specifications

Table 6.1 has the technical specifications for Antaira's STM-60XC series: 1/2/4 port industrial Modbus Gateway.

Specifications	Description	
Interface	I/O Port	• STM-601C: 2 x RJ45 + 1 x RS-232/422/485 • STM-601C-T: 2 x RJ45 + 1 x RS-232/422/485 • STM-602C: 2 x RJ45 + 2 x RS-232/422/485 • STM-602C-T: 2 x RJ45 + 2 x RS-232/422/485 • STM-604C: 2 x RJ45 + 4 x RS-232/422/485 • STM-604C-T: 2 x RJ45 + 4 x RS-232/422/485
	Power Connector	Terminal Block
Physical	Enclosure	Metal with solid mounting hardware
	Installation	DIN-Rail and Wall mount
	Dimensions (WxHxD)	• STM-601C & STM-602C: 37 x 140 x 95mm (1.46" x 5.51" x 3.74") • STM-604C: 55 x 140 x 95mm (2.17" x 5.51" x 3.74")
LED Display	System LED	Power 1, Power 2, Status
	Port LED	LAN: Speed, Link/Active Serial: Tx, Rx
Environment	Operating Temperature	Standard models -10°C ~ 60°C (14°F ~140°F) (-T) models: -40°C ~ 70°C (-40°F ~ 158°F)
	Storage Temperature	-40°C ~ 70°C (-40°F ~ 158°F)
	Ambient Relative Humidity	5 ~ 95% RH
Ethernet Communications	Compatibility	IEEE 802.3, IEEE 802.3u
	Speed	10/100 Mbps
	Port Connector	8-pin RJ45
	Protection	Built-in 1.5 KV magnetic isolation
Serial Communications	Port Type	RS-232/422/485, software selectable
	Port Connector	DB9 male
	Data Bits	7, 8
	Stop Bits	1, 2
	Parity	None, Odd, Even, Space, Mark
	Flow Control	XON/XOFF, RTS/CTS, DTR/DSR

	Baud Rate	50 bps ~ 921.6 kbps, any baud rate setting
	Protection	Built-in 15 KV ESD for all signals 'CI' models: 2KV Isolation for RS-422/485 signals
Power	Power Consumption	• STM-601C: 5.2W • STM-602C: 5.2W • STM-604C: 6.3W
	Power Input	12 ~ 48VDC, redundant dual inputs
Software	OS Support	32-bit/64-bit Windows XP/Vista/7/8/8.1, Windows Server 2003/2008/2008 R2/2012/2012 R2, and Linux
	Utility	Device Configuration Utility
	Operation Modes	Modbus RTU Master/Slave mode Modbus ASCII Master/Slave mode
	Configuration	Windows utility, Web Browser
	Management	SNMP MIB-II
Regulatory Approvals	EMC	CE, FCC Part 15 Subpart B (Class A)
	Safety	UL/cUL (Class 1, Division 2, Groups A, B, C, and D), ATEX (Zone 2 Ex nA nC IIC T4 Gc)

Table 6.1

Technical Specifications of Modbus Gateways