Intuicom®

XC400™
Industrial IoT LTE Router

Basic User Guide

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FCC Notification

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept
any interference received, including interference that may cause undesired operation.

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 when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Maintain at least 20cm physical separation between human body and any antenna during operation.

Warning: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Attention:
Incorrect termination of supply wires may cause internal damage and will void warranty. To ensure your XC400 Industrial IoT Router enjoys a long life, double check ALL your connections with the user manual before turning the power on.

Note: All equipment must be properly grounded for safe operations.
Note: All equipment should be serviced only by a qualified professional.

Product disposal:
When your product reaches the end of its useful life, it is important to take care in the disposal of the product to minimize the impact on the environment.

The product housing is made of aluminum and may be recycled through regular metal reclamation operators in your area.

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Follow Instructions:
Before installing, operating, or servicing this equipment, read this entire manual and all other publications pertaining to the work to be performed. Practice all plant and safety instructions and precautions. Failure to follow the instructions can cause personal injury and/or property damage.

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1 Product Overview

The Intuicom XC400 series Industrial IoT LTE router is a feature-rich device that delivers LTE connectivity demanded in mission critical applications. Designed to provide the crucial link to your remote devices and provide Industrial Internet of Things (IIoT) connectivity, the XC400 provides secure, robust communication options across a wide variety of equipment and applications.

The Intuicom XC400 series router has dual SIM backup, two LAN ports where one port can support an Ethernet WAN connection option for fixed internet failover to cellular. RS232 and RS485 interfaces are available to support Serial-to-IP communication and protocol translation. The XC400 series router also supports two digital inputs and two digital outputs for alarms and the XC400 can act as a gateway for MQTT, Sparkplug B, and Modbus, as well as other protocol translations and capabilities.

The XC400 supports a wide 9-to-48 VDC power input range and is designed with reverse-voltage protection mechanism for reliability in industrial applications. It is ideally suited for IIoT connectivity and wireless M2M applications which need reliable features for data transmission.

XC400 Key Features and Benefits:

- Cellular 3G/4G CAT4 LTE router with diversity receive
- Compact industrial enclosure, IP30, with DIN rail mount for easy installation
- Dual SIM card support with configurable failover to SIM2 or wired WAN
- Ethernet, RS-232/RS-485 serial, two digital inputs and two digital outputs
- IPSec, OpenVPN Client & Server, L2TP, GRE VPNs
- Port Forwarding, DMZ Support multiple VPN tunnels
- Modbus RTU, ASCII, TCP, MQTT, and Sparkplug B transport support
- Internal serial servers
- Industrial input power range of 9-to-48 VDC
- SMS Notification and Control
- 2x 10/100M LAN/WAN ports
- GNSS
- Future support for optional 2.4G WiFi Station/Access Point

2 Basic Setup and Operation

This user guide covers the core features of the XC400 including basic setup and operation. The XC400 ships in a default state where the two Ethernet ports are both part of the same LAN interface (effectively bridged together) and IP addresses are served with an internal DHCP server. By default, the XC400 has each of its two SIM/WWAN interfaces enabled and configured to attempt automatic configuration of an APN as well as failover from SIM1/WWAN1 to SIM2/WWAN2. The primary application for the XC400 is to provide Internet access via its LTE WWAN interface to devices connected to its LAN port(s). This user guide assumes basic competency with IP addressing, routing, bridging, WiFi, and Cellular.

2.1 Basic Physical Setup

1. Insert SIM card in SIM slot 1 per **Section 11**. If using a secondary/failover SIM, insert the second SIM into slot 2.

2. Connect cellular antenna(s) per **Section 10.1**. Be sure to install/orient the antennas for good cellular signal reception and for safe operation, avoiding power lines and away from human exposure (at least 20cm).

3. Connect LAN interface. Connect an Ethernet cable between ETH0 on the XC400 and the LAN to which the configuring PC is connected. Alternatively, direct connection can also be made between the XC400 and the configuration PC's Ethernet interface. Configure the PC to accept a DHCP address on this interface. **Note:** Ensure that the XC400 is the only DHCP server on the LAN.

4. Connect a ground to the device. It is strongly recommended to connect a ground per **Section 13**.

5. Connect DC power: If the XC400 was ordered with a AC/DC adapter, it will already be connected to the DC power terminal block. If no AC/DC adapter was ordered, connect 9-48VDC to the included terminal block as showing in **Section 9.2**.

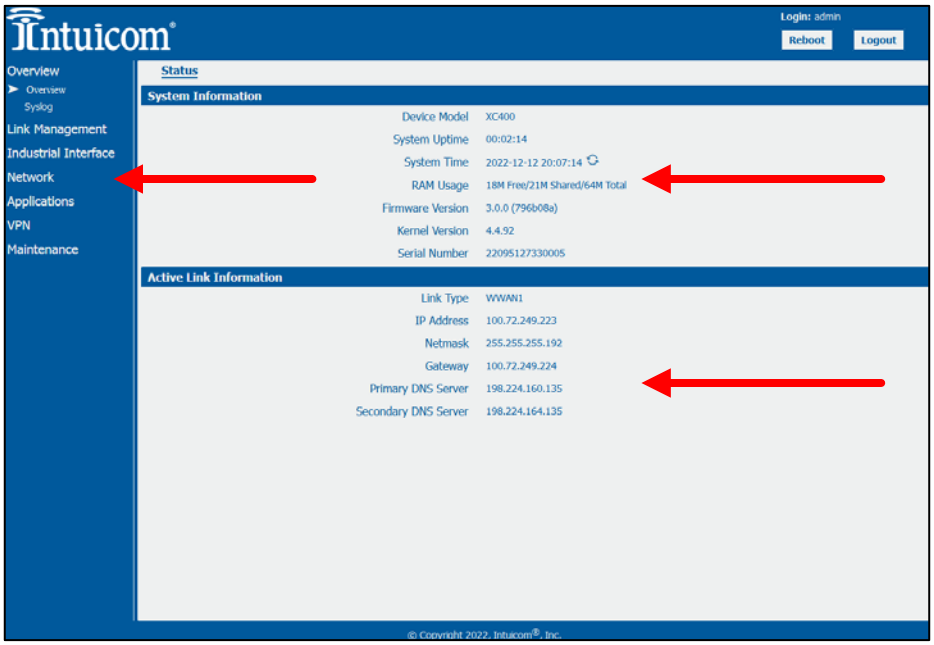
2.2 Accessing the Configuration Interface

The primary configuration interface for the XC400 is via HTTP(S) on its default IP address of **192.168.5.1**. Each XC400 ships with a unique default password which is printed on the unit's side label. It is highly recommended that the admin password be changed from the default value. It is also recommended that the unit's unique default password be recorded with its serial number and MAC address for future reference as a backup to the side label.

On the PC connected to the XC400, open a web browser and enter the default IP address of the XC400: **http://192.168.5.1**. A login screen should be present:

Enter '**admin**' for the username and the unique default password found on the side label. If the login is rejected, it is possible the unit is not at its default state and the password as been previously changed. If necessary, reset the unit to defaults using the reset button (**Section 12**).

Upon successful login, the overview page is displayed. This page includes basic information about the unit including its serial number, firmware, processor information, and WWAN/WAN connection state. If the unit has already established a successful cellular connection, the WWAN IP address will be shown in the lower portion of the page.



The configuration options are displayed by expanding the menu on the left-hand side of the page. Throughout the configuration interface, when a configuration has been changed, it will need to be saved by clicking the **SAVE** button on the dialog or at the bottom of the page. Most configurations will not take effect until the **APPLY** button at the bottom of the page has been clicked. If the unit is power cycled or rebooted, all saved changes will be automatically applied. Be sure to consider how a configuration change may affect access to the configuration interface (e.g. IP address of the device, configuration of the LAN interface, a new password, etc.).

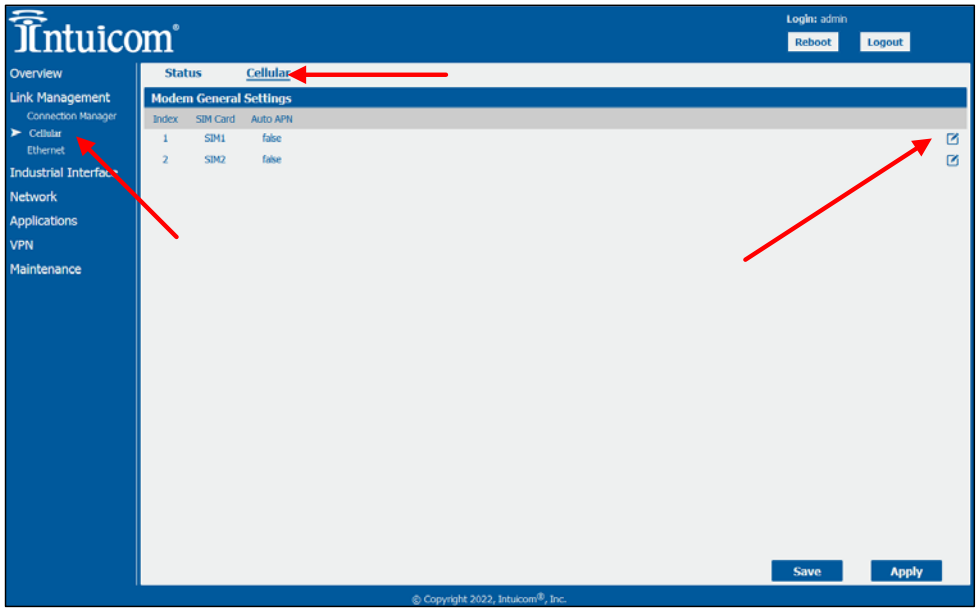
Note: The configuration interface has an inactivity timeout and will require the user to login if expired. Because different browsers handle the timeout differently, it is recommended to return to the URL entry and enter **http://192.168.5.1** again, to return to the login page. It may be necessary to reload the page in the browser tab using a **CTRL+SHIFT+R** to force a refresh and overwrite the cache.

Note: The default configuration includes a limit on the number of connection attempts on WWAN1 and WWAN2 before the unit is automatically restarted. If the unit is booted with no SIM and/or no valid configuration to successfully connect on either WWAN1 or WWAN2, the unit, after the failed connection attempts, will reboot. This functionality can be disabled by disabling WWAN1 and WWAN2 and/or setting the number of connection attempts to 0.

2.3 Cellular Configuration

A SIM with data service is required to successfully connect with a cellular service provider. In addition to an active and correctly provisioned SIM, the correct APN (access point name) will need to be configured in the XC400.

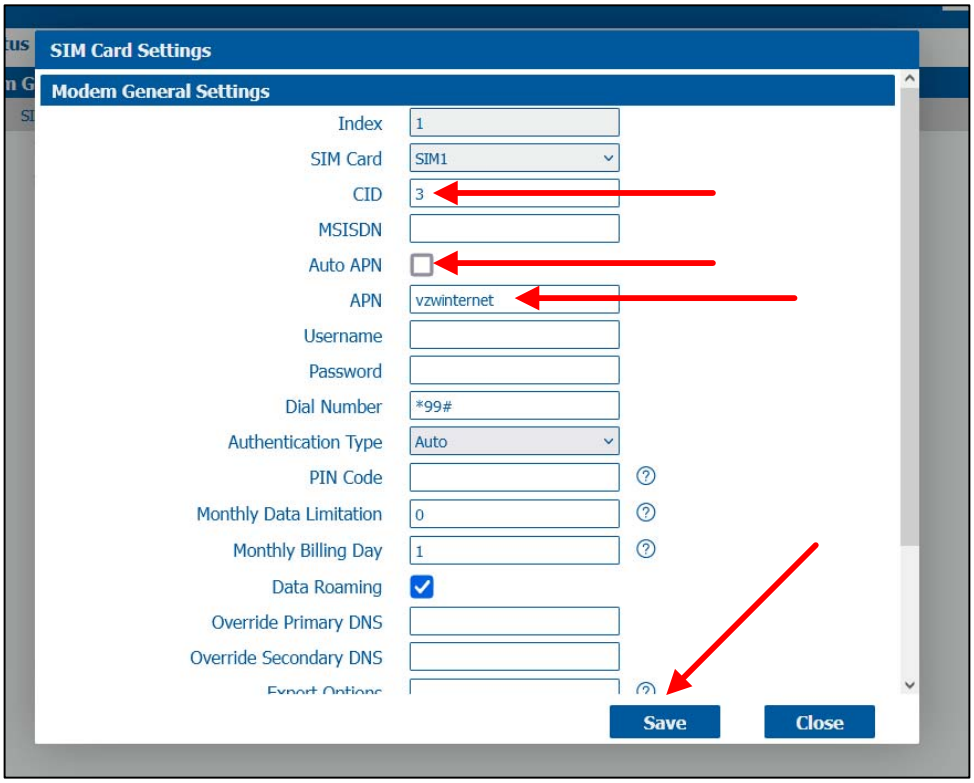
To configure the APN, select **Link Management->Cellular**, and select the **Cellular** link to the right of the Status link.



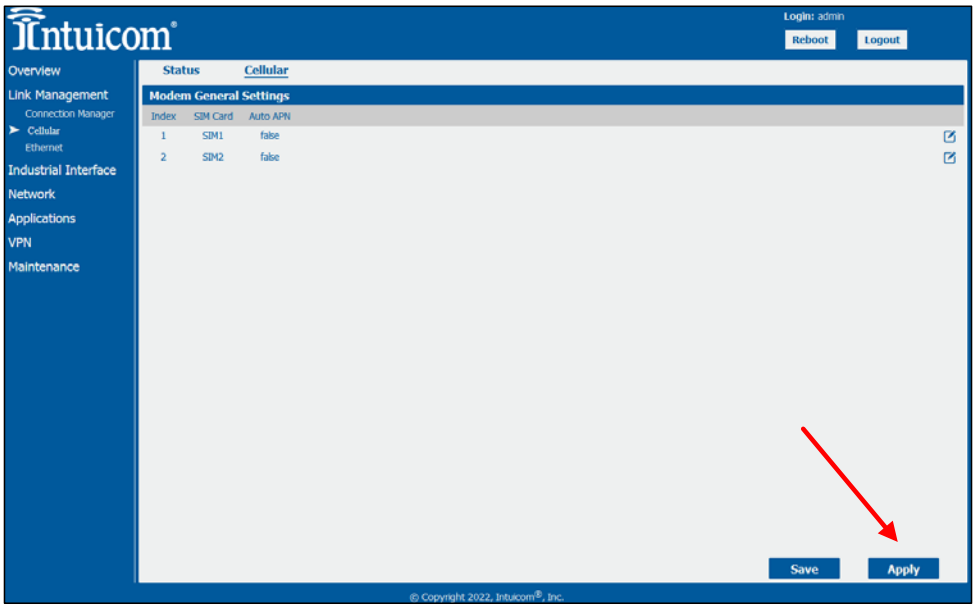
Make sure the correctly provisioned SIM card is inserted in the SIM1 slot, and access the SIM1 configuration by clicking on the edit link on the far right for Index 1/SIM1.

This will display a dialog with configuration options for SIM1. Uncheck the 'Auto APN' option and complete the CID and APN fields according to the table below, then click **SAVE**. The carriers below do not require any additional configuration from the defaults. It is recommended to leave the other fields at their default settings.

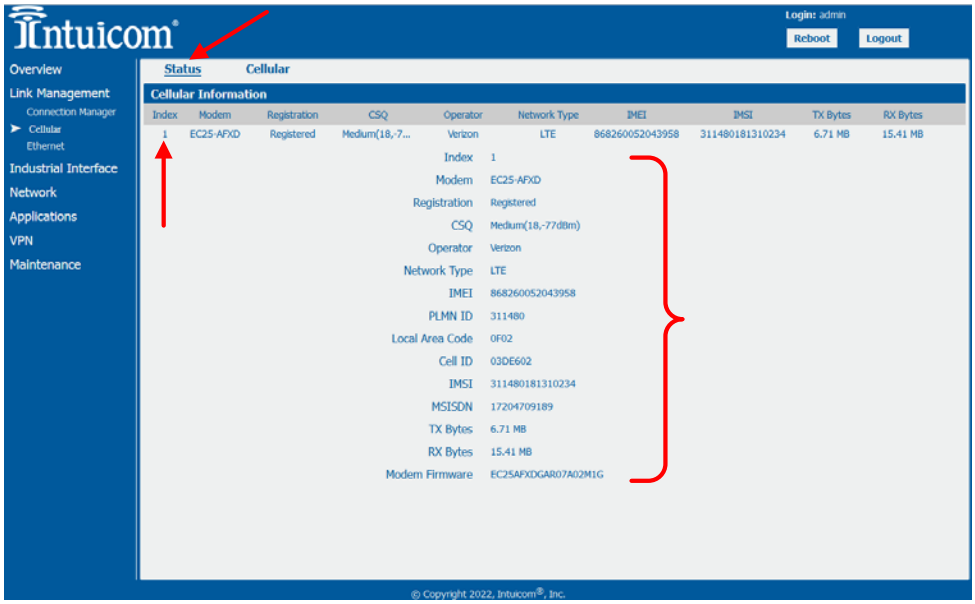
US Carrier APN Configurations			
Carrier	**CID**	**APN**	**Description**
Verizon	3	vzwinternet	Dynamic IP Address
Verizon	3	**xx**01.vzwstatic	Verizon Static IP where **xx**= 'we', 'se', 'ne' depending upon region
AT&T	1	broadband	Dynamic IP Address
AT&T	1	i2gold	Static IP Address
T-Mobile	1	fast.t-mobile.com	Dynamic IP Address



After clicking **SAVE** and closing the configuration dialog, be sure to click **APPLY** to have the new settings take effect.



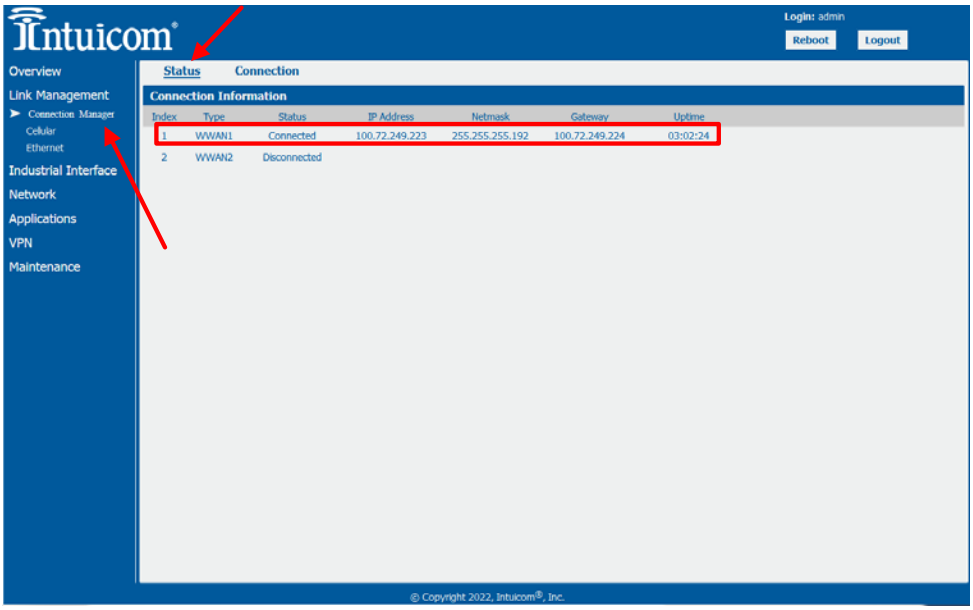
Now select the **Status** link on the top of the page, and select the SIM1 line to expand the current status of the cellular modem registration to the carrier's network. To refresh, repeat the steps by clicking on **Status** and then the SIM 1 line.



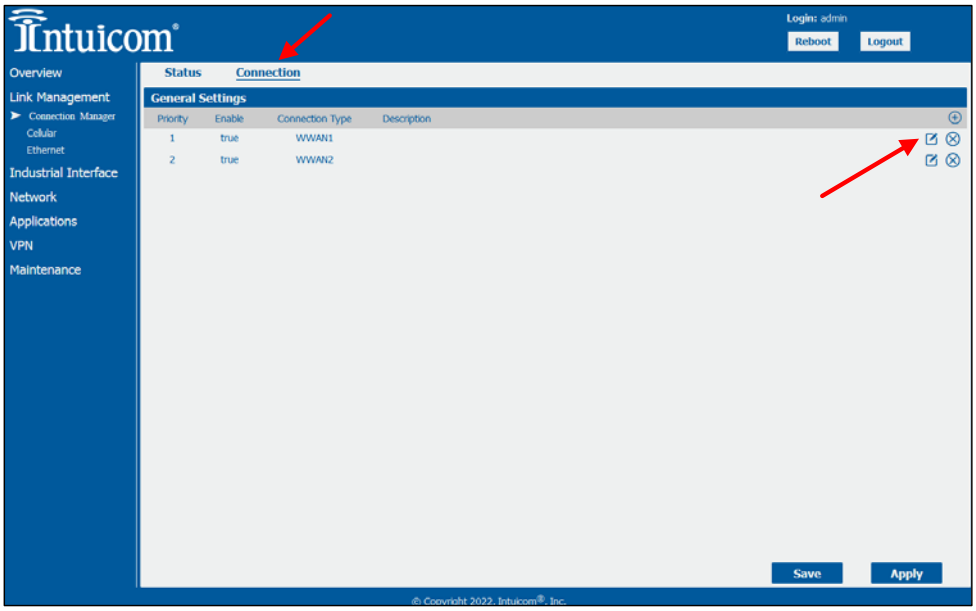
2.4 WWAN/WAN Configuration – Connection Manager

Wide area network configurations and status are available in **Link Management->Connection Manager**. Here, one configures how the device makes cellular or optionally a wired WAN connection – most commonly to the Internet. For cellular connections, while the XC400 may be connected and registered with the carrier, it is the WWAN connection that actually establishes internet connectivity.

Up to two configurations are supported and the device will use the configuration in Index/Priority 1 as the first priority, with the second configuration acting as the failover. The image below shows the status for a connected WWAN1.



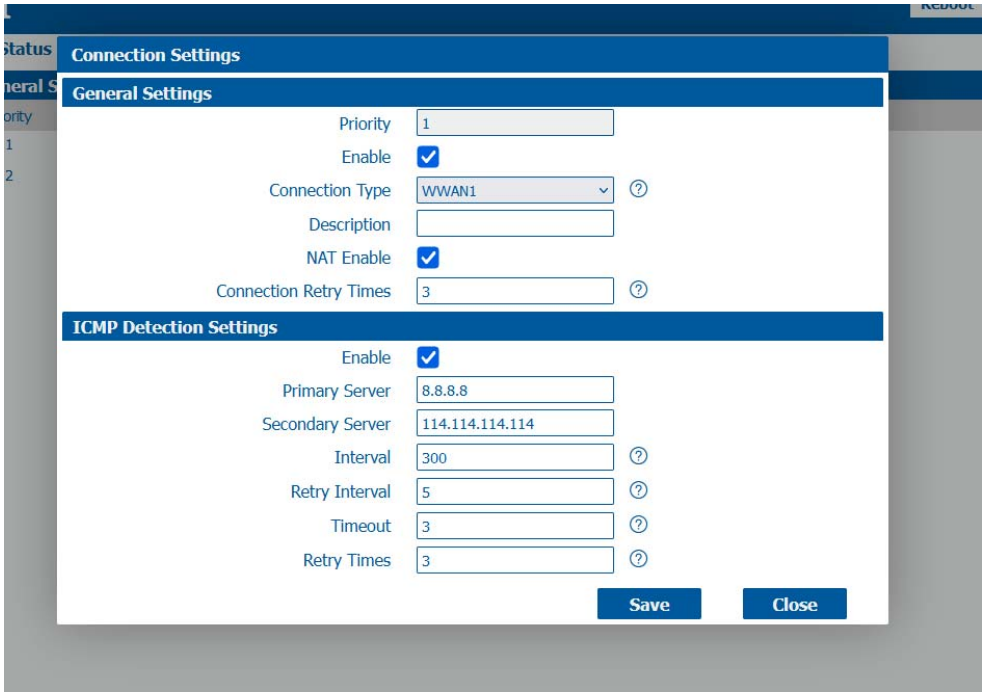
To access the configuration(s) select **Connection** on the top of the page, and then select the edit icon to the right of the priority/index to be configured.



Each WWAN configuration can be enabled or disabled. If, for example, WWAN1 is enabled and WWAN2 is disabled, no failover will occur if WWAN1 becomes unavailable. WWAN1 uses SIM1 and the cellular configuration for SIM1, while WWAN2 similarly uses the configuration for SIM2. It is possible to change the priority 1 configuration (index 1) to use WWAN2/SIM2 if desired (possibly due to not physically being able to access the SIM card slots) – and index 2 to use WWAN1/SIM1. To swap priorities, delete the configuration in index/priority 2 (using the "X" to the right of the edit icon), and configure index 1 as desired. A new connection can be created by clicking the "+" in the upper right corner of the page.

By default, the XC400 has both configurations enabled, and configured for Priority 1/Index 1/WWAN1 and Priority 2/Index 2/WWAN2. If using only a single SIM, it is recommended to use SIM slot 1, and disable the configuration for WWAN2 as no failover can occur with only a single SIM.

It is possible to configure the ETH0 Ethernet port to be a WAN connection. If ETH0 has already been configured to be a WAN, it will show as a Connection Type option alongside WWAN1 and WWAN2. Additionally, for XC400 units with optional WiFi: when the WiFi interface is configured to operate in Client/Station mode, the WLAN interface will show as an option.



2.4.1 Connection Settings General

In most cases, the default Connection Setting should be used.

Priority

The priority field is not editable. Priority is set by virtue of which Connection index is edited. A priority 1 must exist before a priority 2 can be created.

Enable

Check or uncheck to enable/disable this Connection. A disabled Connection configuration will not be attempted.

Connection Type

For this Connection configuration, select which type of connection to use: WWAN1, WWAN2, WAN. Connection types can only be used in a single configuration. If a connection type is already in use, it will not be possible to save this Connection configuration.

Description

A user defined field. A description may be a useful reminder of the connection type, intent, etc.

NAT Enable

Whether or not to enable Network Address Translation for this Connection. It is recommended to enable NAT in most cases to enhance security and avoid unnecessary network address configuration.

Connection Retry Times
The number of times to attempt a connection with this configuration before failing over to the next priority connection. The default value is 3 attempts. This may be set to 0 for unlimited attempts. It is not recommended to set a value of 0 as it may be possible for the unit to continue to retry when a reboot and refresh of the underlying cellular modem is appropriate.

2.4.2 ICMP Detection Settings

If the initial connection is successful, ICMP Detection can monitor the connection at intervals to detect if the configuration becomes stale or inoperative. ICMP Detection works by using Ping to contact configured servers at regular intervals. It is common to set these IP addresses as highly reliable, publicly available servers. In some situations where a private cellular network or private APN is utilized, the servers may have to be selected from servers available on the private network. If ICMP Detection is used, the servers to ping must be available or the XC400 will incorrectly conclude the connection has failed and attempt a connection to the Priority 2 configuration.

Enable
Enable or Disable ICMP Detection for this Connection configuration.

Primary Server
Enter the IP address of the primary server to attempt to ping each Interval.

Secondary Server
Enter the IP address of the secondary or backup server to attempt to ping each Interval.

Interval (1-1800 seconds)
The interval in seconds between ICMP Detection (ping) attempts.

Retry Interval (1-300 seconds)
The interval in seconds between ping retry attempts.

Timeout (1-10 seconds)
The amount of time to wait for a response to an attempted ping before concluding that the packet is lost.

Retry Times (1-10 times)
The number of times to attempt to ping the server.

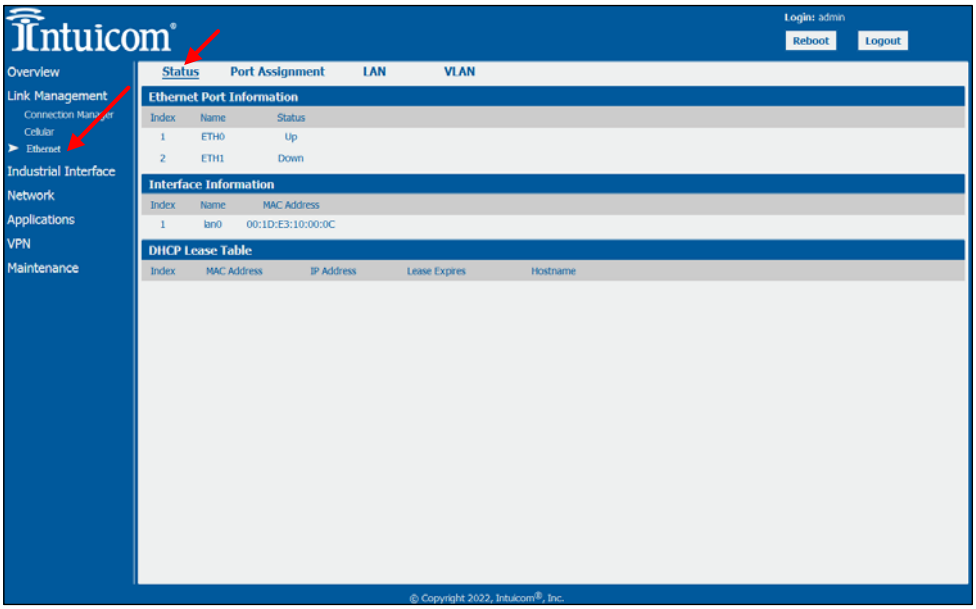
After any Connection configuration settings are changed, click the **SAVE** button on the bottom of the dialog. Be sure to click the **APPLY** button to apply the new settings now.

2.5 Ethernet LAN Configuration

The XC400 has two physical ethernet interfaces: ETH0 and ETH1. By default, the two physical interfaces are bridged together and are part of the LAN0 configuration. By default, the XC400 is part of LAN0 and has the IP address 192.168.5.1 and a DHCP server is enabled.

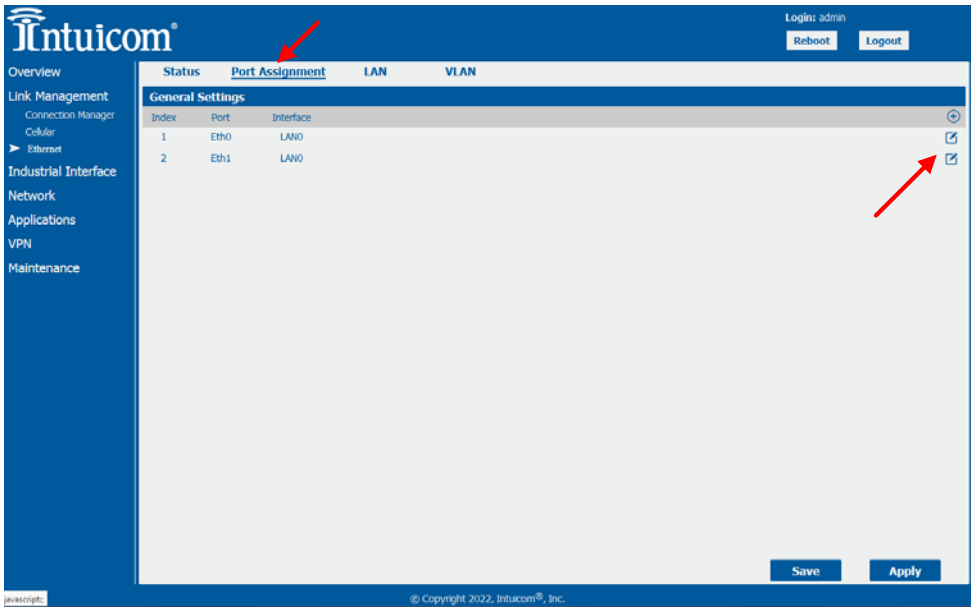
It is possible to have two different LAN configurations: LAN0 and LAN1. It is possible to assign the ethernet interfaces ETH0 and ETH1 to be on different LAN configurations. It is also possible to make ETH0 a WAN connection. The LAN IP configurations can also have secondary IP addresses assigned.

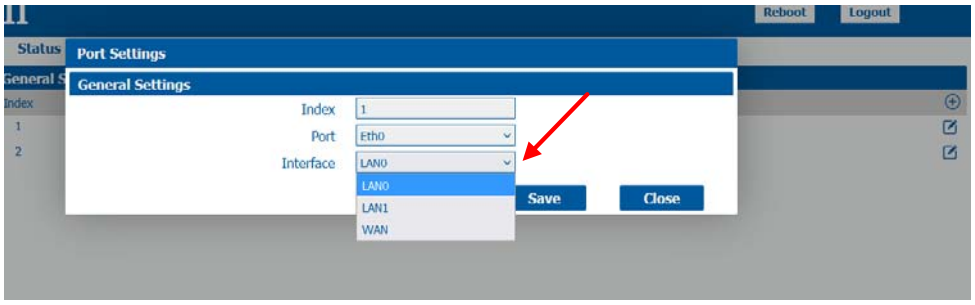
Ethernet/LAN configuration is available from the **Link Management->Ethernet** menu selection. When selected, the current status is displayed showing the status of the ETH0/1 interfaces, the LAN configuration to which they are assigned, MAC addresses, and DHCP lease information.



2.5.1 Port Assignment

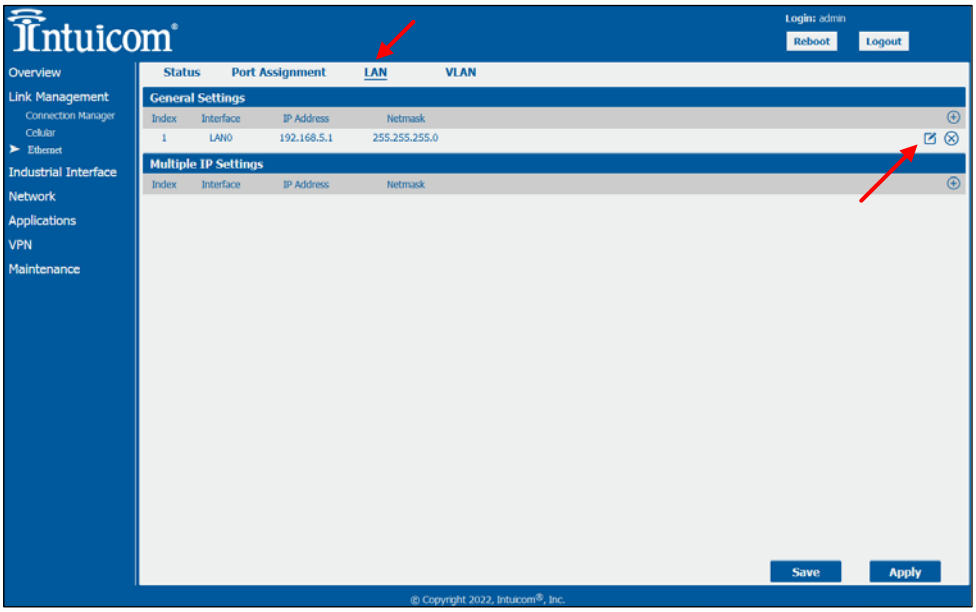
The physical Ethernet ports ETH0 and ETH1 can be assigned to the same or different logical LAN configurations. By default, ETH0 and ETH1 are assigned to the LAN0 configuration. To change the LAN interface assigned to a given physical Ethernet port, select **Port Assignment** and then select the edit icon to the right to display the configuration dialog. In the dialog, select the Interface to assign to the Port. Note that the WAN interface cannot be assigned to ETH1. Be sure to click the **SAVE** button and then the **APPLY** button to save and apply the configuration change now.

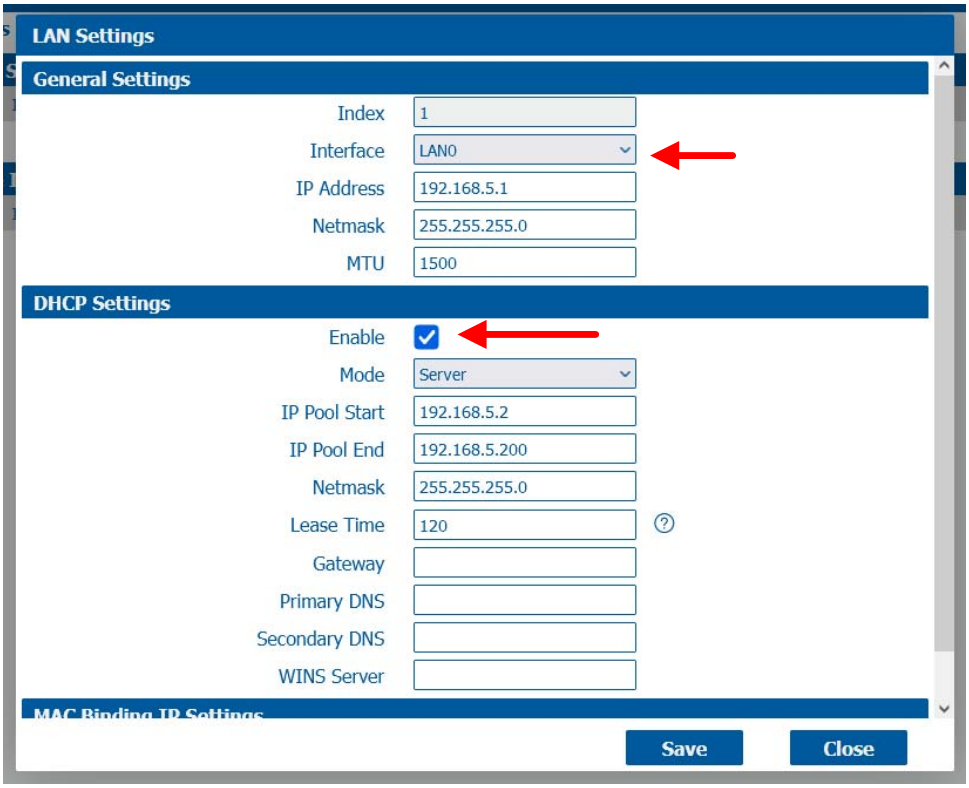




2.5.2 LAN Configuration

The XC400 supports up to two LAN/WAN interfaces/configurations: LAN0, LAN1, WAN. By default, the XC400 is configured with a single LAN0 with an IP address of 192.168.5.1 and DHCP enabled. To edit an existing configuration, select **LAN** from the top row and click the edit icon to the right of the configuration to edit. There must be at least one LAN configuration assigned to at least one physical Ethernet port.





To create a new configuration, use the "+" icon in the upper right. To delete a configuration, use the "X" icon to the right of a given configuration line. Note that to choose a different interface for a given configuration, the interface must first be assigned to a physical port. For example, to configure LAN1, LAN1 must be assigned to ETH0 or ETH1.

To enable DHCP on the interface, click the "Enable" checkbox in the DHCP Settings and complete the DHCP settings including the start and end IP addresses, netmask and default lease time. (Unless otherwise specified, the gateway and DNS provided to a DHCP client will be the interface address itself and the DNS service for the active WAN/WWAN.)

To configure MAC address binding, use the "+" on the right-hand side of the MAC Binding IP Settings section to create a new binding.

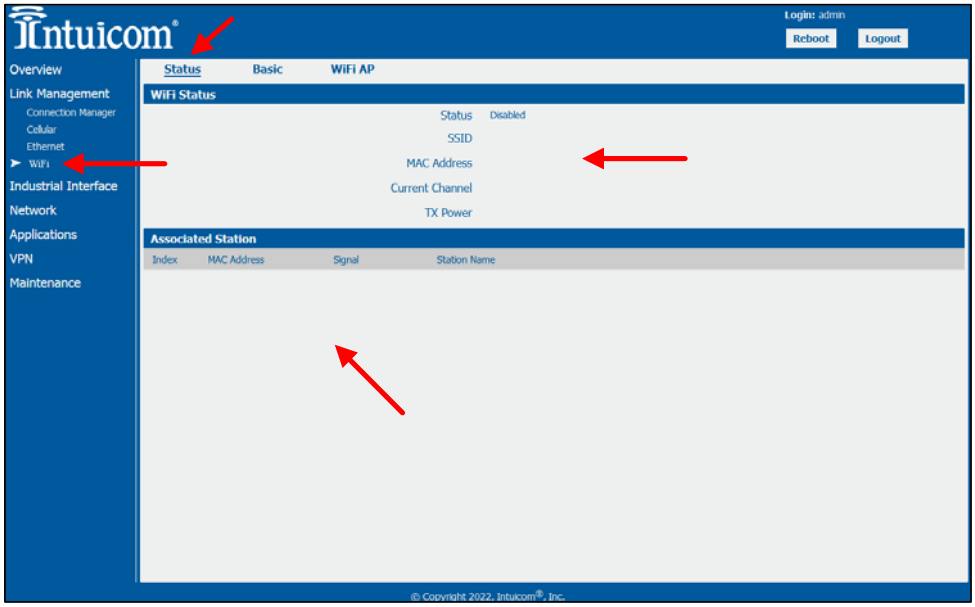
To assign an additional IP address to a LAN interface, select the "+" button to the right of the Multiple IP Settings section and select the interface, IP address, and netmask for the additional IP address.

When done with a configuration, be sure to click the **SAVE** button and then the **APPLY** button to save and apply the change.

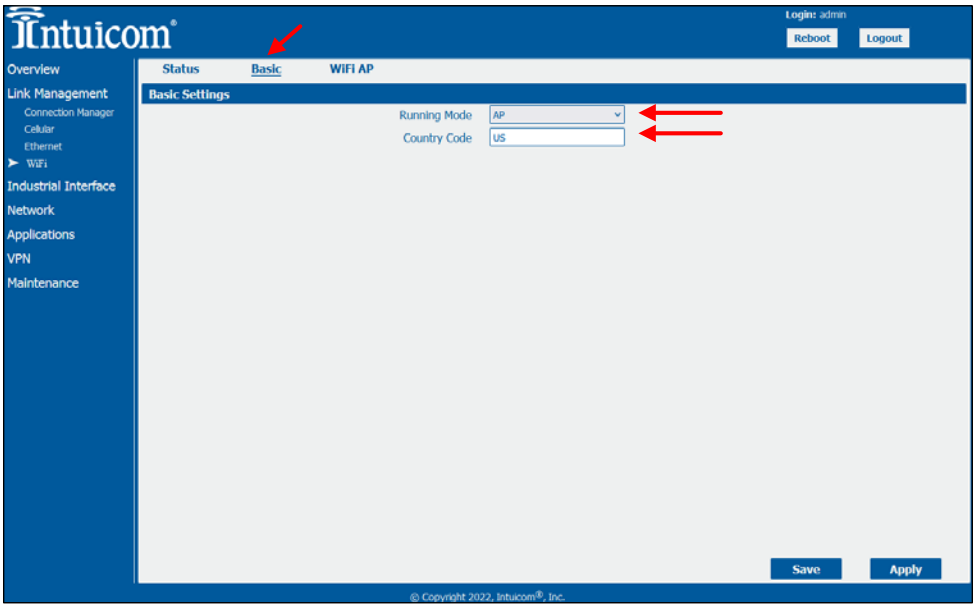
2.6 WiFi (optional, future)

The XC400 can optionally be ordered with a 2.4GHz WiFi Interface (future). A unit with WiFi includes two RP-SMA antenna connectors on the bottom of the panel. By default, the WiFi interface is disabled. The XC400 WiFi interface can be operated as either an Access Point or as a Client/Station.

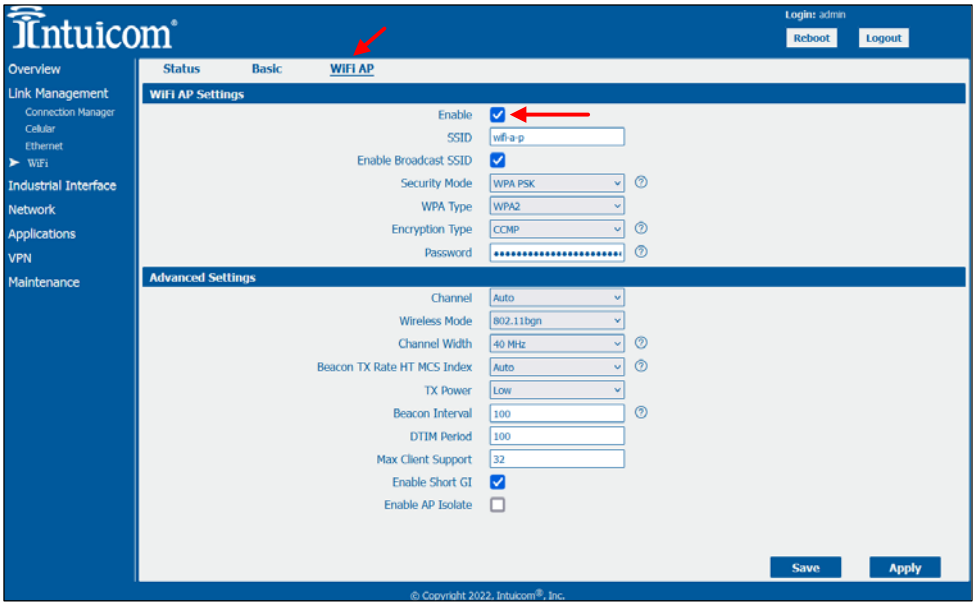
Before enabling WiFi on an XC400, first make sure the WiFi antennas are correctly connected per **Section** Error! Reference source not found.. WiFi configuration is accessed via **Link Management->WiFi** from the menu. The first page displayed is the WiFi Status. This page shows whether WiFi is enabled or disabled and if enabled, its configured SSID, MAC address, Channel, and TX power configurations. Any connected WiFi stations are listed in the lower half of the page.



Before enabling WiFi, configure the operation mode (Client/Station or Access Point) and set the correct Country Code. By default, the XC400 is configured to act as an Access Point (AP) and has US for the Country Code. Select Basic from the top and choose the Operation/Running Mode (AP or Client/Station) and, if necessary, enter the Country Code. Be sure to click SAVE and APPLY to save and apply any changes.



To enable WiFi, select the link WiFi AP or WiFi Client on the top depending upon the Operation/Running Mode configured. The configuration interface will differ depending upon the Operation/Running mode, however, the top item will be a checkbox to enable the interface.



2.6.1 Client/Station Mode

In Client/Station Running Mode for WiFi, the WiFi interface becomes a WAN option for the device. The WLAN interface will show as an interface option when configuring one of the two possible WAN connections in the Connection Manager (**Link Management->Connection Manager**) **Section 2.4.**

To configure Client/Station mode, enter the SSID and the password for the 2.4GHz AP to which a connection is desired. Select either DHCP (client) or manually enter the IP parameters for the WLAN interface.

2.6.2 AP Mode

When operating as an AP, it is highly recommended to take full advantage of security available: WPA PSK, WPA2, and CCMP for encryption. Note: CCMP is only available in 802.11n mode. Select a good password for the AP network. Select the Wireless Mode that best suits the wireless devices that will connect to this AP. If bandwidth is not required it may be advantageous to operate the AP on a 20MHz channel rather than a 40MHz wide channel to avoid interference. Use the lowest power setting necessary to provide reliable communications to wireless client devices.

Once operating as an Access Point, the WLAN interface is bridged to the LAN0 interface. Any DHCP server configured on the LAN0 interface (or accessible through it) will serve wireless client devices.

3 Industrial Interface

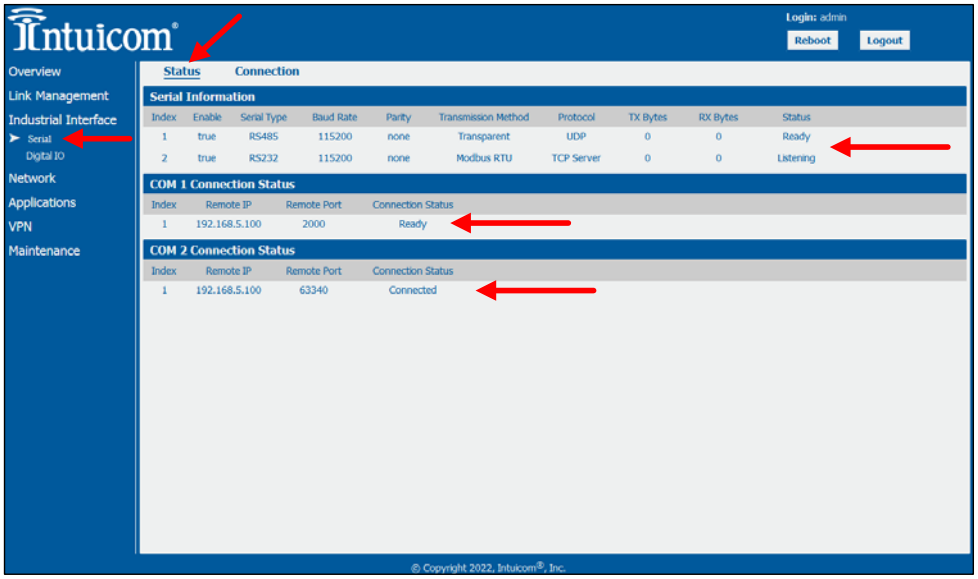
The XC400 provides signals for serial and digital IO interfaces. The terminal block on the XC400 front panel hosts the signal connections for one RS232, one RS485, two digital inputs, and two digital outputs. **Section 9.1** includes the pinout for the front panel terminal block to physically connect the RS232 and/or RS485 ports. To configure, select either **Industrial Interface->Serial** or **Industrial Interface->Digital IO** from the menu.

3.1 Serial - RS232/RS485

The XC400 has one RS232 (TX, RX, GND), and one RS485 (A, B, GND) interface. Each interface can be enabled or disabled as well as be configured with the appropriate baud rate, start bits, stop bits, and parity and the port's Transmission Method and Network Protocol. The XC400 offers a number of different ways to exchange data between its serial interfaces and IP hosts across the LAN/WAN or WWAN network interfaces. Note that the serial interfaces can also be utilized by optional applications such as Modbus. It is important to avoid creating a conflict where more than one application/feature is trying to utilize a port.

3.1.1 Serial Status

The current status of the serial ports and their network connections can be found by going to **Industrial Interface->Serial** and clicking the **Status** link on the top. From there the status of the two serial ports can be viewed along with the network connection status for each port. Depending upon the configuration, the value in the status column might show Not Ready, Listening, or Ready.



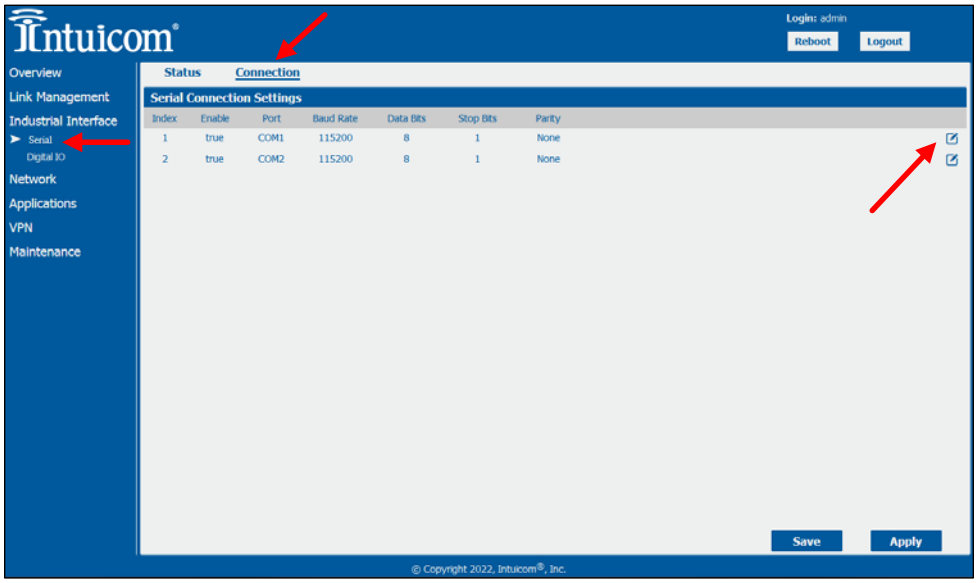
Serial Information Status	Meaning
Not Ready	• The port is disabled, or • The protocol is configured as TCP Client and a connection attempt is in progress
Ready	• The protocol is configured as UDP and the port is enabled, or • The protocol is configured as TCP Client and the port is enabled – a connection attempt to the server address/port may be in progress.
Listening	• The protocol is configured as TCP Server and the port is enabled – the service is listening for an inbound TCP connection.

The lower sections of the page show the network connection status for the port with values of: Disconnected, Connecting, Connected, or Ready, depending upon the current status and the configured Protocol. To refresh the status, click the **Status** link on the top.

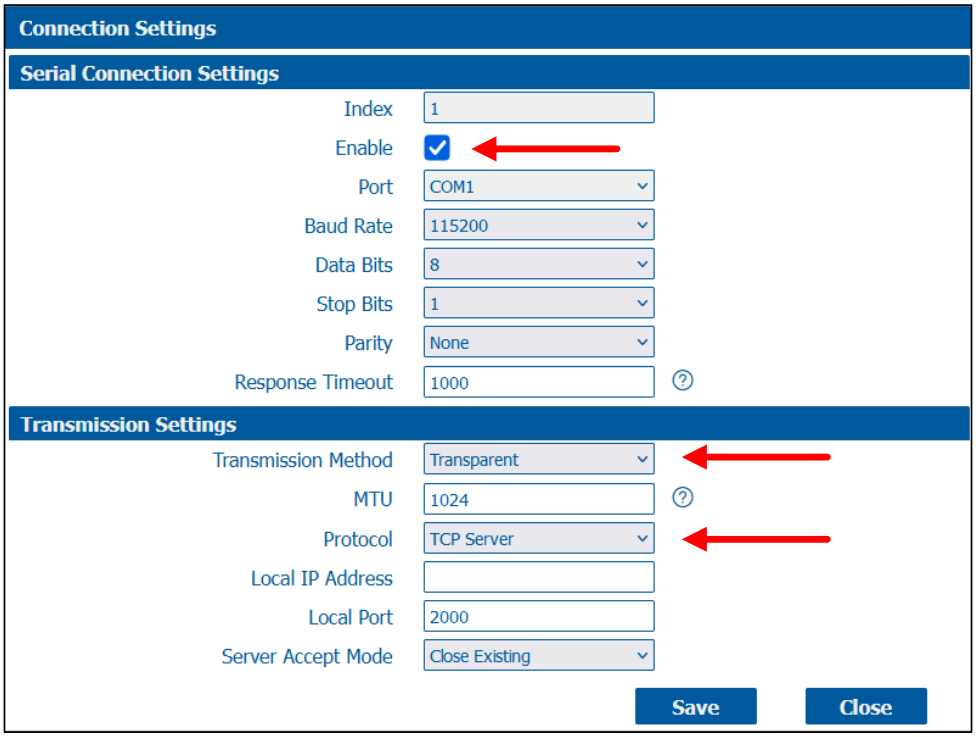
Port Connection Status	Meaning
Connecting	When protocol configured as TCP Client and a TCP connection to a remote server is being attempted.
Connected	When protocol configured as TCP Client or TCP server and a TCP connection is established between the XC400 and a remote host.
Disconnected	When protocol configured as TCP Server and a previously connected TCP client has disconnected.
Ready	The protocol is configured as UDP. Packets with data from the serial port will be sent to the configured UDP host (s) destination/port. Payloads from incoming UDP packets will be sent out the serial port.

3.1.2 Serial Configuration

To configure the Serial ports, go to **Industrial Interface->Serial** and select the **Connection** link at the top.



For the port to be configured (1-COM1-RS485, or 2-COM2-RS232), click the edit icon on the right to display the port configuration dialog.



Enable
Select the checkbox to enable or disable the port and its network protocol.

Baud, Data Bits, Stop Bits, Parity
Select the appropriate serial Baud Rate, Data Bits, Stop Bits and Parity to interface with the connected serial device/equipment.

Retry Timeout (if operating one of the Modbus Transmission Methods)
Set the amount of time in milliseconds to wait for a response to a Modbus command/function.

Transmission Method

Transmission Method	Description
Transparent	In Transparent Mode, all data (byte for byte) received on the serial interface is transmitted to the configured host connection and all data received across the network connection from a host is passed out the serial port. No translation or formatting of the data occurs.
Modbus RTU Gateway	In Modbus RTU Gateway mode, the XC400 translates between Modbus RTU (to/from the serial interface) and Modbus TCP (to/from the network interface) protocols.
Modbus ASCII Gateway	In Modbus ASCII Gateway mode, the XC400 translates between Modbus ASCII (to/from the serial interface) and Modbus TCP (to/from the network interface) protocols.

MTU
Maximum Transmission Unit – the number of serial bytes per packet (whether UDP or TCP) can be limited by setting the MTU. Note that the MTU includes the UDP or TCP overhead.

Protocol

Protocol / Mode	Description
TCP Server	In TCP Server mode, the XC400 will accept incoming connections to the configured Local Port. Once a connection is established, bytes can flow or be translated (depending on the Transmission Mode) between the serial port and the network socket.
TCP Client	In TCP Client mode, the XC400 will establish one or more connections to remote TCP servers on the configured TCP port(s). Data received on the serial port will be sent to all servers and data received from any server will be sent out the serial port.

UDP	In UDP mode, one or more remote host IPs and UDP ports can be configured and any data received on the serial port will be sent via UDP to these hosts and ports. Similarly, a local UDP port number is configured on which to receive datagrams from remote hosts and the contained data will be sent out the serial port.

Local IP Address

When the protocol is configured as TCP Server, this setting controls the interface on which the port is bound. If the field is left blank, the XC400 will listen on ALL network interfaces for incoming connection attempts to the configured port. To limit the XC400 to listen on a specific port, enter the IP address of the network interface on which to listen. For example – to have the XC400 only listen on the default LAN0 interface, enter 192.168.5.1. Special attention should be paid to no inadvertently expose a port on an unintended interface.

Local Port

When operating in TCP Server or UDP protocol, set the local UDP or TCP port on which to listen for datagrams or incoming TCP connections.

Server Accept Mode

Only applies if the Protocol is TCP Server. Select how to handle incoming TCP connections when a connection is already established: Close the Existing connection and accept the new connection, or Close the New incoming connection. Depending upon the application it can be helpful to have the XC400 close the existing connection when a new connection attempt is made as a way to remove a stale connection automatically.

TCP Client/UDP Channel

When TCP Client or UDP Protocol is selected, an additional configuration section is exposed. Click the "+" icon on the right-hand side to create a new remote address/port configuration. To edit an existing configuration, click the edit icon, and to remove an existing configuration click the "X". Each address/port is an endpoint to connect to when the TCP Client protocol is configured, or is a UDP endpoint to send datagrams to when UDP protocol is configured. This allows the XC400 to send serial data to more than one remote endpoint.

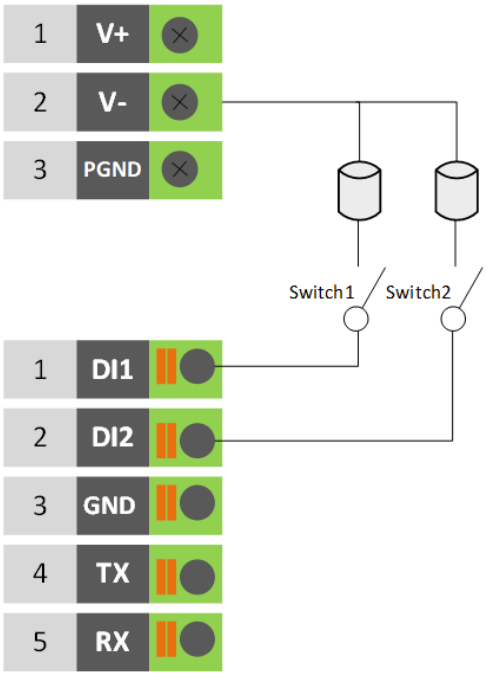
After configuring the port, be sure to click the **SAVE** button on the dialog and the **APPLY** button to apply any configuration changes.

3.2 Digital IO

The XC400 has two digital inputs and two digital outputs available on the front panel terminal block. See **Section 9.1** for IO pinouts. The XC400 Digital IO ports can be used by a number of different XC400 features and optional applications including: Event Log, SMS, Modbus Slave, and Modbus Master. To avoid conflicts for control of a digital output, ensure that two different applications are not trying to control the same digital output.

3.2.1 Inputs Example and Limits

The diagram below shows a typical example Digital Input application where the inputs are shorted to ground to indicate "activated". The digital inputs are internally pulled up and activated by connecting them to the device's ground/V-. The Digital inputs are designed to provide a pull-up that another device's digital output can sink.

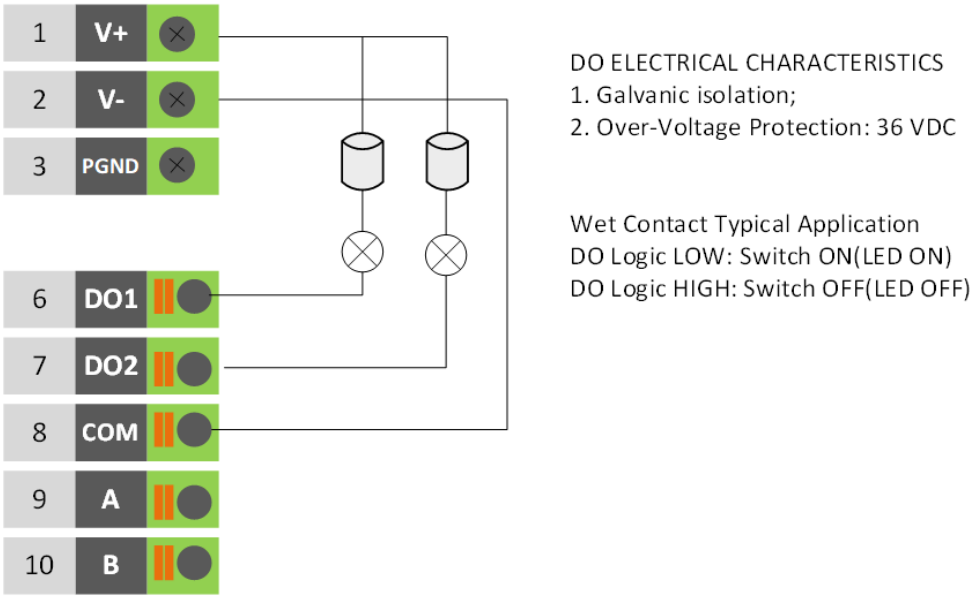


DI ELECTRICAL CHARACTERISTICS
1. Galvanic isolation;
2. Over-Voltage Protection: 36 VDC
3. Over-Current Protection: 100mA per channel @ 25°C

Dry Contact Typical Application
Switch ON(Short to V-): DI Logic LOW
Switch OFF(Open): DI Logic HIGH

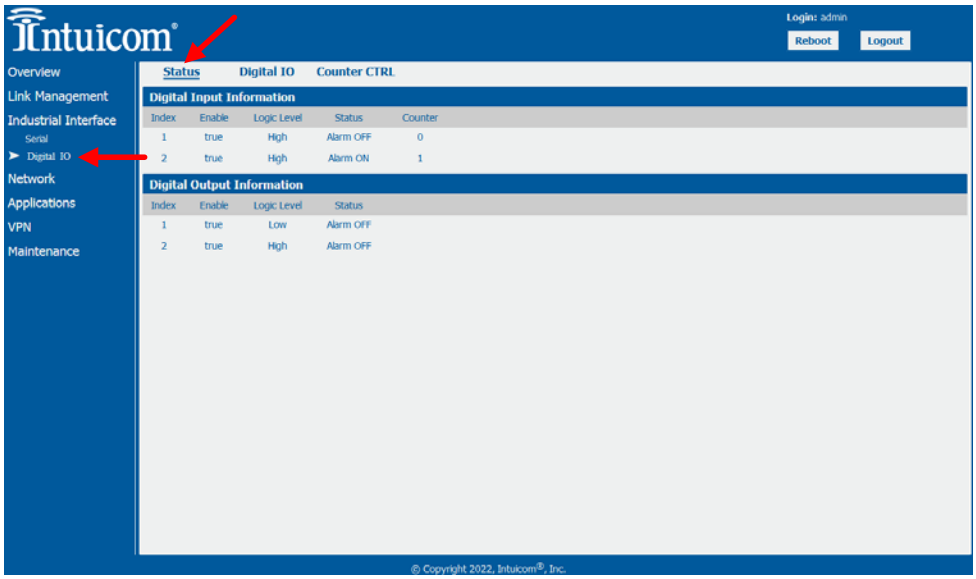
3.2.2 Outputs Example and Limits

The diagram below illustrates a common application using the XC400 Digital Outputs. In this application the outputs are acting as switches and sinking the current from a connected LED to the COM terminal, which is in turn connected to the power ground/V-. Note the outputs have a current limit of ~ 50mA.



3.2.3 Status

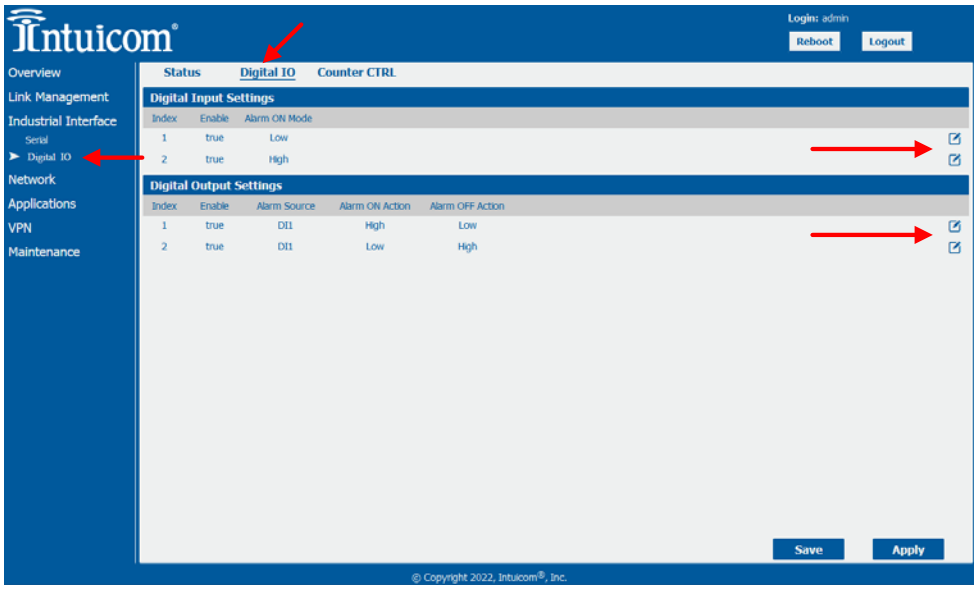
The current status of the XC400 Digital Inputs and Outputs can be found by navigating to **Industrial Interface->Digital IO** and clicking on the **Status** link at the top.



The Status page displays each input's and each output's current status (including whether they are enabled or disabled), the current logic state, the current alarm state, and the current count (inputs).

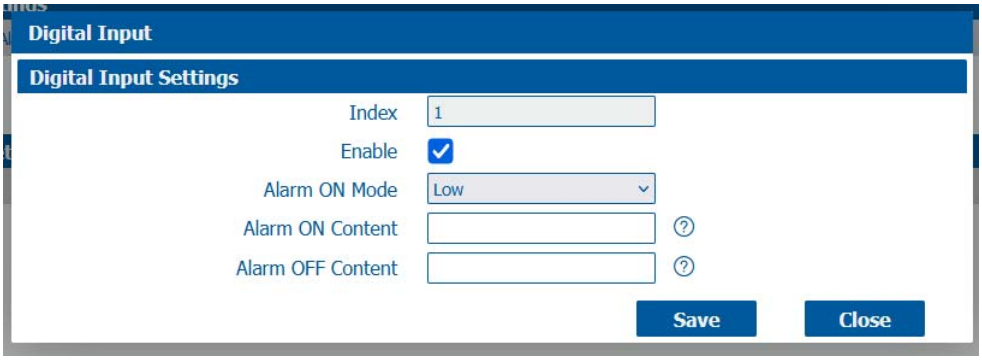
3.2.4 Configuration

To configure the digital inputs and outputs, navigate to **Industrial Interface->Digital IO** from the side menu and click on the **Digital IO** link at the top.



Select the input or output configuration to edit and click the edit icon on the right-hand side to display the configuration dialog.

Input Configuration



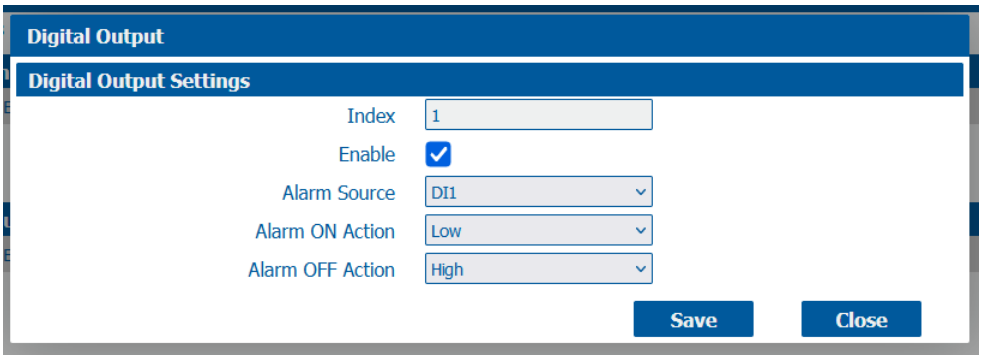
Enable
Use the Enable checkbox to enable or disable the selected input.

Alarm ON Mode
Select whether the input's "alarm" state is triggered by the input going low (ground) or going high (voltage).

Alarm ON Content
Here a string can be constructed that will be used in the event log and can be used for SMS notifications when the alarm state is triggered. This string can be enhanced with system variables such as: $DI_INDEX, $DATE, $SERIAL_NUMBER, $DEVICE_MODEL, $FIRMWARE_VERSION, $SYSTEM_UPTIME, $LINK_TYPE, $IP_ADDRESS, $MODEM_MODEL, $CSQ, $OPERATOR, $NETWORK_TYPE, $IMEI, $PLMN_ID, $LOCAL_AREA_CODE, $CELL_ID, $IMSI, $MODEM_FIRMWARE

Alarm OFF Content
Similar to Alarm ON Content: a string can be constructed and the same choice of system variables are available.

Output Configuration



The digital outputs can be controlled by the digital inputs, incoming SMS messages, by Modbus alarms, or by the Modbus Slave feature. The action taken by the output when in "alarm" state – i.e. triggered state - can be to set the output low (common), high (high impedance), or the output state can be pulsed with a single pulse of configurable width.

Enable
Use the Enable checkbox to enable or disable the selected output.

Alarm Source
Select the source of the trigger for the output – Digital Input 1, Digital Input 2, an SMS message, or a Modbus Alarm.

Alarm ON Action
Set the action to take when the output is triggered or in its "alarm" state.

Alarm OFF Action
Set the action to take when the output is NOT triggered or in its "alarm" state.

Pulse Width
Enter the pulse width in milliseconds to use for any action configured to pulse.

3.2.5 Counter Control

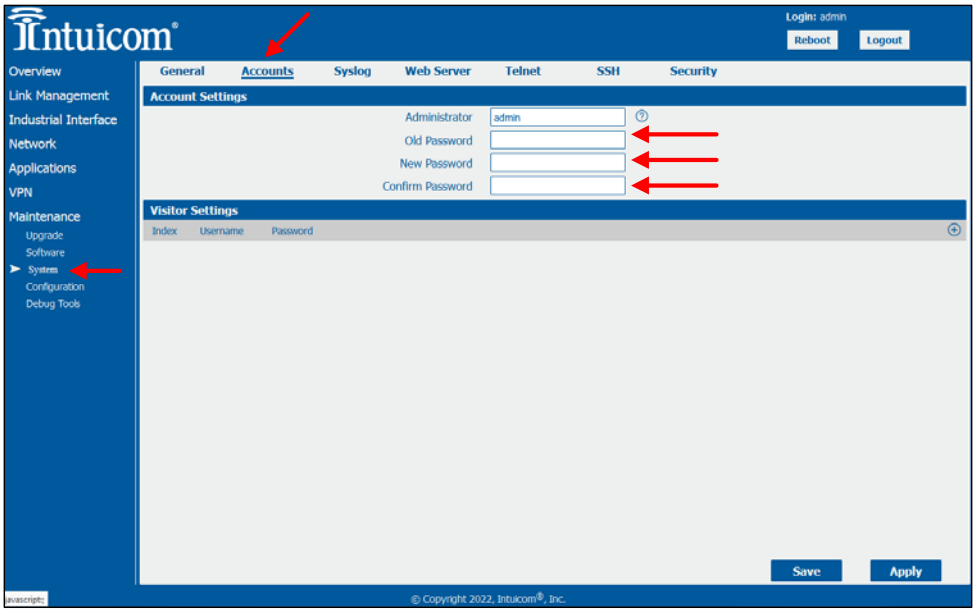
Access the Digital Input Counter Control feature by navigating to Industrial **Interface->Digital IO** and selecting the **Counter CRTL** link on the top of the page. The counter control feature allows the count (the number of transitions) for a digital input to be reset to 0 or set to a specific value. Select the DI number (1 or 2) and enter a value for the count and click **START** on the bottom of the page.

4 Device Security

4.1 Changing Admin Password

Each XC400 has a unique default admin password. This unique password is printed on the device's side label. When a unit has been reset to factory defaults, this unique password will be required to access the device's configuration interface.

It is highly recommended to change the admin password from the default value. While the admin username can also be changed, it is recommended to leave the admin username as 'admin'. To change the admin password, navigate to **Maintenance->System** and select **Accounts** from the options across the top.



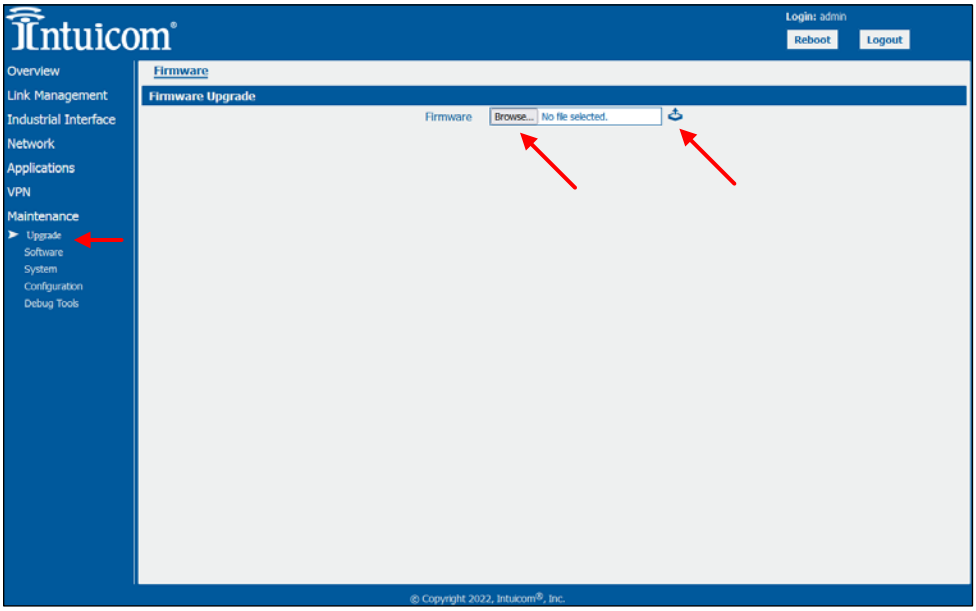
Enter the current admin password in the "Old Password" field, and enter a new admin password in both the "New Password" and "Confirm Password" fields.

Read-only user accounts can be created under Visitor Settings by clicking on the "+" on the right-hand side and completing the username and password. It is not recommended to create visitor accounts for the device.

Be sure to click **SAVE** and **APPLY** to save and apply these changes.

5 Firmware Upgrade

To upgrade the firmware on an XC400, select **Maintenance->Upgrade** from the menu. Use the Browse button to open a file selection dialog. Select the correct firmware file (note the file will have a **.bin** extension) and click the "Open" button on the dialog. The firmware filename will now be populated. Click the icon with an up arrow to the right of the filename to begin the firmware upgrade process.

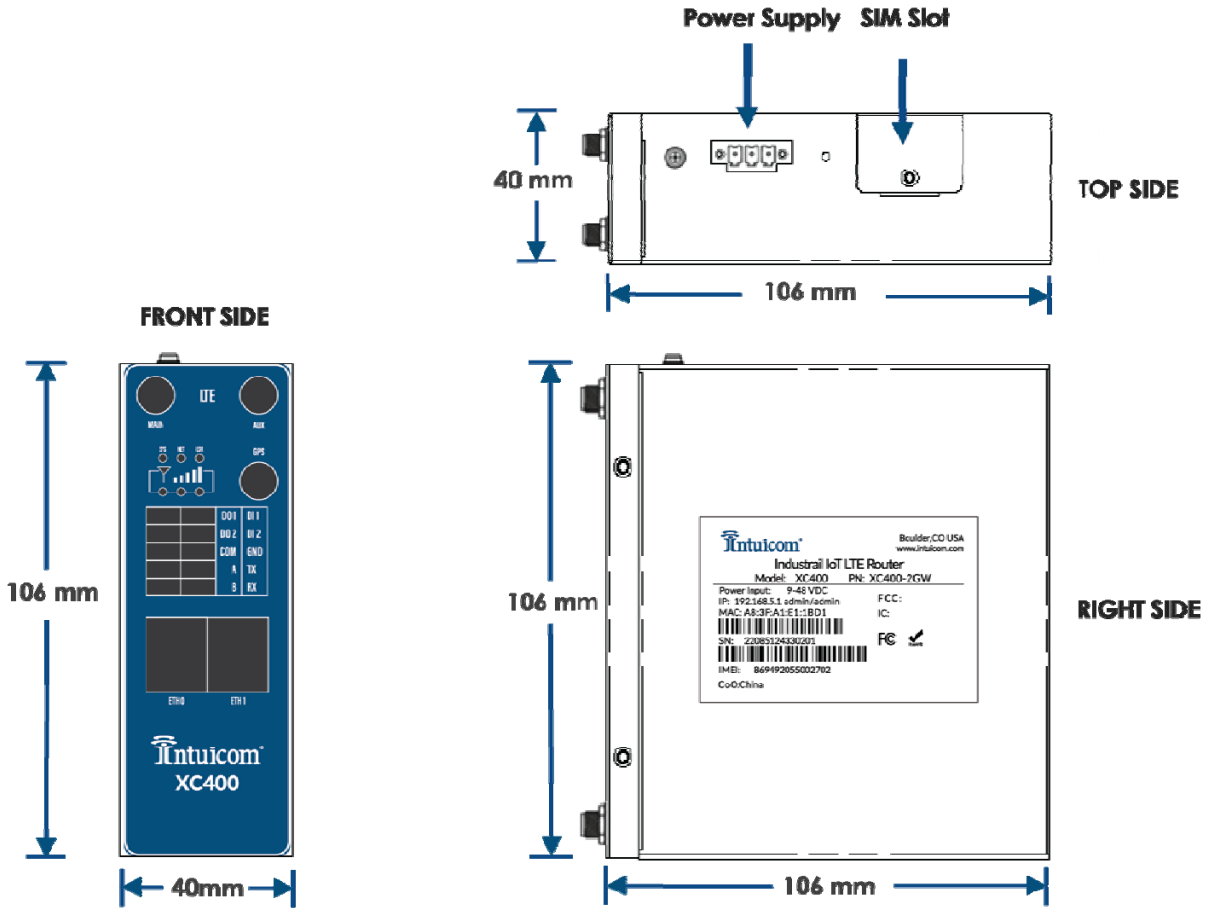


The firmware file will be verified for integrity and a progress bar will be displayed at the top of the page. After the firmware file has been uploaded and verified, a dialog prompting to reboot the unit will be displayed. Select **OK** on the dialog to reboot the unit with the new firmware.

Attention: Do not interrupt power to the device during the upgrade process or the subsequent reboot. Interrupting power can render the unit inoperative.

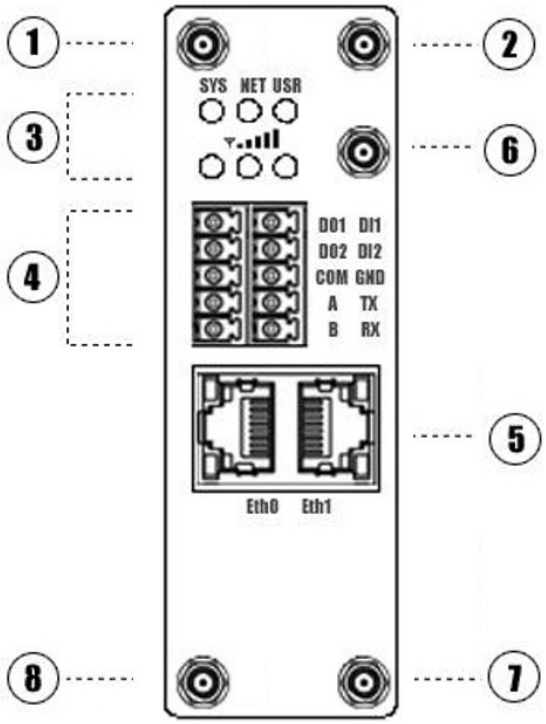
Attention: Ensure the correct firmware file is selected for the unit.

6 Product Dimensions



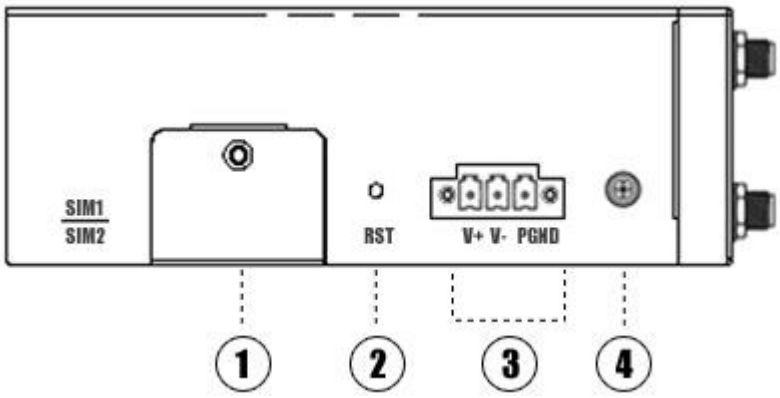
7 Physical Layout

7.1 Front Panel



① Cell antenna SMA Connector - MAIN
② Cell antenna SMA Connector – Aux/Diversity
③ LED Indicators – SYS, WWAN, USR, RSSI
④ Terminal Block Socket – Serial, I/O
⑤ Ethernet 0/1 RJ45 connectors
⑥ GNSS SMA Antenna Connector
⑦ WiFi antenna RP-SMA Connector
⑧ WiFi antenna RP-SMA Connector

7.2 Top Side



① SIM Card Slot
② Reset Button
③ Power Connector
④ Grounding Stud

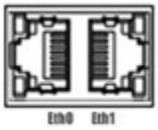
8 LED Indicators

8.1 System, WWAN, User, WWAN RSSI

Name	Color	Status	Description
SYS	Green	Slow Blinking (500ms duration)	Operating normally
		Fast Blinking	System initialing
		Off	Power is off
NET	Green	On	Register to Highest priority network service (depending on modem, e.g. if modem supports LTE as highest priority network)
		Fast Blinking (500ms duration)	Register to Non-Highest priority network service (depending on modem, e.g if modem supports LTE as highest priority network, then WCDMA and GPRS are considered non-highest priority networks)
		Off	Network Registration failed
USR: SIM	Green	On	Device is trying cellular connection with SIM1
		Fast Blinking (250ms duration)	Device is trying cellular connection with SIM2
		Off	No SIM detected
USR: WiFi (optional)	Green	On	WiFi is enabled but without data transmission
		Blinking	WiFi is enabled and data transmission
		Off	WiFi is disable or initialize failed
Cellular Signal Strength Indicator (RSSI)	Green	On, 3 LED light up	Signal strength is high
		On, 2 LED light up	Signal strength is medium
		On, 1 LED light up	Signal strength is low
		Off	No signal

8.2 Ethernet LAN/WAN

Note: While there are physically two LEDs per Ethernet port, only the TOP green LEDs are used.



Name	Status	Description
Link Indicator (green)	On	Connection is established
	Blinking	Data is being transmitted
	Off	Connection is not established

9 Pinouts

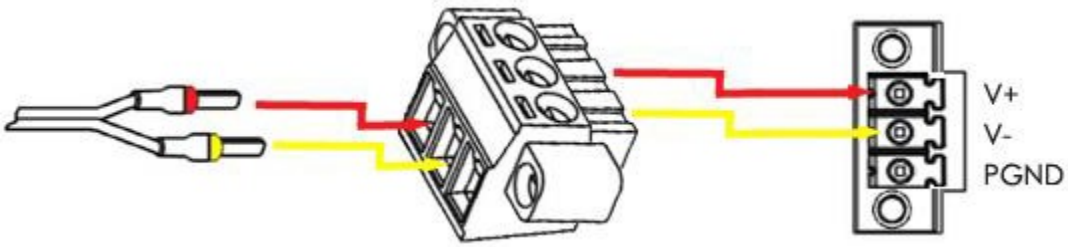
9.1 Serial RS232, RS485, Digital Inputs, Digital Outputs

10 signal 3.5mm terminal block

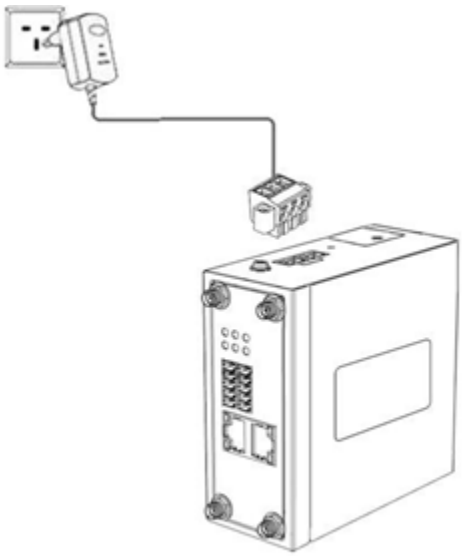
PIN	RS232	RS485	DI	DO	Direction
1	--	--	--	DO1	Router-->Device
2	--	--	--	DO2	Router-->Device
3	--	--	--	COM	--
4	--	A	--	--	Router<-->Device (RS485)
5	--	B	--	--	Router<-->Device (RS485)
6	--	--	DI1	--	Router<--Device
7	--	--	DI2	--	Router<--Device
8	GND	--	--	--	--
9	TX	--	--	--	Router-->Device (RS232)
10	RX	--	--	--	Router<--Device (RS232)

9.2 DC Supply

3-position, 3.5mm terminal block with locking screws



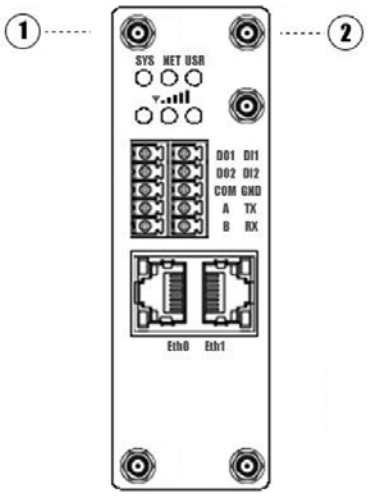
PIN	Description
V+ (Red line)	Positive
V- (Yellow line)	Negative
PGND	GND (internally connected to V-)

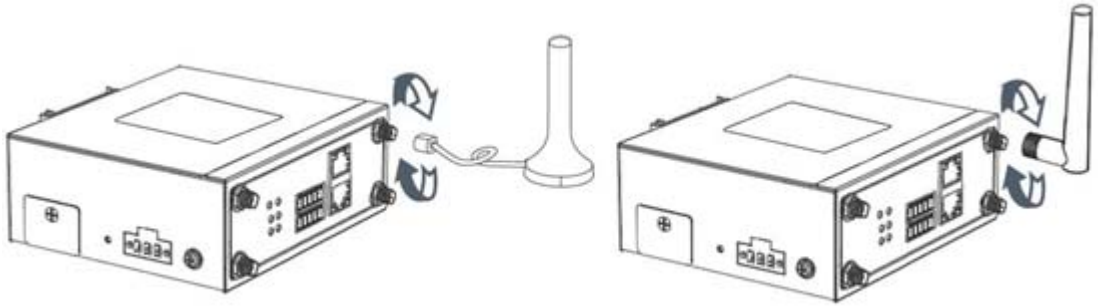


10 Antenna Connections

10.1 Cellular

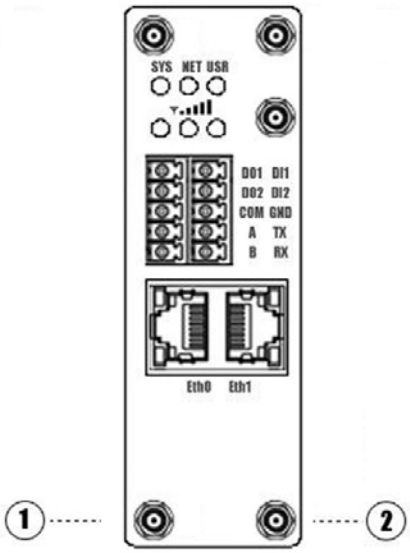
The XC400 supports two cellular antennas: a main antenna (1) which is required for operation and a diversity (AUX) receive antenna (2). It is recommended to utilize the diversity feature with a second antenna. The cellular antenna connectors on the XC400 are SMA Female. Only connect approved antennas to the XC400.

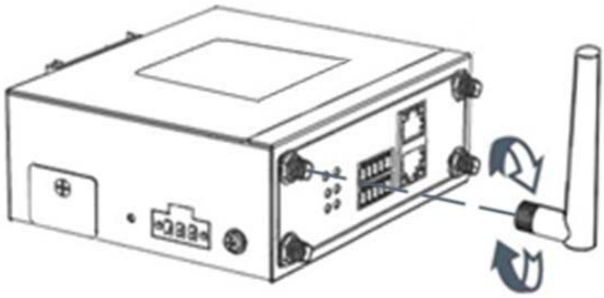




10.2 WiFi

XC400 models with optional WiFi have two RP-SMA antenna connectors on the bottom of the front panel shown as (1) and (2) in the diagram. Connect **both** RP-SMA WiFi antennas to the RP-SMA WiFi antenna ports. The connectors are RP-SMA to help avoid incorrect antenna type connections. Only connect approved antennas to the XC400.



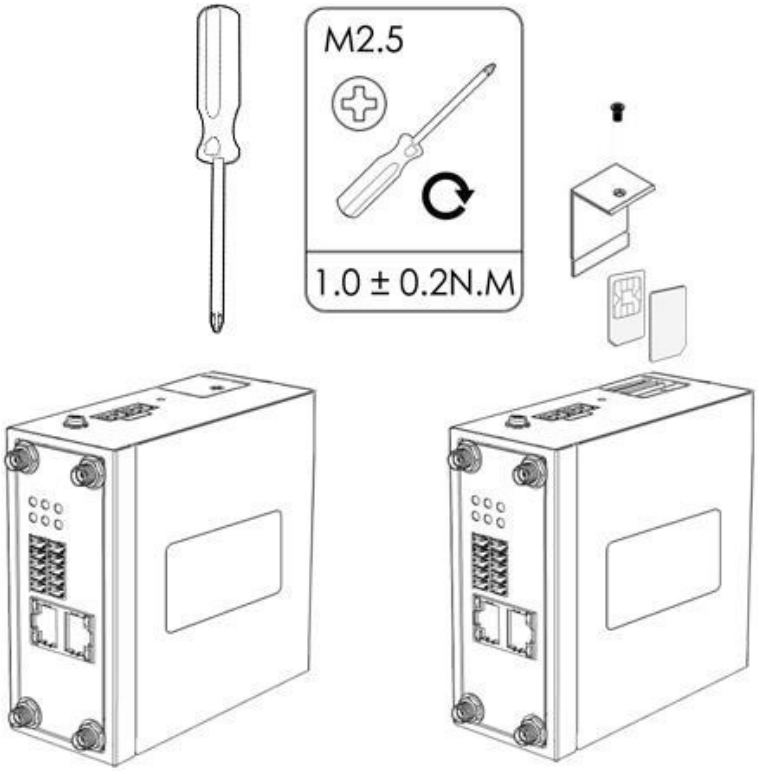


11 SIM Card Access

The XC400 has two SIM card slots: SIM 1 and SIM2. The slots for the SIM cards are located beneath a cover on the top side of the enclosure. The top side of the enclosure includes a label indicating the relative locations of the slots for SIM 1 and SIM 2.

To access SIM cards/slots:

1. Disconnect power.
2. Use Philips head screwdriver to remove the M2 screw holding down the SIM slot cover. Take care not to lose or misplace the screw.
3. Insert the SIM card(s) into the appropriate slots. Take care to correctly orient the SIM card when inserting. The contacts on the SIM card must face the PCB; the corner indicator on the SIM should face down. Insert the SIM until a positive click is heard or felt. Do not force.
4. To remove a SIM card, depress the card until a positive click is heard or felt. The card should spring back/out slightly. Carefully remove the card. Do not force.



12 Reset Button (RST)

A reset button is accessible via a small hole in the top of the enclosure between the power terminal block and the SIM door. This hole is labeled RST. The button can be activated by inserting a paperclip or similar tool into the hole. The button has a light tactile feel to indicate whether or not it is being pressed.

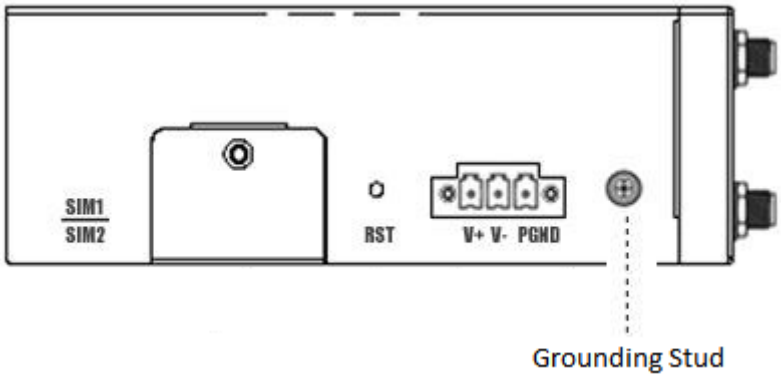
The reset button can be used to reboot the unit or to restore the unit to factory default settings.

Function	Action
Reboot	Press and hold the RST button for less than three seconds while the router is operating normally.
Factory Reset	Press and hold the RST button between 3s to 10s (all LEDs blink few times) then reboot the router manually. Note that the user must then reboot the router, either by power-cycling or by clicking **Reboot** from the configuration web page.
Run Normally	If the RST button is pressed for longer than 10s, the router will continue to run normally without a reboot or factory reset.

13 Grounding

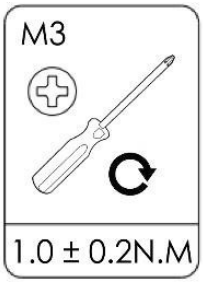
It is strongly recommended that when installed, the XC400 be properly grounded to help provide protection against ESD, surges, and lightning strikes. Please consult the proper electrical code or a licensed electrician for grounding requirements at the installation location.

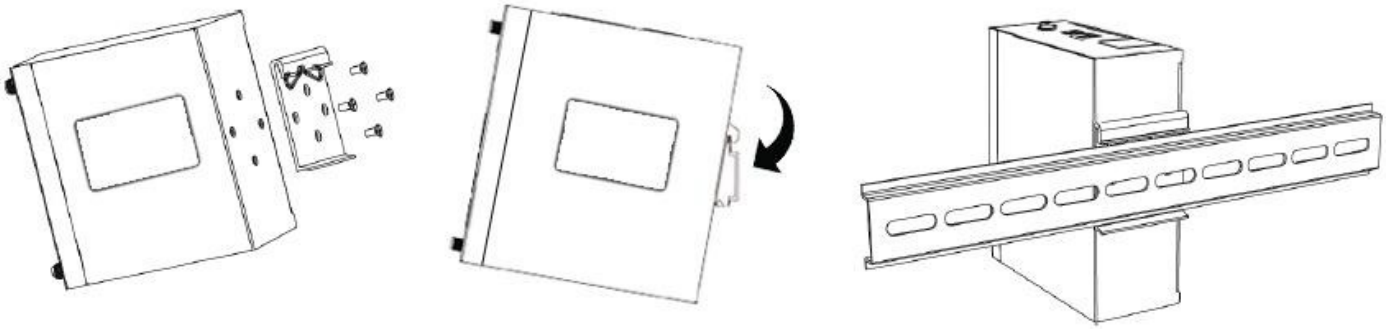
The top side of the XC400 enclosure provides a grounding stud.



14 DIN Rail Mounting

To mount the XC400 to a DIN rail, use the DIN Rail mounting kit which includes the mount and (4) M3x6mm screws.





15 Troubleshooting

Issue	Possible Resolution(s)
LED indicators not lighting when power is applied	Confim correct wiring and pinout on the DC power terminal block. Confirm AC/DC adapter is plugged in. Confirm DC power supply turned on. Confirm DC terminal block plugged into unit.
No cellular connection	Confirm antennas correctly installed. Confirm SIM card correctly inserted. Confirm SIM card is active and correctly provisioned. Confirm SIM card in another device. Confirm celluar and WWAN configurations. Confirm cellular coverage for SIM provider. Confirm status of WAN/WWAN failover if so configured.
Unable to access configuration interface	Confirm PC with browser is connected to Ethernet interface of XC400. Confirm PC connected to an enabled Etherenet interface on XC400. Confirm link light on Ethernet port on both PC and XC400. Confirm IP address being used to access unit. Confirm that PC's IP configuration is correct for the Ethernet/LAN interface used on XC400.
Unable to access Internet	Confirm APN for cellular configuration in use. Confirm WWAN configuration.

16 Support

Additional technical support for the XC400 can be obtained by contacting support@intuicom.com