AcuLink 810

Data Acquisition Gateway & Server

User Manual

ACCUENERGY

The information contained in this document is believed to be accurate at the time of publication, however, Accuenergy assumes no responsibility for any errors which may appear here and reserves the right to make changes without notice. Please ask the local representative for latest product specifications before ordering.

Please read this manual carefully before installation, operation and maintenance of the AcuLink810 data acquisition server. The following symbols in this manual are used to provide warning of danger or risk during the installation and operation of the equipment.

Electric Shock Symbol: Carries information about procedures which must be followed to reduce the risk of electric shock and danger to personal health.

Safety Alert Symbol: Carries information about circumstances which if not considered may result in injury or death.

Prior to maintenance and repair, the equipment must be de-energized and grounded. All maintenance work must be performed by qualified, competent accredited professionals who have received formal training and have experience with high voltage and current devices. Accuenergy shall not be responsible or liable for any damages or injuries caused by improper meter installation and/or operation.

Table of Contents

Chapter 1: Introduction to AcuLink 810 6

1.1 Module Types 6
1.2 Functional Overview 6

Chapter 2: Installation 8

2.1 Appearance and Dimensions 8
2.2 Installation Checklist 9
2.2.1 Optional Hardware: 9
2.2.2 LAN Information 9
2.2.3 Installation Safety Requirements and Considerations 10
2.2.4 Powering the Unit 10

Chapter 3: LED Status Descriptions 11

3.1 AcuMesh LEDs 11
3.2 Wi-Fi LEDs 12
3.3 RS485 LEDs 13

Chapter 4: Initializing the AcuLink 810 14

4.1 Accessing the AcuLink 810 Webpage 14
4.1.1 Method 1 - Ethernet Direct Connection 14
4.1.2 Method 2 - Wi-Fi Wireless Connection 18
4.1.3 Login AcuLink 810 19
4.2 Dashboard 20
4.2.1 About Webpage 21

Chapter 5: Device Templates 23

5.1 Modbus Templates 23
5.1.1 Import Template 24
5.1.2 New Template 25
5.1.3 Typical Energy Meter Template 30
5.1.4 Creating Template from CSV 32
5.2 BACnet Template 34
5.2.1 Import Template 35
5.2.2 Convert from EPICS File 36

Chapter 6: System Settings 38
6.1 Network 38
6.1.1 Ethernet 38
6.1.2 Wi-Fi 39
6.1.3 HTTP Proxy 41
6.1.4 RSTP 41
6.1.5 Default Routing Webpage 42
6.2 Whitelist Management 43
6.3 Time & Date 44
6.4 Remote Access 45
6.5 User Management 46
6.5.1 General 46
6.5.2 User Configuration 47
6.5.3 Role Configuration 47
6.5.4 Password Policy 48
6.5.5 Password Management 49
6.6 Certificate Management 49
6.7 Configuration Management 49
6.8 Emergency Mode 51
Chapter 7: Protocols 52
7.1 Modbus 52
7.1.1 RS485 Devices 52
7.1.2 USB Devices 53
7.1.3 Adding Modbus RTU Device 53
7.1.4 TCP Devices 56
7.1.5 Adding Modbus TCP Device 56
7.1.6 Modbus Gateway Function 59
7.2 AcuMesh 60
7.2.1 Local Configuration 60
7.2.2 Scan & Remote Configuration 62
7.2.3 AcuMesh Diagnostics 65
7.2.4 Adding AcuMesh Device 66

7.2.5 Search Modbus Device 69
7.3 Modbus Polling 71
7.4 BACnet 72
7.4.1 BACnet MS/TP Assignment 72
7.4.2 Adding BACnet MS/TP Device 74
7.4.3 BACnet IP Configuration 76
7.4.4 Adding BACnet IP Device 77
7.4.5 Search BACnet Device 79
7.4.6 BACnet Gateway 81
7.4.7 BBMD 82
7.5 MQTT Protocol 83
7.5.1 MQTT General Settings 83
7.5.2 MQTT Authentication 84
7.5.4 Last Will & Testament 85
7.5.5 Device Publishing 86
7.6 Azure IoT 87
7.6.1 Creating Azure IoT Device on Azure Portal Server 88
7.6.2 Create an IoT Devices /IoT Edge Device in the Azure Portal 89
7.6.3 Retrieving Connection String in the Azure Portal 91
7.6.4 Configure AcuLink 810 from Azure 91
7.7 SNMP 92
7.7.1 MIB File 93
7.8 MBus 94
7.8.1 Adding MBus Device 94
7.9 Virtual Device 98
7.9.1 Adding Virtual Parameter 99
7.10 Google IoT 101
7.10.1 General 101
7.10.2 SSL/TLS 102
7.10.3 Device to Publish 102

Chapter 8: Device Readings 104

8.1 Parameter Configuration 105

8.2 Writing to Modbus Device 107
Chapter 9: Digital Inputs 110
9.1 Device Alarm 112
9.2 Alarm Log 114
9.3 Email Alarm Notifications 114
Chapter 10: Data Logging 117
10.1 Data Loggers 117
10.1.1 Rapid Logger 118
10.2 Post Channels 120
10.2.1 HTTP Post Method 120
10.2.2 FTP Post Method 121
10.2.3 SFTP Post Method 122
10.3 Downloading Data 123
10.4 AcuCloud 124
10.5 Post Historical Data 127
Chapter 11: Network Diagnostics 129
Chapter 12: Maintenance 134
12.1 System Status 134
12.2 Event Log 134
Chapter 13: Firmware Update 135
13.1 Auto Firmware Update 135
13.2 Manual Update 135
13.3 Remote Update 138
Chapter 14: Reset Button 140

Chapter 1: Introduction to AcuLink 810

The AcuLink 810 is an intelligent data acquisition server and gateway that allows users to collect data from all Accuenergy meters, sensors, and other third-party devices.

The AcuLink 810 collects and logs time-stamped data from connected downstream serial or Ethernet devices and can store the data in its local non-volatile memory. When using Ethernet, it is possible to push or pull data using HTTP or FTP protocols as well as pushing data to different energy management system or any end user software platform. There is no software installation required for the AcuLink 810, all configuration is done from the gateway's webpage.

1.1 Module Types

AcuLink 810-X: Standard data acquisition server and gateway with one 2.4 GHz Wi-Fi connector and no built- in AcuMesh.

AcuLink810-900: Based on AcuLink810-X, AcuLink810-900 includes one 2.4 GHz Wi-Fi connector and a built-in 900MHz AcuMesh used in regions including North and South America, Oceania, and certain parts of Asia.

AcuLink810-868: Based on AcuLink810-X, AcuLink810-868 includes one 2.4 GHz Wi-Fi and a built-in 868MHz AcuMesh used mostly in regions including Europe, Middle East, Africa, and certain parts of Asia.

1.2 Functional Overview

Hardware Specifications

- Disk Capacity: 8 GB RAM
- Interval Recording: 1-1440 minutes, user selectable
- LEDs: Power, Ethernet, Wi-Fi, Modbus TX/RX, AcuMesh

Power

- Power Supply: 24VDC, 500mA

NOTES: This unit is to be sourced by a Class 2 power supply with the following output: 24VDC, 500mA min not to exceed 8A.

Isolation

- RJ45 Ethernet 1500Vrms
- RS485 2500Vrms

- Digital Input 5000Vrms
- Communication
- Protocol Support: Modbus RTU, Modbus TCP, BACnet MS/TP, BACnet IP, HTTP/ HTTPS, FTP, SFTP, NTP, SMTP, RSTP, MQTT, MBus SNMP, SunSpec
- LAN: 2 x RJ45 10/100 Ethernet, full half duplex, auto polarity
- Wi-Fi: 802.11 b/g/n, 2.4GHz
- USB: USB expansion port, USB 2.0 Host

Inputs

- RS485 Port: RS485 Modbus supports up to 32 external devices (expandable)
- Baud Rate: 9600-115200 bps
- USB Port: Modbus via RS485-to-USB converter supports up to 32 external devices.
- Baud Rate: 9600-115200 bps
- Digital Input: 8 pulse counters
- Input Voltage Range: 8-28Vdc
- Input Current (Max): 8mA
- Start Voltage: 15V
- Stop Voltage: 5V
- Pulse Frequency (Max): 100Hz, 50% Duty Ratio (5ms ON and 5ms OFF)

Environment

- North America: -25° to 70°C (-13°F to 158°F), 90% RH, non-condensing

Chapter 2: Installation

2.1 Appearance and Dimensions

Physical Size: 6.3" x 3.5" x 1.27" (159.9mm x 90mm x 32.2mm)

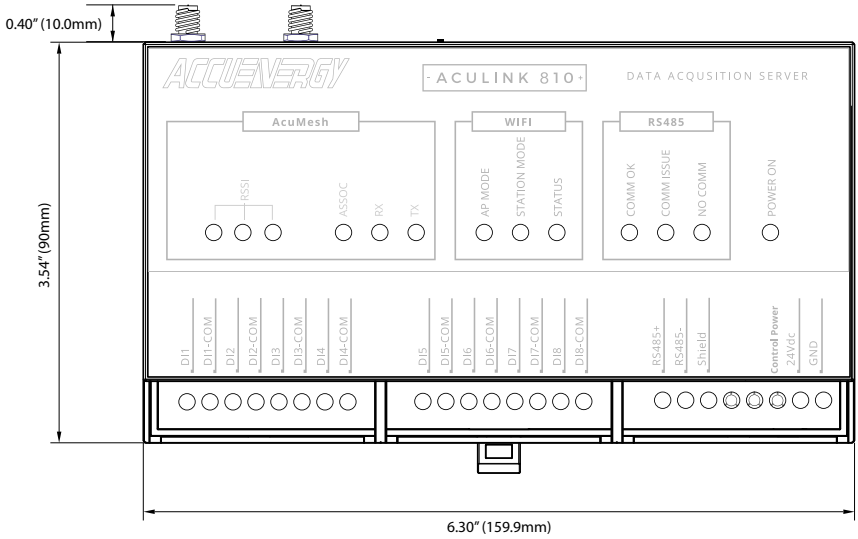
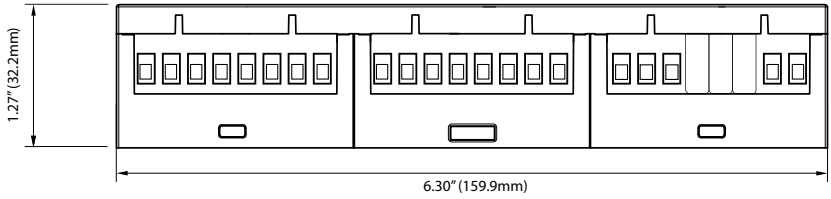


Figure 2-1 AcuLink 810 Layout (Front View)



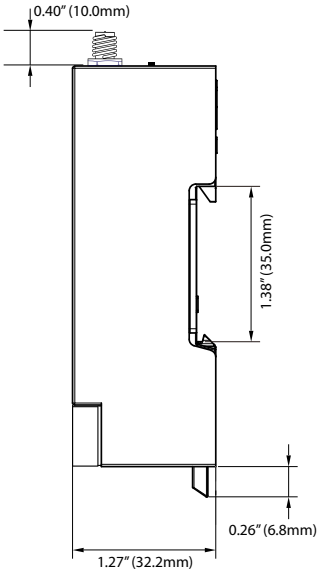


Figure 2-2 AcuLink 810 Layout (Top and Side View)

2.2 Installation Checklist

The following materials are required for the AcuLink 810 installation:

- AcuLink 810 Data Acquisition Server & Gateway
- Ethernet Category 5 cable (required for LAN or direct computer to AcuLink 810 connection)
- Power supply (24Vdc)
- Wi-Fi Antenna
- AcuMesh Antenna

2.2.1 Optional Hardware:

- Additional Modbus RTU devices
- Two wire Modbus/RS485 connection

2.2.2 LAN Information

- Ethernet 10/100MB connection point (router/switch)
- IP address and subnet mask (check with system administrator)
- Gateway address (check with system administrator)
- DNS server address (check with system administrator)

2.2.3 Installation Safety Requirements and Considerations

- Field wiring must have a rating of higher than 70°C(158°F); stranded wiring
- Intended for indoor use
- Altitude: 2,000 meters
- Overvoltage Category: II
- Pollution Degree: 2

2.2.4 Powering the Unit

The power supply of the AcuLink 810 is rated for 24Vdc.

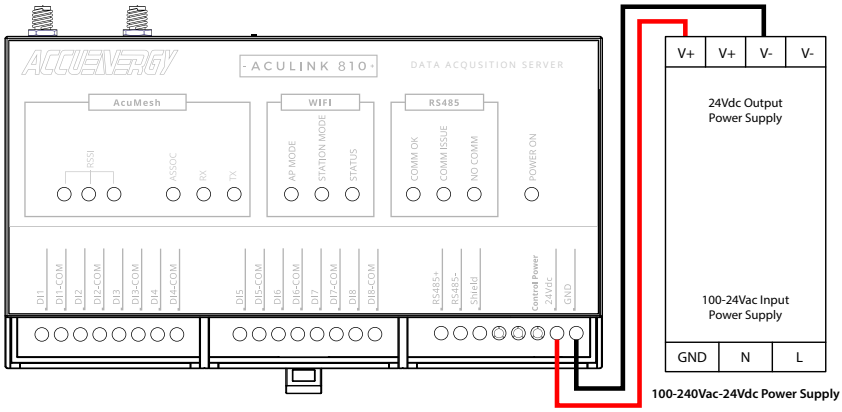


Figure 2-3 AcuLink 810 Power Supply

Chapter 3: LED Status Descriptions

There are total of thirteen (13) LEDs on the AcuLink 810 data acquisition server and gateway, and each represents different functions pertaining to the unit.

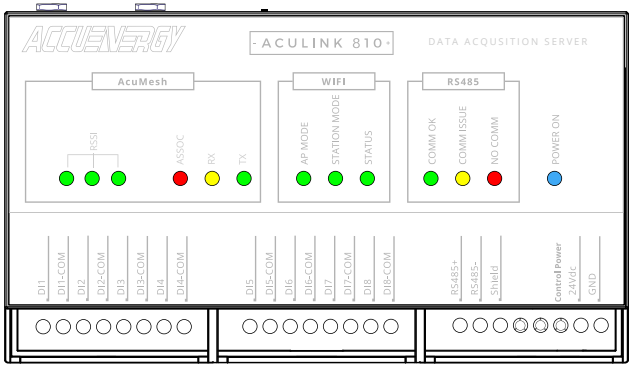


Figure 3-1 AcuLink 810 LEDs

The LEDs are divided into three groups plus a blue LED that indicates the power status of the AcuLink 810. The groups are AcuMesh LED, Wi-Fi LED, and RS485 LED.

3.1 AcuMesh LEDs

A total of six LED indicators are dedicated to the AcuMesh status states.

RSSI

- There are three RSSI LEDs that light up green to indicate the signal strength of the incoming signal.
- Three green LEDs indicates an excellent signal strength.
- Two green LEDs indicates a good signal strength.
- One green LED indicates a poor signal strength.
- No LED lights indicates a very poor to no signal strength.

ASSOC

- Solid red LED light indicates that the transceiver is powered ON or is communicating.
- A brief flashing red LED light happens during a RF transmission.

RX

- Yellow LED light indicates that the transceiver is receiving data.

TX

- Green LED light indicates that the transceiver is transmitting data.

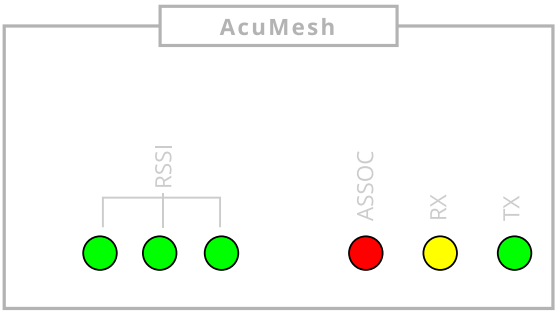


Figure 3-2 AcuLink 810 AcuMesh LEDs

3.2 Wi-Fi LEDs

The Wi-Fi has a total of three LEDs which are related to the Wi-Fi status states.

AP MODE

- When illuminated green, it signifies that the Wi-Fi is operating in Access Point Mode.

STATION MODE

- Green illumination indicates that the Wi-Fi is functioning in Station Mode.

STATUS

- Green illumination indicates that the Wi-Fi is working and functioning properly.

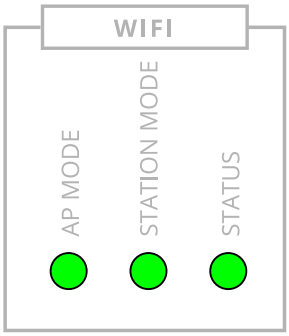


Figure 3-3 AcuLink 810 Wi-Fi LEDs

3.3 RS485 LEDs

The RS485 has a total of three LEDs which are related to the RS485 status states.

COMM OK

- Green illuminated LED light indicates that all RS485 and USB devices in the RS485 network are online.

COMM ISSUE

Yellow illuminated LED light indicates that some of the devices are online and some devices are offline in the RS485 network.

NO COMM

- Red illuminated LED light indicates that all RS485 devices in the RS485 network are offline.

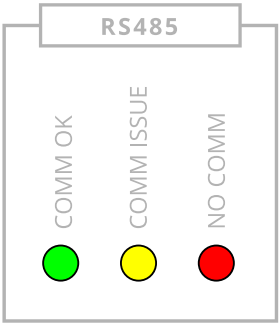


Figure 3-4 AcuLink 810 RS485 LEDs

Chapter 4: Initializing the AcuLink 810

The AcuLink 810 has a remote webpage that users can access to configure the gateway settings and view device data. The AcuLink 810 gateway has two Ethernet ports and supports communication with a 2.4GHz Wi-Fi connector.

The default IP addresses and modes are:

Ethernet 1: 192.168.8.101

Ethernet 2: DHCP

Wi-Fi: Access Point Mode

The following outlines the different methods that can be used when accessing the AcuLink 810 webpage for the first time. Each method below will explain the step-by-step instructions to set up the webpage.

4.1 Accessing the AcuLink 810 Webpage

4.1.1 Method 1 - Ethernet Direct Connection

For the direct connection method, there must be an Ethernet connection from the AcuLink 810's Ethernet 1 port to a computer.

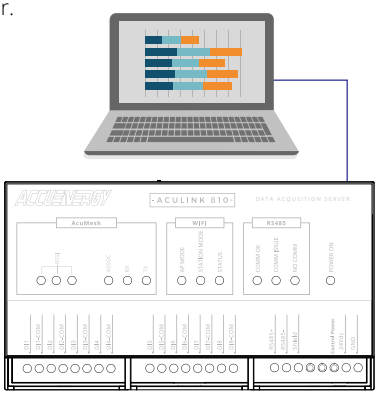


Figure 4-1 AcuLink 810 Ethernet Direct Connection to PC

To access the webpage, the computer IP address must be configured within the same subnet as the AcuLink 810 Ethernet 1 IP address. The Ethernet 1 port has a default IP address of 192.168.8.101.

The following outlines how to change the computer's IP:

1. Start by accessing the control panel of the computer and select Network and Internet.

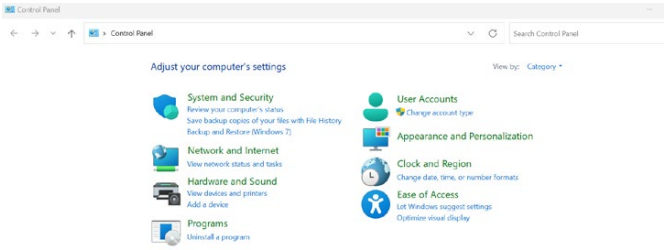


Figure 4-2 Windows Control Panel

2. Select Network and Sharing Center

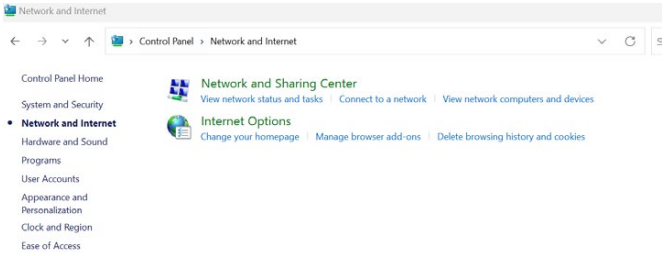


Figure 4-3 Windows Network and Internet Settings

3. From the left panel of the screen, select **Change adapter settings**.

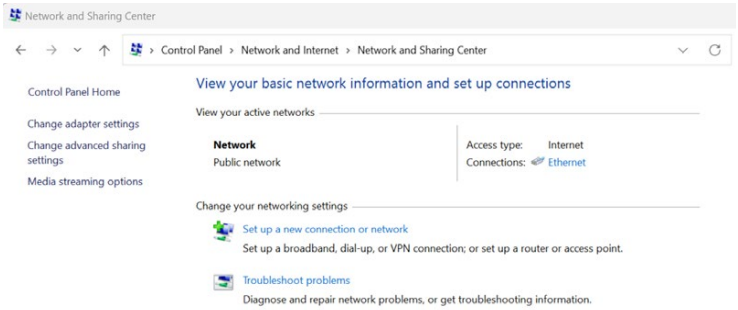


Figure 4-4 Windows Change Adapter Settings

4. Double-click **Ethernet**, or right-click **Ethernet** and select **Properties** from the menu.

Figure 4-5 Windows Network Status

5. The following window will open, click on **Properties** button.

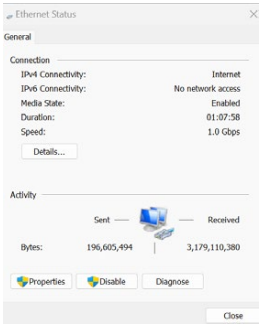


Figure 4-6 Windows Ethernet Status

6. The Ethernet Properties window will open. Select **Internet Protocol Version 4 (TCP/IPv4)** and click on the **Properties** button.

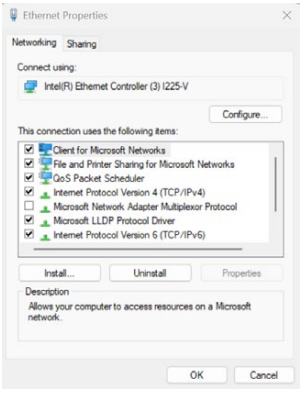


Figure 4-7 Windows Ethernet Properties

7. Select the option **Use the following IP address:** and change the IP address of the computer. The AcuLink 810 Ethernet 1 address is 192.168.8.101, the computer's IP will need to be within the same subnet. The IP of the computer can be 192.168.8.xxx, where xxx can be any number ranging from 1 to 254. For example, an IP address of 192.168.8.10 can be used.

NOTE: The computer IP address and the AcuLink 810 Ethernet 1 IP address cannot be the same.

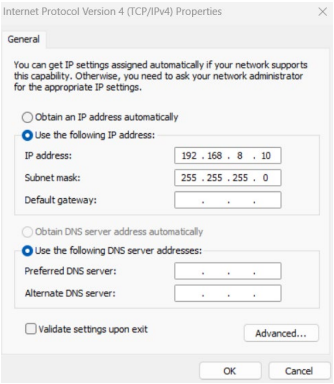


Figure 4-8 Windows TCP/IPv4 Properties

Once all settings are complete click on the **OK** button to confirm the network changes. Next, open an internet browser and from the address bar type in the AcuLink 810 IP address **192.168.8.101**. The browser will redirect to the login screen and the user will be prompted to enter the sign-in credentials.

4.1.2 Method 2 - Wi-Fi Wireless Connection

The AcuLink 810 webpage can be accessed wirelessly with a Wi-Fi connection. Ensure the Wi-Fi antenna is installed on the AcuLink 810 before enabling.

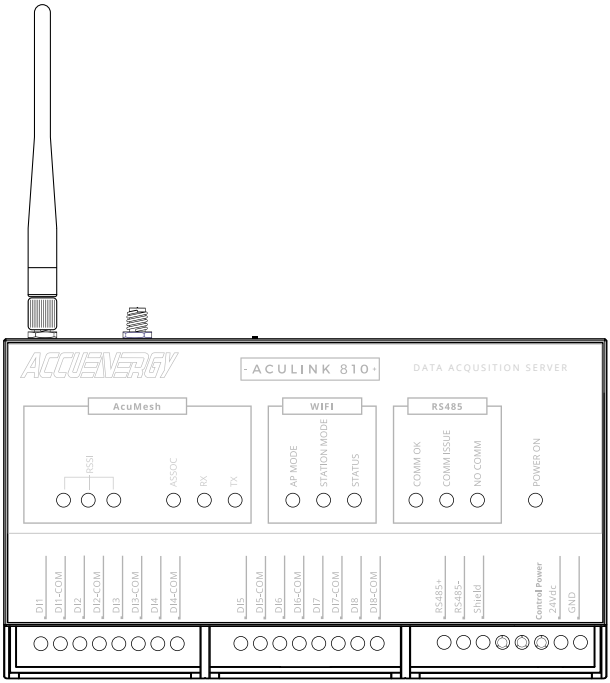


Figure 4-9 AcuLink 810 Wi-Fi Antenna

By default, the AcuLink 810 has its Wi-Fi mode set as AP (Access Point) mode. This mode allows the AcuLink 810 to act as a wireless access point for other wireless devices to connect and access the gateway.

To connect to the AcuLink 810 AP mode, search for the SSID in the list of available wireless networks.

The SSID will be by default **AcuLink810-WiFi-S8Pxxxxxxxx**, where the **S8Pxxxxxxxx** is the unique serial number for the AcuLink gateway. The serial number of the AcuLink 810 can be found on the side of the unit. The password for the network **accuenergy**.

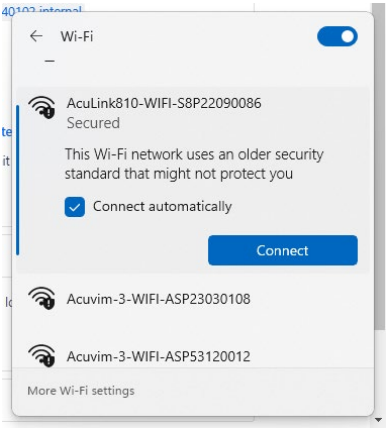


Figure 4-10 Connect AcuLink 810 Wi-Fi on Windows

Once connected to the gateway's wireless network, open an internet browser and in the address bar enter the IP address 192.168.100.1. The browser will redirect the web server login screen and the user will be prompted to enter the sign-in credentials.

4.1.3 Login AcuLink 810

To log into the webpage, a username and password must be entered. The default username is **admin**, and the password is also **admin**.

NOTE: For the best performance, the recommended internet browsers to access the AcuLink 810 webpages are Google Chrome, or Firefox.

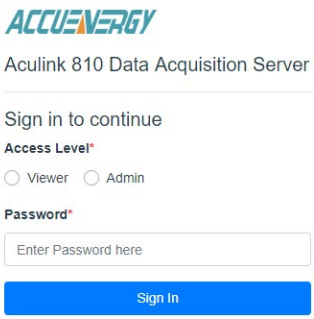


Figure 4-11 AcuLink 810 Login Window

4.2 Dashboard

After signing into the AcuLink 810 webpage, users are directed to the **Dashboard** webpage. The Dashboard provides the user with a summary of all the offline devices as well as devices under the Alarms section. The Alarms section includes the **Up Since** time, which shows the last time when the AcuLink 810 was powered on or rebooted.

The menu tabs on the top of the webpage allow users to access different settings within the gateway.

The header at the very top of the webpage displays the time and date of the AcuLink 810. The footer on the bottom of the webpage includes contact information and links to the Accuenergy website for further details.

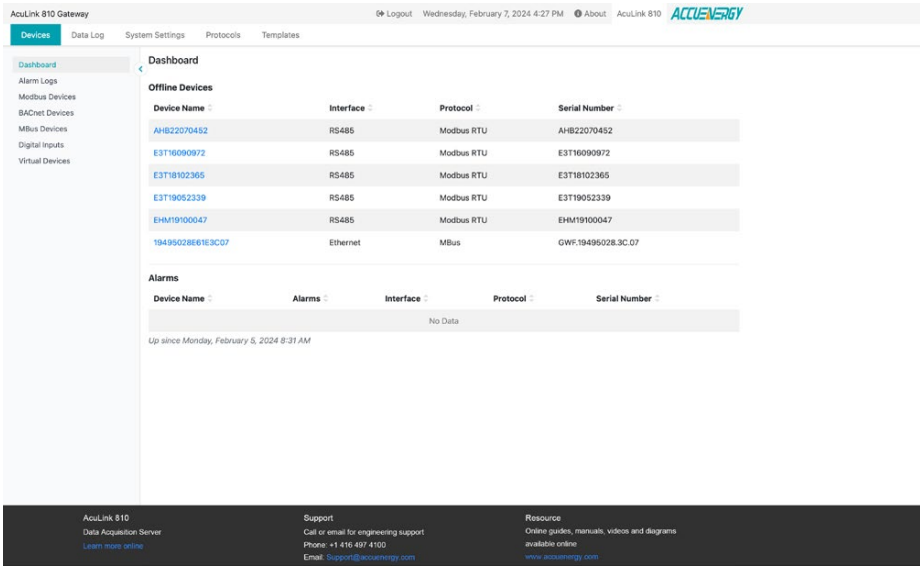


Figure 4-12 AcuLink 810 Dashboard

4.2.1 About Webpage

The AcuLink 810 Device Information section can be found under the **About** webpage. The About menu tab is located on the top right corner of the dashboard. This webpage provides an overview of the AcuLink 810 model number, serial number, Hardware and Firmware versions, and the Ethernet/Wi-Fi MAC addresses.

Users have the option to enter a Name, Location, and Description for the gateway. Once configured click on the **Save** button.

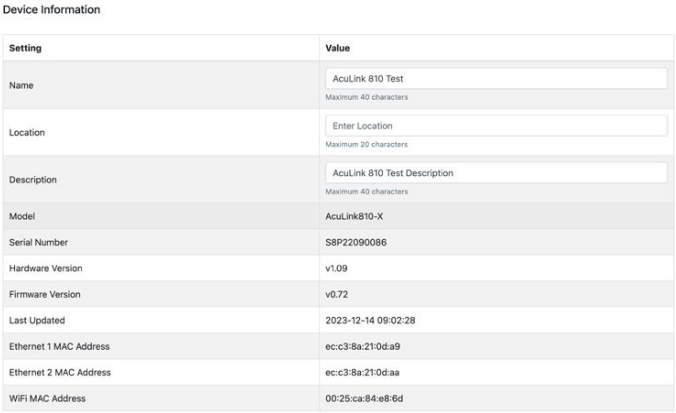


Figure 4-13 AcuLink 810 About Webpage

Chapter 5: Device Templates

The AcuLink 810 requires a device template to communicate and read data from any Modbus or BACnet device. The Modbus template supports different Modbus function codes including read coil (Function code 01), read discrete input (Function Code 02), read holding registers (Function Code 03), read input registers (Function Code 4) and write single holding register (Function Code 06). The Modbus device template also supports several data type formats to read different types of Modbus parameters.

A device template needs to be created first before using the AcuLink 810 to read device data over the Modbus or BACnet protocol. Within the AcuLink 810 webpage, users can create, modify, and convert custom templates using different formats (CSV, EPICS, etc.). Users can view the template configuration from the **Templates** menu tab, from where they can create or add both Modbus and BACnet templates.

The following sections explain how to create Modbus and BACnet templates for the AcuLink 810.

5.1 Modbus Templates

Modbus templates are used in the AcuLink 810 to correctly read the metering data from Accuenergy and third-party Modbus devices. Before a device can be added to the gateway a Modbus template must first be uploaded and installed onto the unit.

In the Modbus Templates webpage users can view the templates and the version number currently installed on to the AcuLink under the **Installed** menu tab.

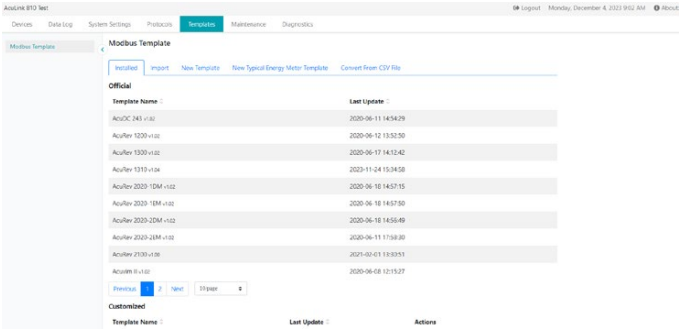


Figure 5-1 AcuLink 810 Installed Modbus Templates

Customized Templates

If there are custom templates on the AcuLink 810 users will have the following action buttons available with the following meaning:

Allows users to download the '.def' format template file.

Allows users to create a new template based on that existing template.

Allows users to create a new version based on that existing template.

Allows users to delete the template.

5.1.1 Import Template

To upload a new device template, click on the **Import** menu tab. All Accuenergy device templates can be found in the Remote Update section of the webpage. To use the remote upload function, users must ensure they have a connection to the internet. For third party device templates, users can upload and install templates manually.

WARNING: Data log and alarm monitoring configurations will be lost after updating an existing device template.

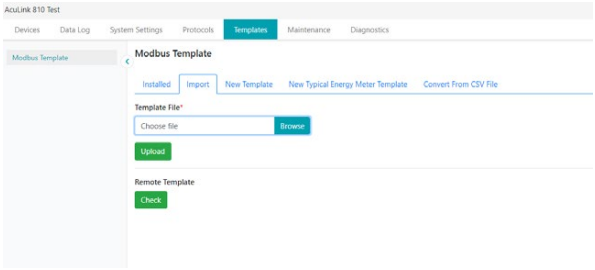


Figure 5-2 AcuLink 810 Import Modbus Templates

5.1.2 New Template

Under the **New Template** menu tab users can create and build their own Modbus template. There are four steps required in building the template which includes:

1) Device Info

2) Create Block

3) Create Parameter

4) Save

1. Device Information

Users need to enter a device model, which must be a unique model name. They will also need to enter a device version that must also be unique.

Click on the **Save Device Info** button once the information has been entered correctly.

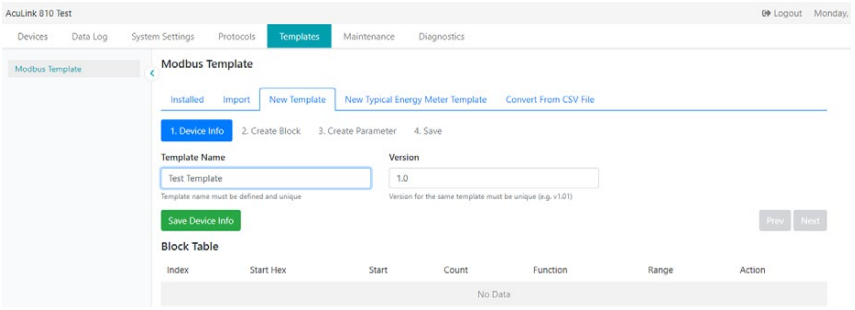


Figure 5-3 AcuLink 810 Device Information

2. Create Block

The second step involves the creation of the register blocks for the Modbus Device.

1. Select the Modbus Function Code of the register block (i.e. Read Holding Registers, Read Discrete Input, Read Coils, Read Input Registers, Write Single Register, Write Multiple Registers, Write Multiple Coils)
2. Select either hexadecimal or decimal format under Address Format, then in the Start field, enter the starting address of the register block.
3. Enter the number of registers in this block in the Count field.

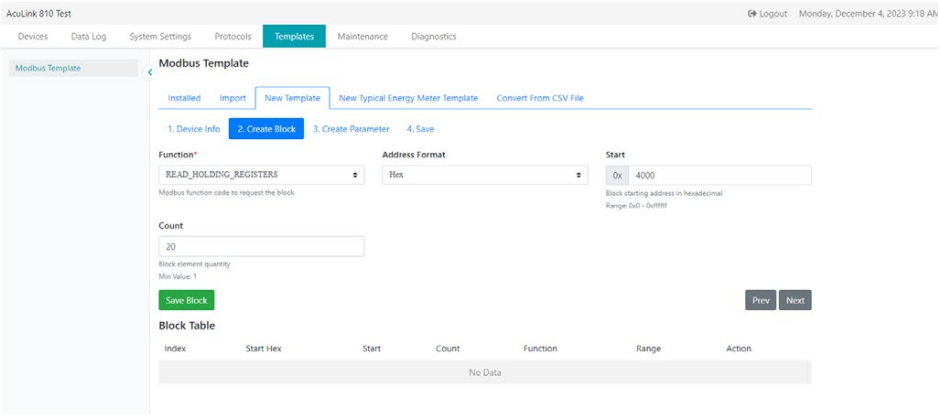


Figure 5-4 AcuLink 810 Create New Modbus Templates

Once all register block information is configured correctly click on the **Save Block** button. The saved block will then appear in the Block Table section at the bottom of the webpage. In the Block Table users have the option to edit, delete or view the details of the register block.

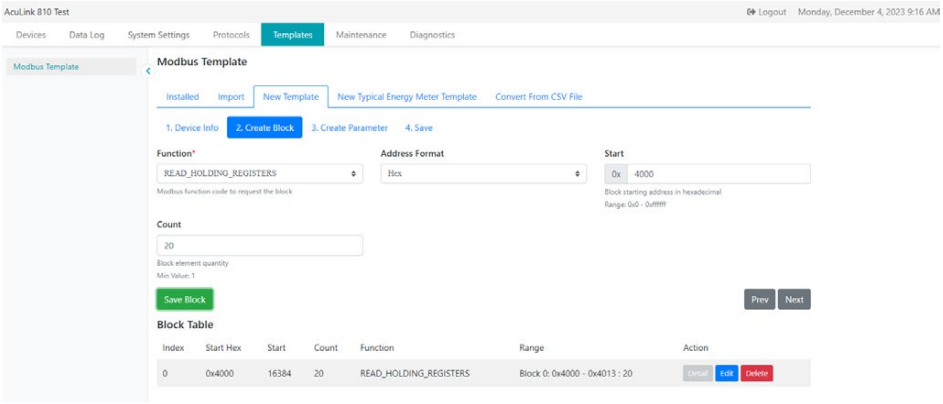


Figure 5-5 AcuLink 810 Saved Modbus Templates

If there are multiple register blocks for the Device users can continue creating them. Once all register blocks are completed, click on **Next** to continue.

3. Create Parameter

The third step includes adding parameters required for the template.

Users need to select what block the parameter resides in and create a display tab to view the parameter once the template is complete.

Block: Select the block for the parameter in the drop-down menu.

Select Display Tab(s): In this field, input the desired tab name and press 'Enter' for tab creation. Examples include 'Energy' or 'Real-time Data.' Upon completing the template, users can locate their created parameters under the designated tab. Subsequently, select the tab from the drop-down menu. Multiple tabs can be created using the same method.

Label: Enter in a label name for the parameter, i.e. voltage, current, or temperature.

Address: Enter in the Modbus register address for the parameter. This address can be either hexadecimal or decimal format.

Multiplier: Users can input a numerical multiplier on the parameter.

Post Label: Users can define a post label name for the parameter. The post label is used whenever the device data is downloaded or sent to an external server, where the generated CSV file will have the post label as the header in the file.

Data Format: Select the data format for the parameter, some typical data types include Int, float, and hex.

Byte Order: Allows for the parameter to be specified for devices that may require the byte order to be swapped to read the parameter correctly.

Unit: An optional field that users can either select a provided unit or input a customized unit.

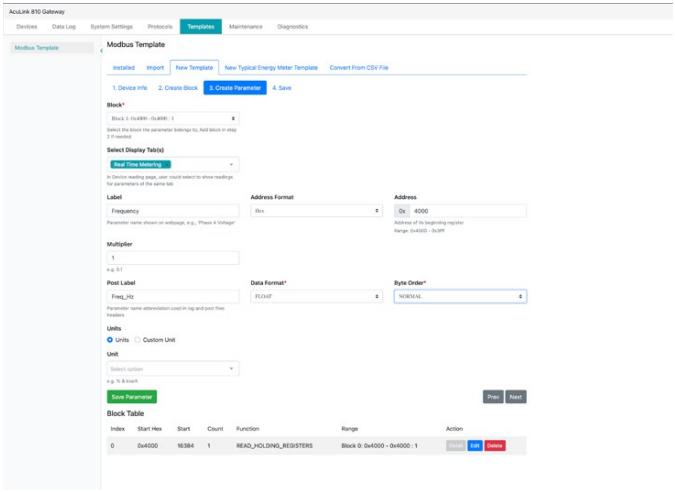


Figure 5-6 AcuLink 810 Create Parameters

Once all parameter settings are configured click on the **Save Parameter** button. Users can then view the parameter under the Block Table and clicking the **Detail** button. Under the Detail section users can modify the existing parameter by clicking the **Edit** button and users can remove the existing parameter by selecting the **Delete** button.

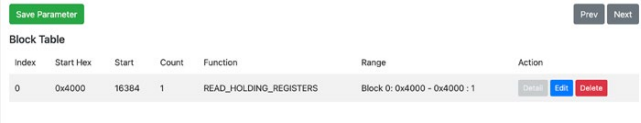


Figure 5-7 AcuLink 810 Save Parameters

Once Users have added all required parameters to the Modbus template click on **Next**.

4. Save

The last step is saving the device template. Users can review the Block Table and modify any parameters before saving the template. They can also click on the **Prev** button to go back and alter any blocks or parameters as needed.

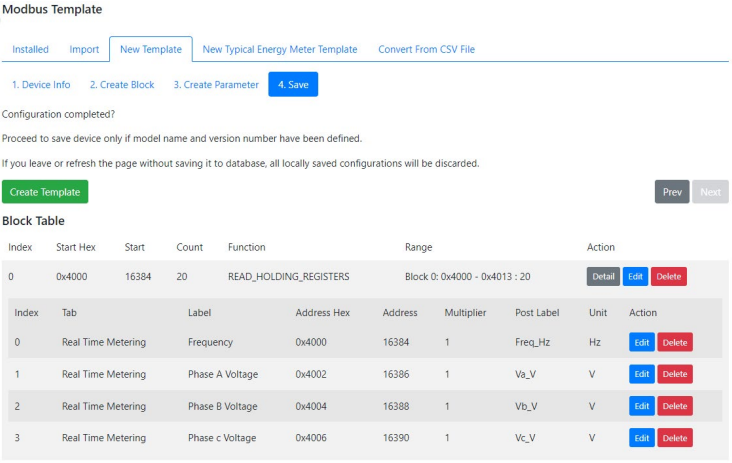


Figure 5-8 AcuLink 810 Save Modbus Templates

After reviewing all details of the Modbus template click on the **Create Template** button, users will be redirected back to the **Installed** menu tab of the Modbus Template webpage where the newly created template can be seen under the **Customized** section at the bottom of the webpage.

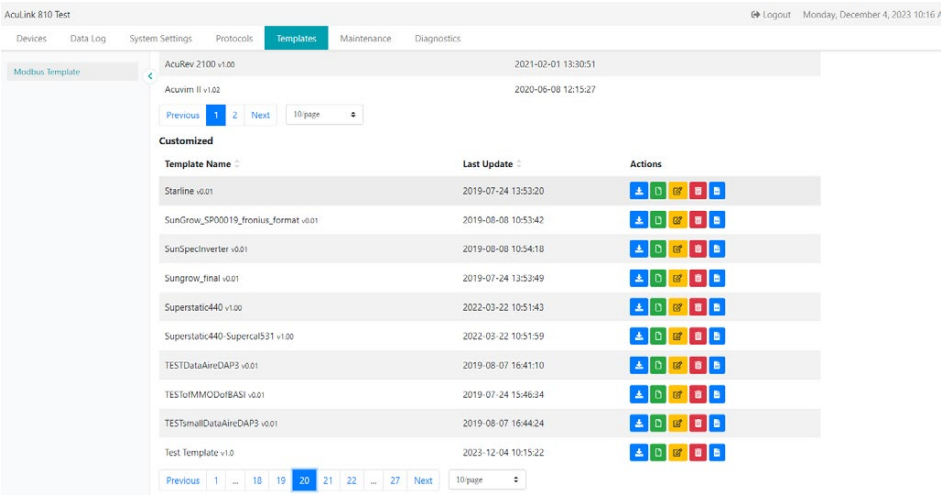


Figure 5-9 AcuLink 810 Installed Modbus Templates

5.1.3 Typical Energy Meter Template

The Typical Energy Meter Template webpage allows users to create a Modbus Template for third-party devices and has the ability to post data to the cloud-based energy management software **AcuCloud**. To create a device template that allows third-party devices to post data to the AcuCloud software, users need to click on the **Typical Energy Meter Template** menu tab.

This webpage will have the following sections:

1. Device

Under the Device section users can enter in the Template name and the version number.

Once all device settings are configured click on the **Save Device Info** button.

2. Block

Users can create the required register blocks for their device, where the function, starting address in hex, and the register count must be specified. Once a block is created click on the **Save Block** button, users can create multiple blocks for the device template. All created blocks will appear in the block table located further down the webpage.

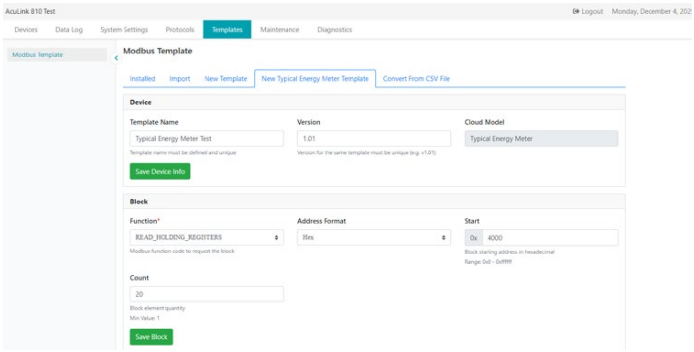


Figure 5-10 AcuLink 810 Create New Typical Energy Meter Templates

3. Parameter Table

The parameter table has all the parameters that are supported on the AcuCloud software. Users can find and locate the same parameters within the table that are supported on their third-party

device and configure it to their template by clicking on the **Edit** button next to the parameter.

On the Edit webpage users will need to select the block, starting address, multiplier, data type and byte order of the parameter.

After these settings are configured click on the **Save** button.

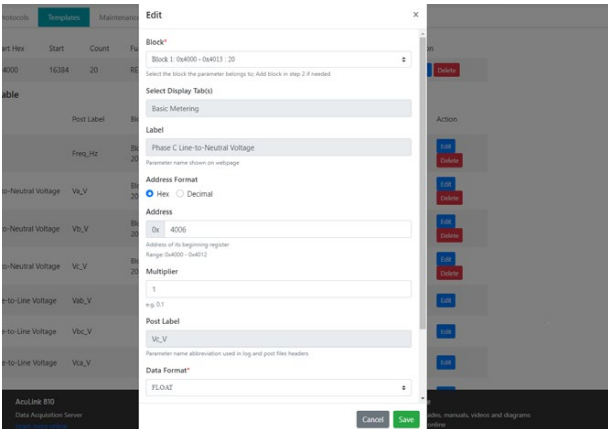


Figure 5-11 AcuLink 810 Edit Parameter Table

When all desired parameters have been configured and added to the template, click on the **Create Template** button.

Users will be redirected back to the **Installed** menu tab on the Modbus Template webpage, where the newly created Typical Energy Meter Template will be seen under the **Customized** templates at the bottom of the webpage.

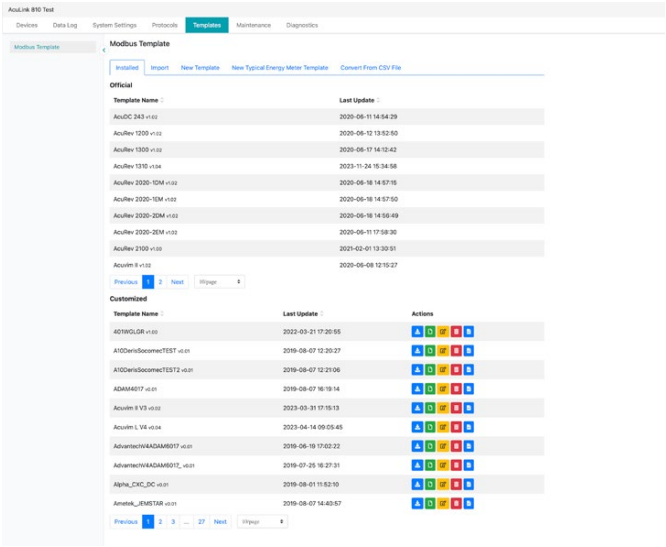


Figure 5-12 AcuLink 810 Customized Templates

5.1.4 Creating Template from CSV

The AcuLink 810 supports a CSV-to-Modbus template converter directly from its webpage. To access this converter, click on the **Convert From CSV File** menu tab on the Modbus Template webpage.

Users can enter in the desired name and version number for the Template.

Under the CSV file section, users will need to upload a .csv file containing all device register information for their device.

A sample CSV file can be downloaded directly from the webpage where users can edit and use it to build their own file. The CSV file must be in the same format as the sample file to successfully convert the file into a Modbus template file.

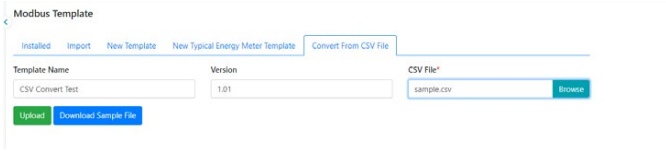
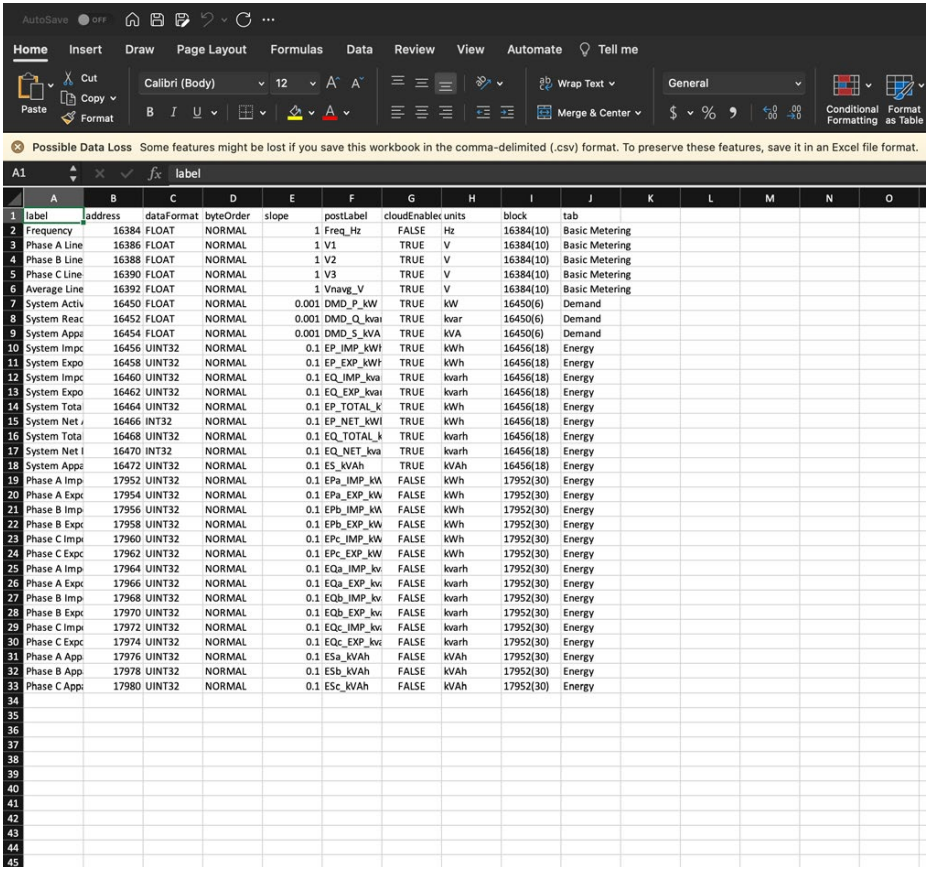


Figure 5-13 AcuLink 810 Convert Modbus Templates from CSV File

Below is the sample CSV file for the CSV-to-Modbus template converter.



Possible Data Loss Some features might be lost if you save this workbook in the comma-delimited (.csv) format. To preserve these features, save it in an Excel file format.

	label	address	dataFormat	byteOrder	slope	postLabel	cloudEnable	units	block	tab
2	Frequency	16384	FLOAT	NORMAL	1	Freq_Hz	FALSE	Hz	16384(10)	Basic Metering
3	Phase A Line	16386	FLOAT	NORMAL	1	V1	TRUE	V	16384(10)	Basic Metering
4	Phase B Line	16388	FLOAT	NORMAL	1	V2	TRUE	V	16384(10)	Basic Metering
5	Phase C Line	16390	FLOAT	NORMAL	1	V3	TRUE	V	16384(10)	Basic Metering
6	Average Line	16392	FLOAT	NORMAL	1	Vnavg_V	TRUE	V	16384(10)	Basic Metering
7	System Activ	16450	FLOAT	NORMAL	0.001	DMD_P_kW	TRUE	kW	16450(6)	Demand
8	System Reac	16452	FLOAT	NORMAL	0.001	DMD_Q_kva	TRUE	kvar	16450(6)	Demand
9	System Appa	16454	FLOAT	NORMAL	0.001	DMD_S_kVA	TRUE	kVA	16450(6)	Demand
10	System Impc	16456	UINT32	NORMAL	0.1	EP_IMP_kWh	TRUE	kWh	16456(18)	Energy
11	System Expo	16458	UINT32	NORMAL	0.1	EP_EXP_kWh	TRUE	kWh	16456(18)	Energy
12	System Impc	16460	UINT32	NORMAL	0.1	EQ_IMP_kva	TRUE	kvarh	16456(18)	Energy
13	System Expo	16462	UINT32	NORMAL	0.1	EQ_EXP_kva	TRUE	kvarh	16456(18)	Energy
14	System Tota	16464	UINT32	NORMAL	0.1	EP_TOTAL_k	TRUE	kWh	16456(18)	Energy
15	System Net /	16466	INT32	NORMAL	0.1	EP_NET_kWh	TRUE	kWh	16456(18)	Energy
16	System Tota	16468	UINT32	NORMAL	0.1	EQ_TOTAL_k	TRUE	kvarh	16456(18)	Energy
17	System Net I	16470	INT32	NORMAL	0.1	EQ_NET_kva	TRUE	kvarh	16456(18)	Energy
18	System Appa	16472	UINT32	NORMAL	0.1	ES_kVAh	TRUE	kVAh	16456(18)	Energy
19	Phase A Imp	17952	UINT32	NORMAL	0.1	EPa_IMP_kW	FALSE	kWh	17952(30)	Energy
20	Phase A Expo	17954	UINT32	NORMAL	0.1	EPa_EXP_kW	FALSE	kWh	17952(30)	Energy
21	Phase B Imp	17956	UINT32	NORMAL	0.1	EPb_IMP_kW	FALSE	kWh	17952(30)	Energy
22	Phase B Expo	17958	UINT32	NORMAL	0.1	EPb_EXP_kW	FALSE	kWh	17952(30)	Energy
23	Phase C Impo	17960	UINT32	NORMAL	0.1	EPc_IMP_kW	FALSE	kWh	17952(30)	Energy
24	Phase C Expo	17962	UINT32	NORMAL	0.1	EPc_EXP_kW	FALSE	kWh	17952(30)	Energy
25	Phase A Imp	17964	UINT32	NORMAL	0.1	EQa_IMP_kv	FALSE	kvarh	17952(30)	Energy
26	Phase A Expo	17966	UINT32	NORMAL	0.1	EQa_EXP_kv	FALSE	kvarh	17952(30)	Energy
27	Phase B Imp	17968	UINT32	NORMAL	0.1	EQb_IMP_kv	FALSE	kvarh	17952(30)	Energy
28	Phase B Expo	17970	UINT32	NORMAL	0.1	EQb_EXP_kv	FALSE	kvarh	17952(30)	Energy
29	Phase C Impo	17972	UINT32	NORMAL	0.1	EQc_IMP_kv	FALSE	kvarh	17952(30)	Energy
30	Phase C Expo	17974	UINT32	NORMAL	0.1	EQc_EXP_kv	FALSE	kvarh	17952(30)	Energy
31	Phase A App	17976	UINT32	NORMAL	0.1	ESa_kVAh	FALSE	kVAh	17952(30)	Energy
32	Phase B App	17978	UINT32	NORMAL	0.1	ESb_kVAh	FALSE	kVAh	17952(30)	Energy
33	Phase C App	17980	UINT32	NORMAL	0.1	ESc_kVAh	FALSE	kVAh	17952(30)	Energy

Figure 5-14 AcuLink 810 Modbus Template Example

Once all information and CSV file have been uploaded, users need to click on the **Upload** button.

Users will be redirected back to the **Installed** menu tab on the Modbus Template webpage where the newly converted Modbus template will be seen under the **Customized** templates located at the bottom of the webpage.

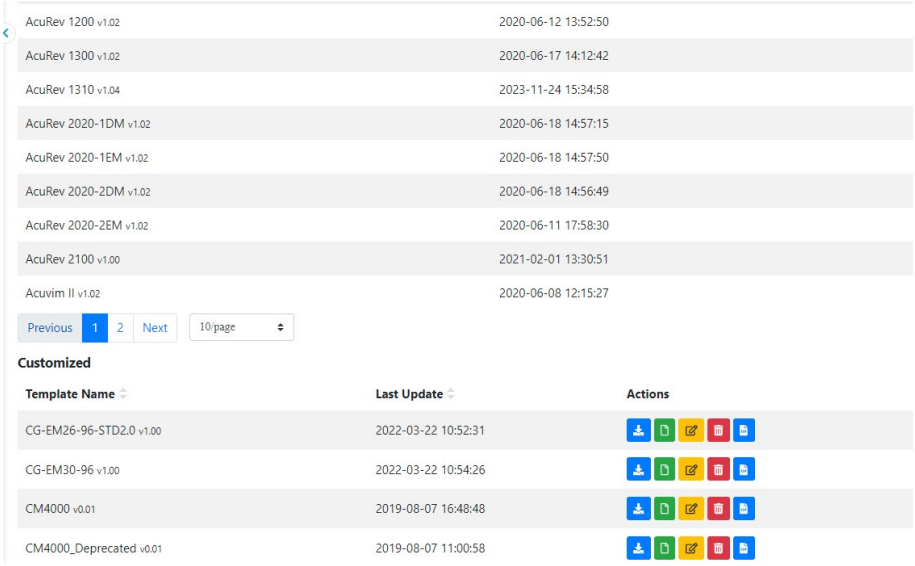


Figure 5-15 AcuLink 810 Customized Modbus Templates (CSV Uploaded)

5.2 BACnet Template

BACnet templates are used in the AcuLink 810 to correctly read the metering data from Accuenergy and third-party BACnet devices. Before a device can be added to the gateway a BACnet template for the device must first be uploaded and installed onto the unit.

On the Templates webpage select **BACnet Template**.

In the BACnet Templates webpage users can view the templates and the version number currently installed on to the AcuLink under the **Installed** menu tab.

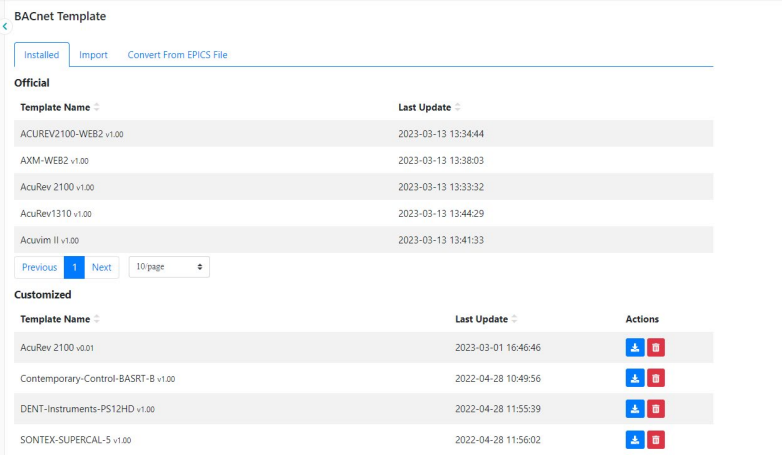


Figure 5-16 AcuLink 810 Installed BACnet Templates

5.2.1 Import Template

To upload a new device template, click on the **Import** menu tab. Users can upload a BACnet template manually or download templates from remote server. To import a template manually, users must ensure that the device template is a **.def** file format as no other formats are excepted on the AcuLink 810.

Alternatively, users can download a BACnet template from the remote server by clicking on the **Check** button. A template can be installed directly from the server onto the AcuLink 810.

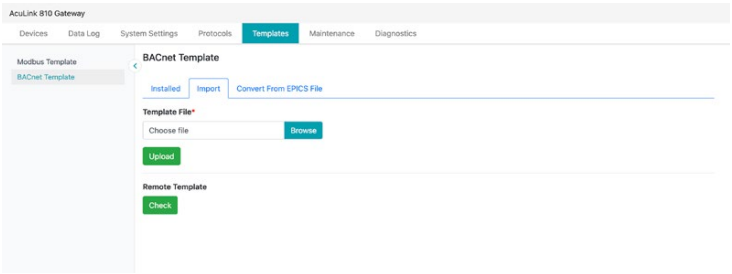


Figure 5-17 AcuLink 810 Import BACnet Templates

WARNING: Data log and alarm monitoring configurations will be lost after updating an existing device template.

5.2.2 Convert from EPICS File

The AcuLink 810 features a template converter designed to transform EPICS files from BACnet devices into a .def BACnet template compatible with the AcuLink 810 system. In the "**Convert From EPICS File**" menu tab, users are prompted to input the template name, version number, and upload the EPICS file for processing.

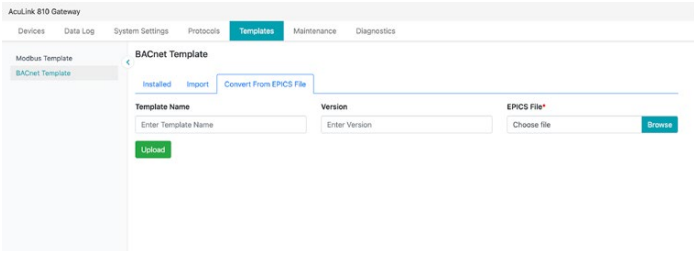


Figure 5-18 AcuLink 810 Covert BACnet Templates from EPICS File

Once the name, version and EPICS file has been selected users can click on the **Upload** button. Users will then be prompted to specify which parameter to include in the BACnet template. Once the parameters are selected click on the **Save** button located at the bottom of the webpage.

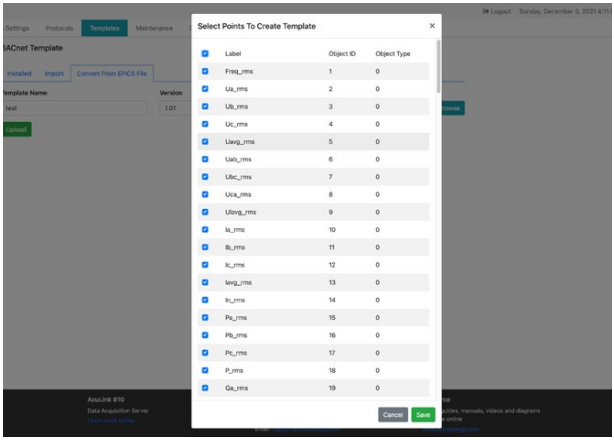


Figure 5-19 AcuLink 810 BACnet Select Points to Create Template

Users will be redirected back to the **Installed** menu tab in the BACnet Template webpage where the newly converted template file will be seen under the **Customized** templates located at the bottom of the webpage.

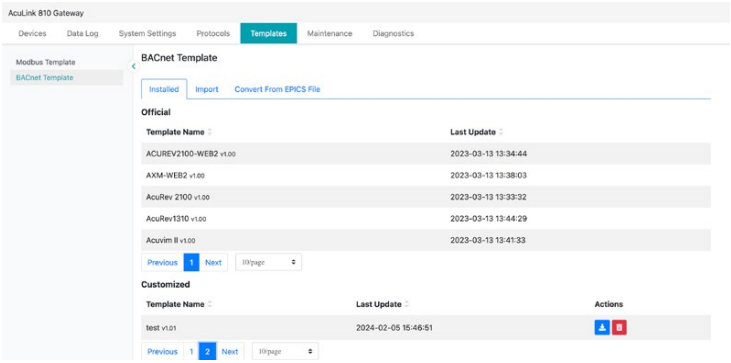


Figure 5-20 AcuLink 810 Customized BACnet Templates

Chapter 6: System Settings

6.1 Network

All network-related configurations can be found on the **Network** page under the **System Status** menu tab. Users can configure all Ethernet 1 port, Ethernet 2 ports, Wi-Fi, DNS, and RSTP configurations from this page.

6.1.1 Ethernet

There are two Ethernet ports on the AcuLink 810, by default Ethernet port 1 has a static IP address whereas Ethernet port 2 is configured for DHCP.

Default Ethernet port 1 settings:

- IP Address - 192.168.8.101
- Submask - 255.255.255.0
- Gateway - 192.168.8.101

Default Ethernet port 2 settings:

- DHCP enabled

The **Interface Status** on the network webpage lets users know what is connected or disconnected, for example the image below shows both Ethernet interface status as **Connected** which indicates that both Ethernet 1 and Ethernet 2 have a RJ45 Ethernet cable connected to the respective ports.

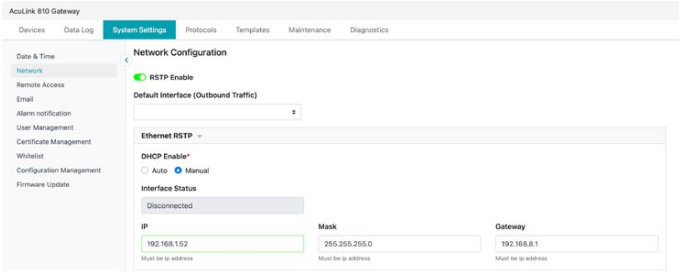


Figure 6-1a AcuLink 810 Network Interface Setting-1

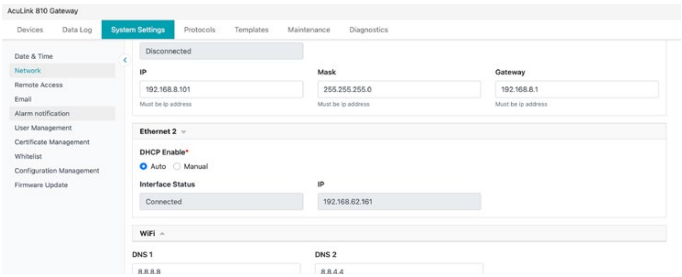


Figure 6-1b AcuLink 810 Network Interface Setting-2

6.1.2 Wi-Fi

There are two Wi-Fi modes in the AcuLink 810, Access Point and Station.

NOTE: When using Wi-Fi ensure that the included antenna is installed on the AcuLink 810 unit prior to use.

Access Point Mode: This is the default Wi-Fi configuration for AcuLink 810, where the gateway will act as a wireless access point and will allow other wireless devices to connect and access the AcuLink 810.

In Access Point mode, users need configure the SSID, Network Key and IP of the AcuLink 810 as well the DHCP DNS servers.

The default AP mode settings:

- SSID - AcuLink810-WiFi-SERIAL#810
- Network Key - accuenergy
- IP - 192.168.100.1

NOTE: For steps on how to access the webpage via Wi-Fi AP mode refer to chapter 4 section 4.1.2.

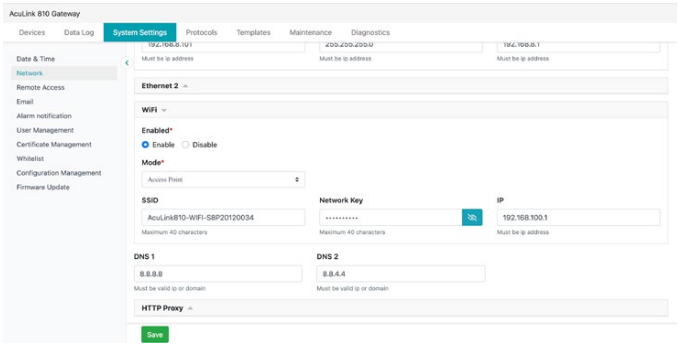


Figure 6-2 AcuLink 810 Wi-Fi Access Point Mode Setting

Station Mode: The AcuLink 810 will behave like a wireless client and a bridge to another wireless network that is available.

In Station mode, users can select the wireless network to connect to in the SSID drop down menu. Once the wireless network is selected enter the Network Key to bridge the AcuLink 810.

Users can configure a static Wi-Fi IP by manually entering the information into the IP, Submask, and Gateway fields of the Wi-Fi network. Alternatively, the Wi-Fi can be configured for DHCP where the IP, Submask, and gateway of the Wi-Fi network is automatically assigned to the AcuLink 810.

Enterprise Wi-Fi: This option allows the AcuLink 810 to connect using an enterprise level Wi-Fi network which is common in many colleges, universities, hospitals, and other institutions. Users can connect to an enterprise level Wi-Fi network by selecting the WPA/WPA2 Enterprise check box and then entering in the username and password.

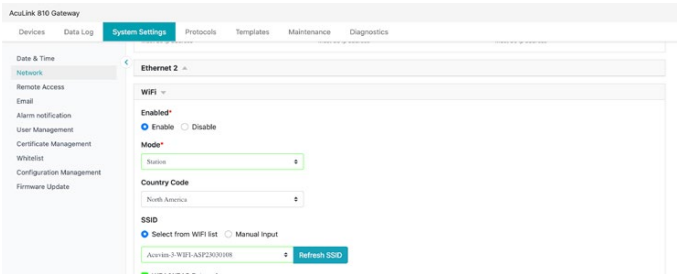


Figure 6-3 AcuLink 810 Wi-Fi Station Mode Setting

6.1.3 HTTP Proxy

The AcuLink 810 supports HTTP proxy configuration which allows users to post data to their servers via a proxy server.

To configure the HTTP proxy, enter in the proxy URL and port number.

Figure 6-4 AcuLink 810 HTTP Proxy Setting

6.1.4 RSTP

The RSTP protocol allows users to create an Ethernet daisy chain using the two Ethernet ports located on the AcuLink 810. When using the daisy chain feature it is able to connect to a network switch/router, other AcuLink 810, and other devices that supports the RSTP protocol.

On the AcuLink 810 webpage the RSTP protocol can be enabled in the network configuration page. Once RSTP is enabled, users will notice there is only one setting for both Ethernet ports as both ports now will be using the RSTP configured IP address instead of two unique IP addresses.

Users can configure the AcuLink 810 IP manually or by setting the DHCP as Auto.

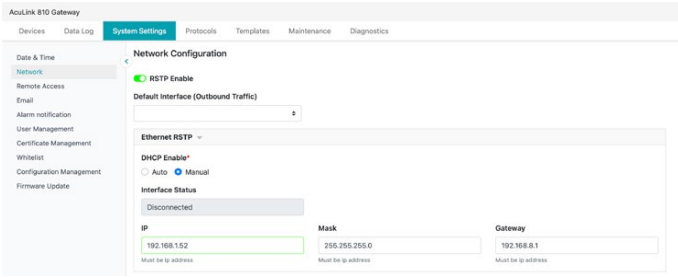


Figure 6-5 AcuLink 810 Network RSTP Setting

NOTE: When the RSTP is enabled, users will not be able to configure Ethernet 1 and Ethernet 2 independently, there is only one IP for the AcuLink using RSTP protocol.

Network Topology

Daisy chain connection is supported in the RSTP protocol. This can reduce the number of network switches required in different applications and allows the use of one network switch/router to be used with multiple devices. Each device can be accessed by configuring a unique IP address or have the IP addresses assigned automatically by the network.

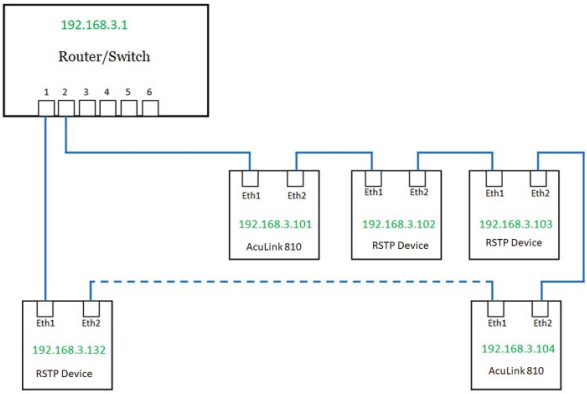


Figure 6-6 AcuLink 810 Network Topology

6.1.5 Default Routing Webpage

The AcuLink 810 default webpage setting allows users to configure which port to use for primary routing to external networks. Since there are multiple ways that the user can connect such as Ethernet1, Ethernet 2, Wi-Fi, or RSTP, this setting will establish which one to use for the main routing. The other webpages can be used for local routing if the users have them connected.

Users can select the default routing webpage as:

- Ethernet 1
- Ethernet 2
- Wi-Fi - only valid if Wi-Fi is configured for station mode
- Bridge (RSTP) - only valid if RSTP is enabled

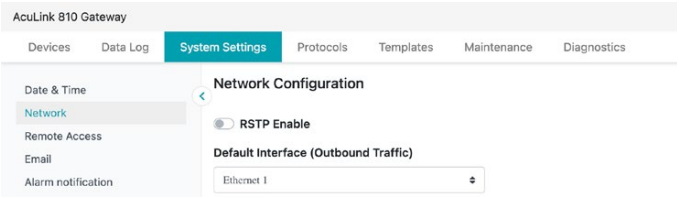


Figure 6-7 AcuLink 810 Default Routing Webpage

6.2 Whitelist Management

The AcuLink 810 supports the access control function, also known as the IP whitelist.

When enabled, only the selected IP addresses can access the gateway's webpage. Users can enter in an IPv4 address along with a description for the address. There is a maximum of twenty IP addresses that can be added to the IP Whitelist.

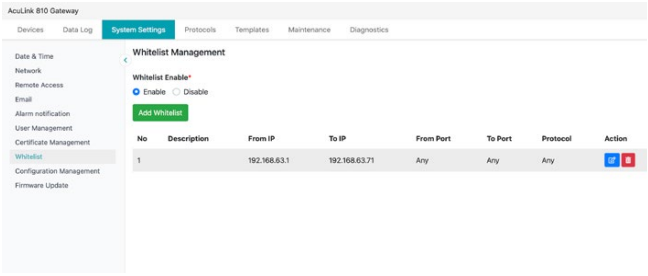


Figure 6-8 AcuLink 810 Whitelist Management

When adding the whitelist users have the option to configure a specific IP or IP range, port, protocol, and description.

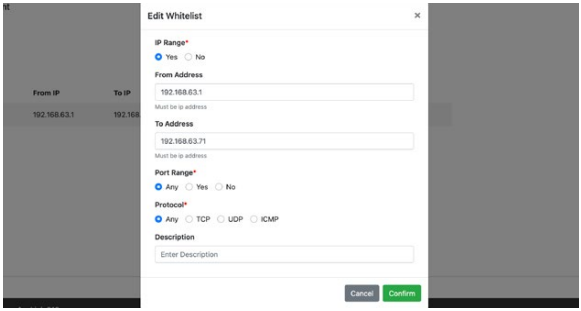


Figure 6-9 AcuLink 810 Edit Whitelist

6.3 Time & Date

The **Date & Time** page under the **System Settings** menu tab is where users can configure the local time of the gateway. The AcuLink 810 supports NTP (Network Time Protocol) where it can synchronize its time to NTP servers across the network.

NOTE: An internet connection is required before synchronizing the AcuLink 810's time to the NTP time servers.

If users do not want to sync the device time to an NTP server, they can disable the NTP setting and configure the time and date manually.

Time Sync: Users can force the time on the AcuLink 810 to update to the NTP by clicking the **Sync** button.

NTP Time Servers: The AcuLink 810 can be synced with up to three NTP servers. By default, the gateway uses 0.us.pool.ntp.org time server. Users can remove or add their own time servers as needed.

Examples of North American NTP servers are:

0.us.pool.ntp.org

1.us.pool.ntp.org

2.us.pool.ntp.org

3.us.pool.ntp.org

For more NTP servers based on region, visit the following site: http://www.pool.ntp.org/en/

Time Zone: Users can select the time zone where the gateway is installed from the drop-down menu. Alternatively, users can simply click the region directly on the map to select the desired time zone.

Once configured, users will notice the desired time and date displayed on the top right corner of the webpage.

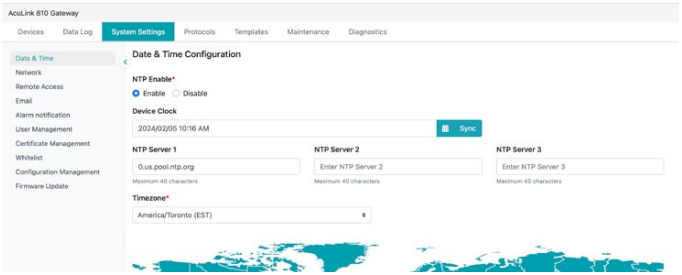


Figure 6-10 AcuLink 810 Date & Time Configuration

6.4 Remote Access

The AcuLink 810 includes a remote access function that allows users to access the AcuLink 810 webpage. By accessing the webpage remotely users will have full functionality as well as access to all gateway settings and device readings. This feature allows users to access the AcuLink 810 webpage through an HTTPS web server easily through a URL without any network port forwarding. Users simply register for remote access on the web server and a remote access URL is then provided allowing users to configure device settings and view meter data. This is useful as the gateway device may be installed on remote sites where the end user may be far away offsite from the actual device.

The remote access configuration can be found by clicking on the **System Settings** menu tab and selecting **Remote Access**.

Users must first register for remote access by clicking on **Manual Register**. Once successfully registered, enable remote access, and click on the **Save** button.

NOTE: To successfully register for remote access there must be an internet connection provided to the AcuLink 810.

When first enabling remote access and registering, the status will remain offline until the user clicks on the **Refresh Status** button to turn the status online. The remote access user webpage will then be accessible by clicking on the remote access URL or by using the **Copy** button to paste the URL into a new tab address bar on the internet browser.

The remote access login credentials are the same as the local login webpage. The default login credentials for the webpage are username **admin** and password **admin**.

Figure 6-11 AcuLink 810 Login Webpage

6.5 User Management

The AcuLink 810 supports the creation of different users for the webpage. Each user roles to determines what permission and functions are available when logged in. To access the user configuration page, users need to click on the **User Management** menu tab.

6.5.1 General

Under the **General** menu tab, the Max Concurrent Logins and Session Timeout settings can be configured. The maximum number of concurrent login setting allows the user to configure how many users can be logged into the webpage at the same time. If the user limit is exceeded, the first user that logged in will be logged out of the webpage (first in, first out method). The range for this setting is from 1 to 10, the default setting is 1.

The session timeout setting represents how long in minutes the user can access the webpage before it times out. When the session timeout limit is reached users will be logged out of the webpage and redirected back to the login page. The session timeout is set to ten minutes by default, and it can be set from 0 to 60 minutes, where 0 indicates the user will never timeout of the webpage.

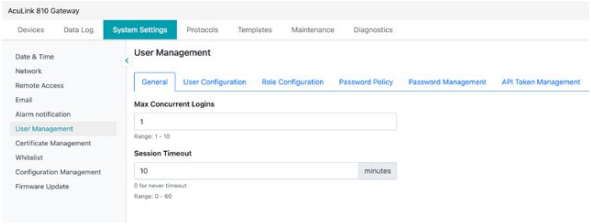


Figure 6-12 AcuLink 810 User Management

6.5.2 User Configuration

The user configuration table provides information regarding the access level, such as the register date, expiration date and last login time. If the correct permission is available on the account, users will have the option to lock an account, edit users, and delete users.

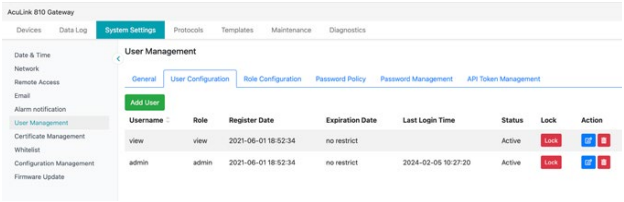


Figure 6-13 AcuLink 810 User Configuration

New users can be added where a username, password, role, and option to override the password policy is available. The role determines the type of access the user will have on the user level. When entering a password, users have the option to override the password rules set in the Password Policy section (see section 6.5.4) for the AcuLink 810 login webpage, this includes character length and complexity of the password (i.e. capital letters, number, special characters, etc.).

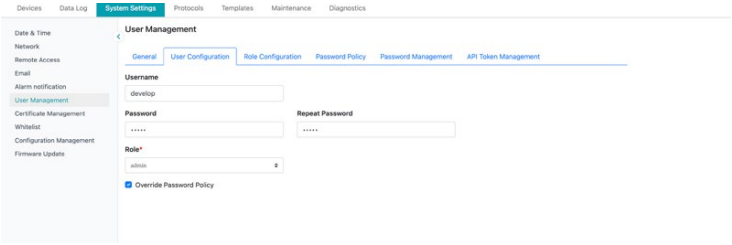


Figure 6-14 AcuLink 810 Override Password Policy

6.5.3 Role Configuration

The role configuration setting allows for the configuration and creation of different user roles for user levels. These roles determine whether the user will have edit, view, or access to certain features on the webpage. By default, there are two roles available, **Admin** and **View**. The Admin role permits the user to view and configure all settings whereas the View role allows users to only view meter readings.

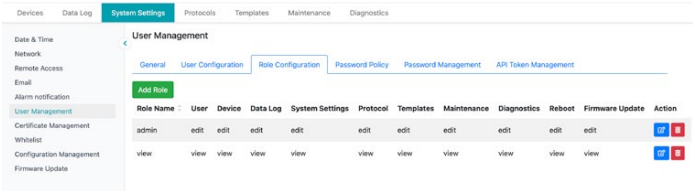


Figure 6-15 AcuLink 810 Role Configuration

When adding a new role, it is possible to specify which sections have view or edit access on the AcuLink 810 webpage.

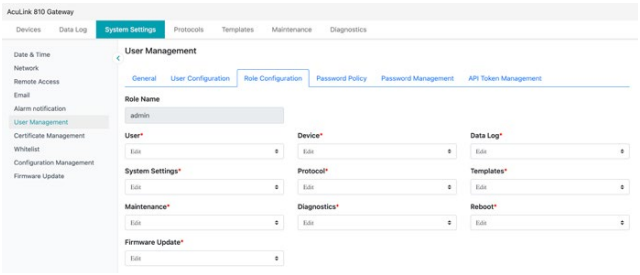


Figure 6-16 AcuLink 810 Edit Role

6.5.4 Password Policy

The password policy provides users with a method to ensure that all passwords created follow specific criteria. The password policy lists specific rules to be set to enforce user password strength to mitigate risky security exposure. When creating a user password there is an option to override the password policy if desired.

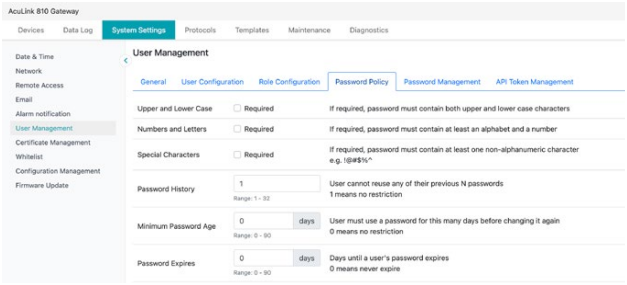


Figure 6-17 AcuLink 810 Password Policy

6.5.5 Password Management

The Password Management webpage allows users to change the password for the different **user levels** created.

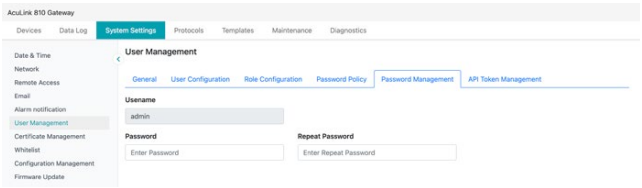


Figure 6-18 AcuLink 810 Password Management

6.6 Certificate Management

From the AcuLink 810 webpage, there is a certificate management section that allows users to view the web page certificate details. Users can also generate a new self signed certificate, generate a certificate signed request, and import/export the certificates.

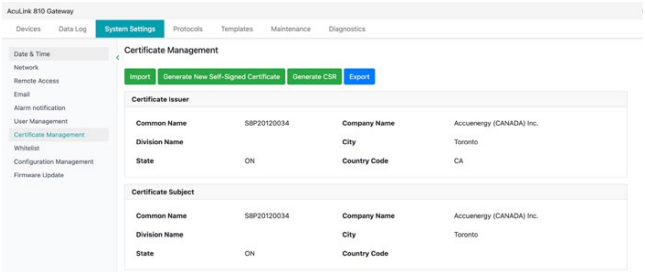


Figure 6-19 AcuLink 810 Certificate Management

6.7 Configuration Management

The AcuLink 810 has a configuration management webpage that allows users to export and import the current system settings, device configuration and user information. This is useful if users have more than one gateway that needs to be programmed with the same settings and eliminates any error when trying to configure another gateway. Users can also restore all the previously configured devices by importing a backup file to the AcuLink 810. This is particularly beneficial when performing a factory reset to the gateway and preventing the need to manually add devices back to the AcuLink 810.

NOTE: Exporting and importing configuration files between different versions is not supported and may result in problems or failure to the device.

Export Configuration: Users can export and save the web settings by clicking on the "export" button.

The following settings are saved in the configuration file:

- All Gateway settings (General, IO, Alarm, Custom Read, Waveform)
- Network settings (Only DNS1, DNS2, TCP Port, HTTP Proxy)
- All Email settings
- All Time/Date settings
- All Data Log settings
- All Post Channel settings
- All BACnet settings
- All SNMP settings
- User Management settings (username/passwords, etc)
- Debug Information (SSH, and Debug Configuration)
- Username/ Password
- Device configuration

The settings that are not included or affected by the Configuration Management file is:

- Most Network settings (RSTP, DHCP, IP, Submask, Gateway, HTTP Port for both Ethernet 1 and Ethernet 2, all Wi-Fi settings)
- AcuCloud
- IP Whitelist
- Remote Access

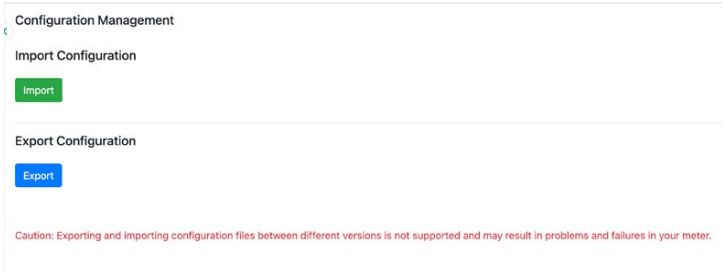


Figure 6-20 AcuLink 810 Configuration Management

Import Configuration: Users can import the backup file and select which part they would like to be restored in the pop-up window. The available options are "Import User", "Import Devices" and "Import App Configuration".

Import User: All saved user and password configuration will be restored.

Import Devices: All the configured devices will be added back to the gateway.

NOTE: The interface must be assigned to the same protocol as the devices in the backup file if the "Import App Configuration" is not checked together with "Import Devices".

Import App Configuration: All the web settings will be restored excluding the exceptions in the "exception" list.

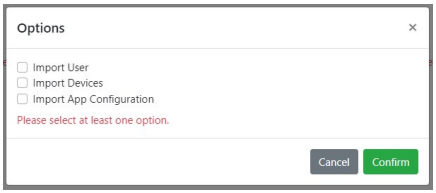


Figure 6-21 AcuLink 810 Import Configurations

6.8 Emergency Mode

AcuLink 810 supports emergency mode which will allow users to download data/configuration settings and update the firmware when the gateway fails to bootup normally due to the disk being full or failed to open database. In emergency mode the web page will guide the users step-by-step with limited functions available.

Step One: Import or export the configuration file. Clear existing configuration and reset the configuration to default. A prompt will appear warning all configuration settings will be reset. Press 'Confirm' to proceed.

Step Two: Data log management allow users to download or delete data logs.

Step Three: Firmware upload/update allow users to update firmware.

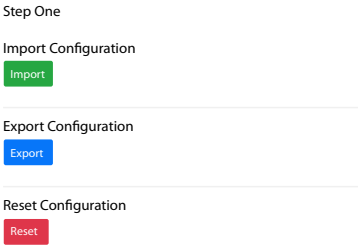


Figure 6-22 AcuLink 810 Emergency Mode Operations

Chapter 7: Protocols

7.1 Modbus

This section outlines how to add devices from the AcuLink 810 webpage using the Modbus protocol.

The AcuLink 810 supports both Modbus RTU and Modbus TCP protocols.

7.1.1 RS485 Devices

The AcuLink 810 gateway supports RS485 serial communication. Users can set up a serial RS485 connection to the AcuLink 810 with any Accuenergy or third-party device. If connecting multiple devices or 'daisy chaining" the devices together, ensure that a unique device address (Modbus Slave ID) is configured for each RS485 device.

NOTE: A termination resistor at the end of the RS485 network is optional when daisy-chaining multiple devices. If using a resistor, a termination value of 150 ohms can be used.

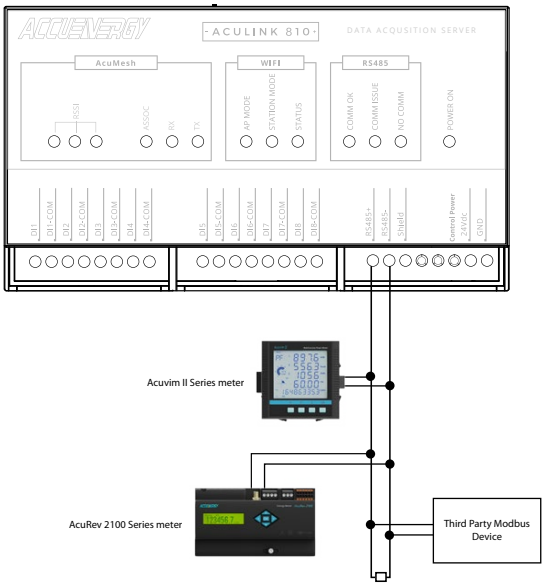


Figure 7-1 AcuLink 810 RS485 Network

7.1.2 USB Devices

The AcuLink 810 has a USB port that allows for additional Modbus RTU devices. Users can connect the additional devices using a RS485-to-USB converter cable.

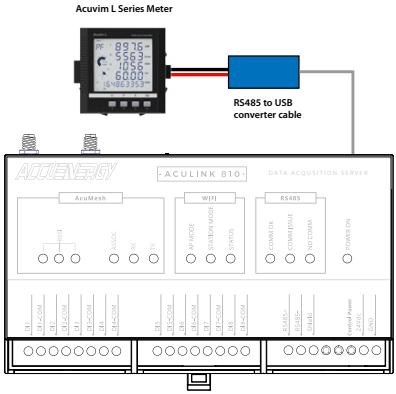


Figure 7-2 AcuLink 810 Modbus RTU Connection

7.1.3 Adding Modbus RTU Device

Before adding a Modbus RTU device, users will need to assign the correct protocol for the RS485 and USB ports from the **Interface Assignment** webpage under the **Protocols** menu tab. By default, the RS485 and USB ports for the AcuLink 810 are configured to use the Modbus protocol.

NOTE: Users will not be able to change the Interface assignment of the USB or RS485 port if there is a device added on the AcuLink 810 with one of the protocols already selected. The device must first be deleted from the AcuLink 810 to change the protocol of the ports.

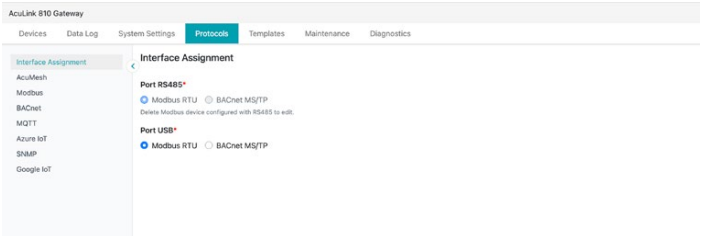


Figure 7-3 AcuLink 810 Protocols Settings Webpage

With the Modbus RTU protocol selected, add a Modbus RTU device via RS485 or USB by navigating to the **Modbus Devices** webpage under the **Devices** menu tab. Click on **Add Device**, and the following fields will need to be configured:

Device Name: Enter a name for the device.

Serial Number: Enter the serial number of the device being added, the serial number must be unique consisting of only letters and numbers.

Template: User will need to select the Modbus template for the device. For information regarding the Modbus Device template see section 5.3 of this user manual.

Protocol: Select 'RTU' as the protocol.

Port: Select either 'RS485' or 'USB'.

Modbus ID: Enter the device address (Modbus Slave ID) of the device, the range is from 1 to 247.

Baud Rate: Select the baud rate of the device, the range is from 9600 to 115200.

Data Bit: Select the number of data bits, either 7 or 8.

Parity: Select the parity of the device from the drop-down list.

Stop Bit: Select the number of stop bits.

Request Timeout: Select a timeout period for the AcuLink 810 to wait for a response from the device, the range is from 1 to 60 seconds, default for Modbus RTU is 0.5.

Auto Save Logger: Select a logger for the meter from the drop-down list.

NOTE: Users cannot add a device with the same device address (Modbus Slave ID). The device address must be unique for each device in the RS485 network.

Click the **Save** button once all settings are entered correctly.

Auto Save Logger: Provides users with a default data log channel to prevent data loss. This ensures data are logged even if a user completes the data post configuration without setting up a valid data log.

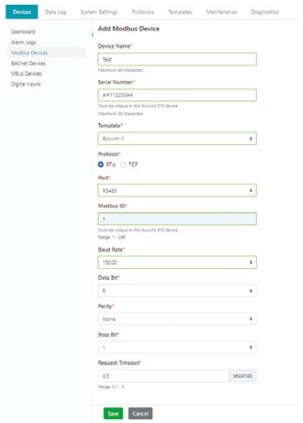


Figure 7-4 AcuLink 810 Modbus Device Setting

After the device is added, it can be found in the **Modbus Devices** webpage. A device that is successfully connected and communicating with the gateway will have display a green **'ON'** status under the Status column. A device that is offline will display a red **'OFF'** warning symbol under the Status column.

NOTE: After adding a new device to the gateway, it may take up to four minutes for the status to show **'ON'**. If after four minutes the device still shows an 'OFF' status, check the configuration settings again to ensure everything is set correctly.

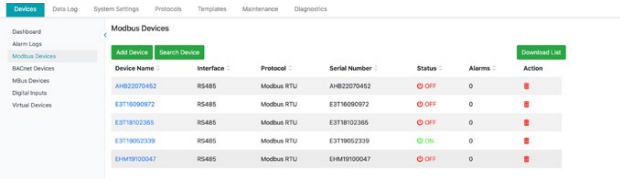


Figure 7-5 AcuLink 810 Modbus Device List

If changes to the configuration of the added device is needed, click on the device and then select the **Configuration**. From this webpage users can reset the device name, port type, baud rate, parity, and other fields. Click the **Save** button to confirm the changes.

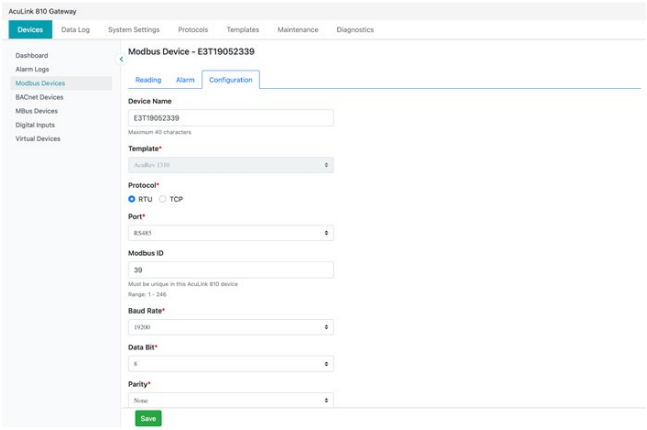


Figure 7-6 AcuLink 810 Modbus RTU Setting

7.1.4 TCP Devices

The AcuLink 810 can support up to 100 Modbus TCP devices for devices on the same network as the gateway.

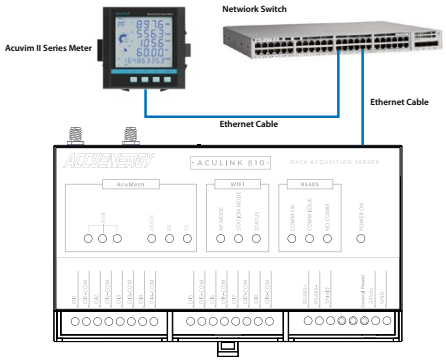


Figure 7-7 AcuLink 810 Modbus TCP Connection

7.1.5 Adding Modbus TCP Device

To add a Modbus TCP device, users need to click on **Add Device** button from the **Modbus Devices** webpage under the **Devices** menu tab. The following fields will need to be configured:

Device Name: Enter the device name of the TCP device.

Serial Number: Enter the serial number of the device, the serial number must be unique and consisting of only letters and numbers.

Template: Select the Modbus template for the TCP device. For more information regarding Modbus templates see sections 5.3 of this user manual.

Protocol: Select TCP as the protocol.

IP Address: Enter the IP address of the device.

Port: Enter the Modbus port of the device.

Modbus ID: Enter the Modbus address of the device.

Request Timeout: Enter the timeout setting, default for TCP is three seconds Click the **Save** button once all settings are entered correctly.

Auto Save Logger: Select a logger for the meter in the drop-down list.

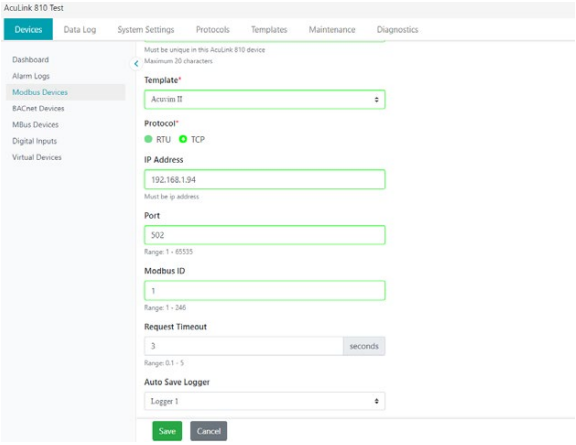


Figure 7-8 AcuLink 810 Modbus TCP Setting

After the device is added, it can be found in the **Modbus Devices** webpage. A device that is successfully connected and communicating with the gateway will have display a green **'ON'** status under the status column. A device that is offline will display a red **'OFF'** warning symbol under the status column.

NOTE: After adding a new device to the gateway, it may take up to four minutes for the status to show **'ON'**. If after four minutes the device still shows an 'OFF' status, check the configuration settings again to ensure everything is set correctly.

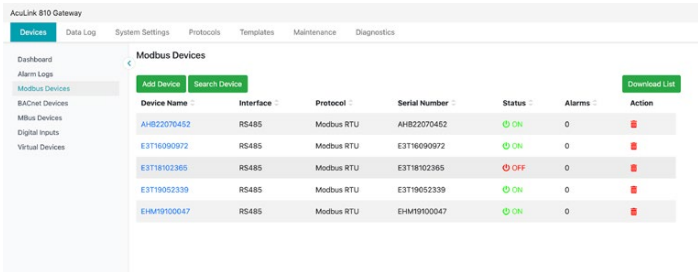


Figure 7-9 AcuLink 810 Modbus Device Status

If changes to the configuration of the added device is needed, click on the device and then select the **Configuration**. From this webpage users can reset the device name, port type, IP address, Modbus ID, and other fields. Click the **Save** button to confirm the changes.

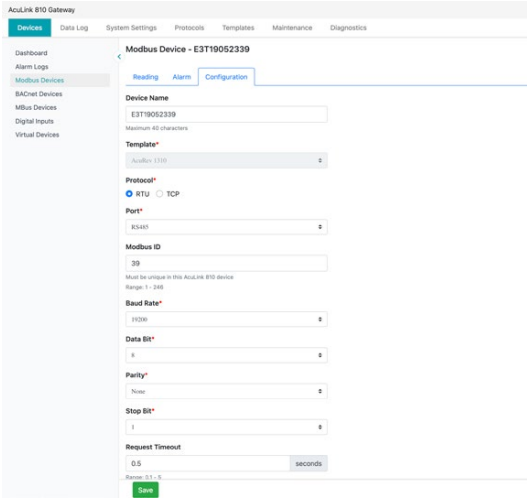


Figure 7-10 AcuLink 810 Modbus Device Edit

7.1.6 Modbus Gateway Function

The AcuLink 810 supports a Modbus gateway function to add a Modbus RTU device and use it as a gateway. Users must choose the device template as **Modbus Gateway Function Only**.

The Modbus gateway function allows users to forward a Modbus TCP request to the corresponding meter. A **Modbus Gateway Function Only** device allows the user to read/write to the Modbus registers of this device via Modbus gateway function. Unlike other Modbus devices, the AcuLink 810 does not periodically collect data for Modbus gateway devices.

Adding Modbus Gateway Device

To add a Modbus gateway device, select add device. Under the **Template** setting select **Modbus Gateway Function Only**. Select **RTU** as the Protocol and enter in the communication settings for that RTU device (baud rate, parity, Modbus ID, and other fields).

Click on the **Save** button once all information is entered in correctly.

NOTE: Only Modbus RTU devices can be used as a Modbus Gateway Function on the AcuLink 810.

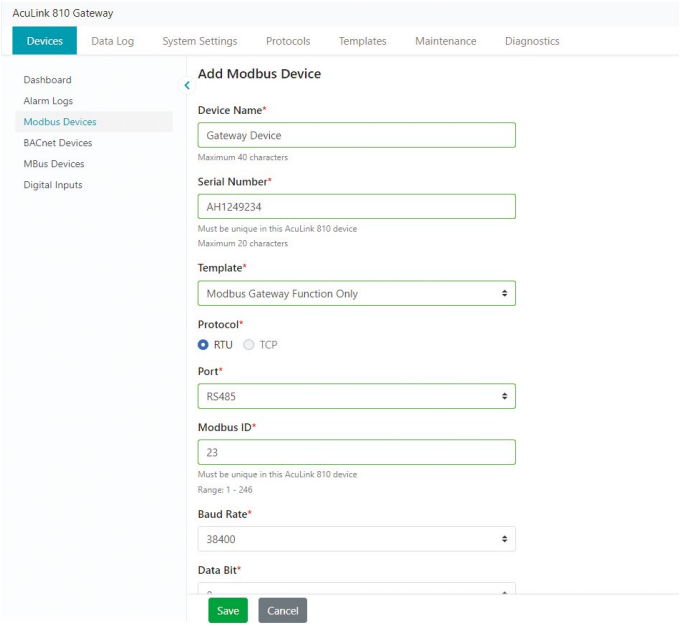


Figure 7-11 AcuLink 810 Modbus Gateway Function Setting

7.2 AcuMesh

Models AcuLink 810-900 and AcuLink 810-868 supports AcuMesh, which allows for a wireless Modbus RS485 mesh network. The gateway includes a built-in AcuMesh transceiver in its hardware which allows the AcuLink 810 to connect wirelessly to other serial RS485 devices such as Accuenergy and third-party Modbus devices that are paired with AcuMesh devices to gather information.

Figure 7-12 AcuLink 810 AcuMesh Network

There are two AcuMesh models for the AcuLink 810:

- AcuLink-868 (868 MHz) is used mostly in Europe, Middle East, Africa, and certain parts of Asia.
- The AcuLink-900 (900 MHz) is mainly used in North and South America, Oceania, and certain parts of Asia.

NOTE: The AcuLink 810-X model is Wi-Fi capabilities but does not support AcuMesh mesh network functionality.

To configure the AcuMesh network settings on the AcuLink 810, click on the **Protocols** tab and select **'AcuMesh'**.

7.2.1 Local Configuration

For the AcuLink to add other AcuMesh paired devices, the local AcuMesh network settings must be configured first. The local configuration webpage refers to the AcuMesh unit built into the AcuLink 810-900 and AcuLink 810-868.

The following can be configured on the local configuration webpage:

Node Name: Users can configure the name of the AcuMesh node in these settings, the maximum range is up to 14 characters.

Local MAC Address: The built-in AcuMesh transceiver will have a local MAC address that is used to identify the unit, this is non configurable.

Network Hop: By default, the network hop is set to 4 and represents the number of times the AcuMesh will scan the mesh network for devices. The range for this setting is from 1 to 7.

Network ID: The network ID is a hex number that is used as an AcuMesh Network Identifier. By default, the network ID is 7FFF, and the range is 0 to 7FFF hex.

NOTE: Only transceivers with the same matching network ID can discover and communicate with each other.

Encryption Enable: Users have the option to put a password on the AcuMesh device. All radio AcuMesh devices would need to have the same password to communicate within the AcuMesh network.

Encryption Key: The encryption key is a hex number with a maximum number of characters is 32.

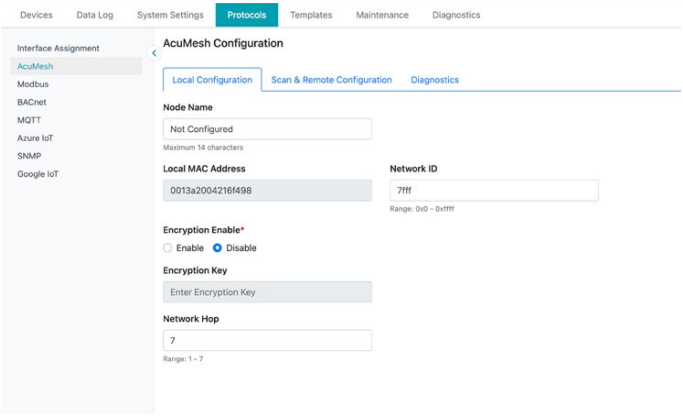


Figure 7-13 AcuLink 810 AcuMesh Local Configuration

7.2.2 Scan & Remote Configuration

Once the Local Configuration has been set, users can then scan for remote radio AcuMesh transceivers. Click on the **Scan & Remote Configuration** menu tab on the AcuMesh Configuration webpage to be redirected to the webpage to setup the remote AcuMesh paired devices.

The Local configuration will appear under the Node Scan section. This will show the Network ID that will be scanned, the Encryption, and the Channel Mask that is being used. The network Hops configuration is the number of times the mesh network will be scanned, the range is from 1 to 7 network hops.

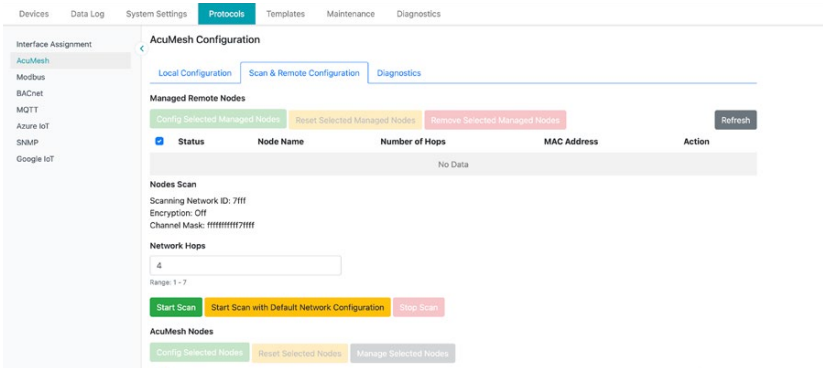


Figure 7-14 AcuLink 810 AcuMesh Scan and Remote Configuration

Click on the **Start Scan** button to search for any remote AcuMesh transceivers.

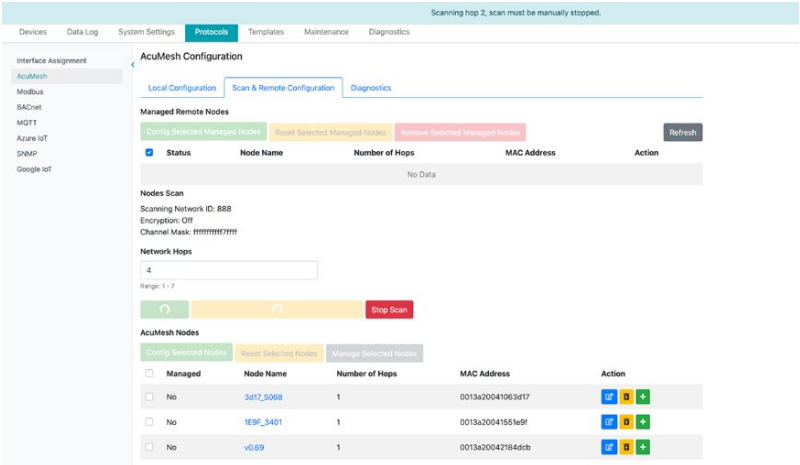


Figure 7-15 AcuLink 810 AcuMesh Scan

All devices found during the scan will have the AcuMesh node name, the number of network hops that the Mesh device was discovered, and the MAC address displayed on the webpage.

Users can click on the check box next to the node name to configure the radio AcuMesh transceiver, or if users wish to configure multiple AcuMesh paired devices they can select the check box next to the node name and then click on the **Config Selected Remote Nodes** button.

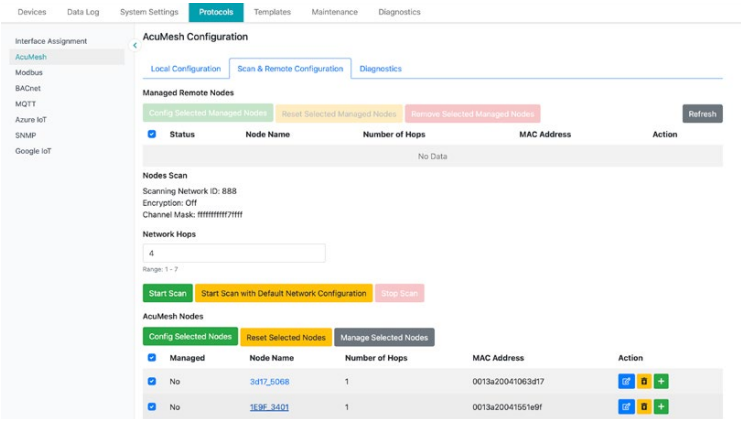


Figure 7-16 AcuLink 810 AcuMesh Device Selection

The following settings on the remote AcuMesh transceivers can be configured:

Network ID: The network ID is a hex number that is used as an AcuMesh Network Identifier. By default, the network ID is 7FFF, and the range is 0 to 7FFF hex.

NOTE: Only AcuMesh transceivers with the same matching network ID can discover and communicate with each other.

Destination MAC Address: The MAC Address of the remote AcuMesh transceivers.

Encryption Enable: Users have the option to put a password for the AcuMesh device. All radio AcuMesh devices will need to have the same password to communicate within the AcuMesh network.

Encryption Key: The encryption key is a hex number where the maximum number of characters is 32.

Advanced Options:

Baud Rate: Select the baud rate of the device, range is from 9600 to 115200.

Parity: Select the parity of the device from the drop-down list.

Stop Bit: Select the number of stop bits.

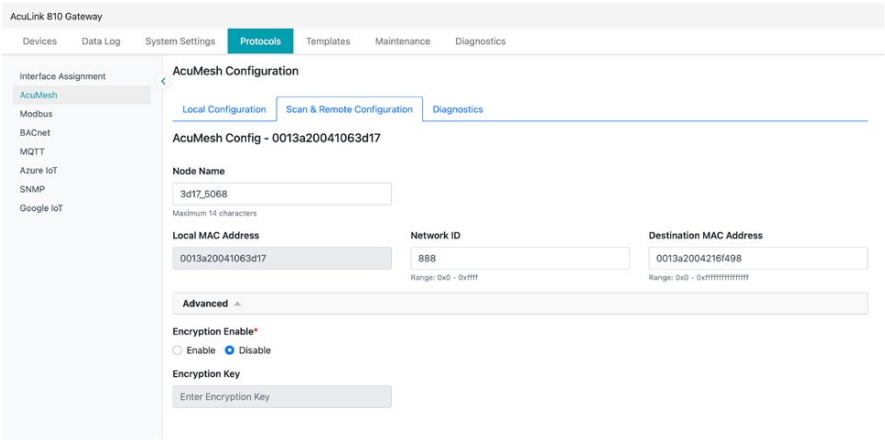


Figure 7-17 AcuLink 810 AcuMesh Device Remote Node Configuration

Managed Nodes

Users can select which AcuMesh devices to manage from the list of all discovered transceivers. The managed nodes will only allow users to see AcuMesh transceivers that are added to the AcuLink 810 managed list section. The AcuMesh transceiver must first be added from the discovered list before it can appear under the managed list section.

For example, if there is a network of 50 AcuMesh devices discovered, but only ten AcuMesh devices are added to the AcuLink 810managed list. Then only these ten transceivers will appear under the managed list section.

Users can click on the green plus icon under the Action column to add a device to the managed list. Alternatively, the check boxes can be used to select multiple transceivers and the **Manage Selected Nodes** button can be used to add multiple transceivers to the managed nodes list.

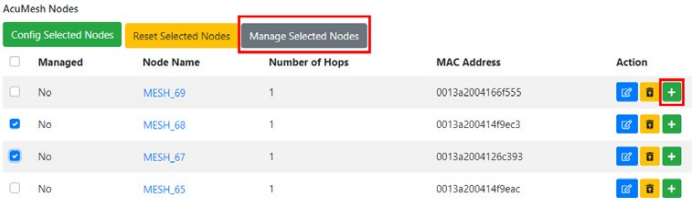


Figure 7-18 AcuLink 810 AcuMesh Nodes Management

Reset Nodes

Users can perform a soft reboot of the discovered AcuMesh transceivers. This can be very useful as sometimes communication is dropped due to timeouts and requires a reboot to initialize and restore the communication. The yellow button under the Action column will allow users to reset the AcuMesh nodes. If multiple nodes require a reset, select the check boxes to pick multiple transceivers and then click the **Reset Selected Nodes** button to reset all selected nodes.

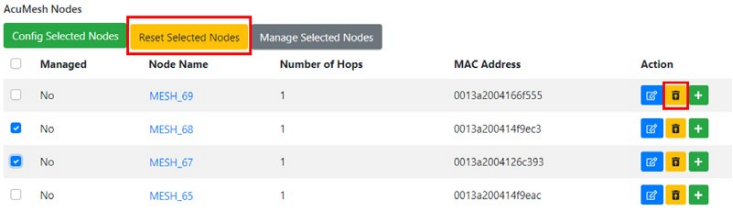


Figure 7-19 AcuLink 810 AcuMesh Nodes Reset

7.2.3 AcuMesh Diagnostics

The AcuMesh diagnostics webpage allows the user to troubleshoot the AcuMesh network connection in the AcuLink 810 to the remote AcuMesh transceivers. The test sends packets at regular intervals to test whether the AcuLink 810 receives a response from the slave AcuMesh transceivers.

Transmission Interval: Is the sending interval of the packet, the range is from 1 to 100 seconds.

Number of Packets: Is the number of packets sent in each test query.

Remote AcuMesh Node Selection: Users can choose which AcuMesh transceiver they want to test from the drop-down selection.

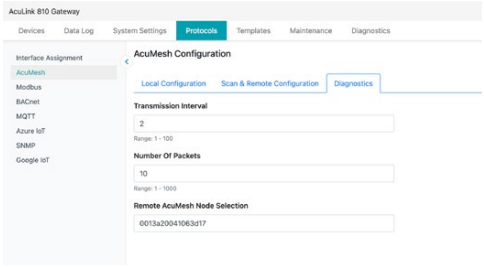


Figure 7-20 AcuLink 810 AcuMesh Diagnostics

The test result will be displayed showing the success rate and average delay of the packets sent.

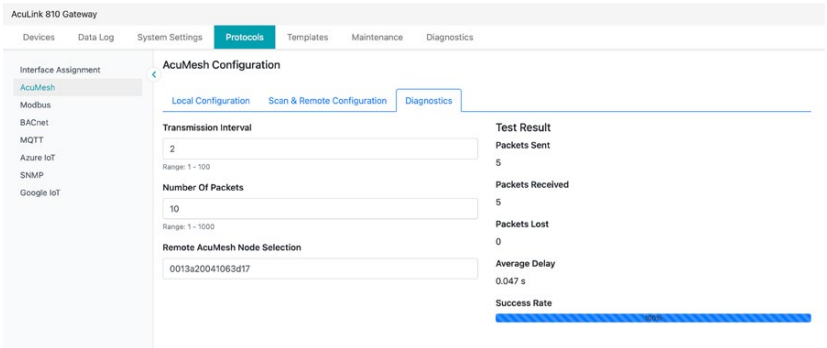


Figure 7-21 AcuLink 810 AcuMesh Diagnostics Test Result

7.2.4 Adding AcuMesh Device

To add an AcuMesh device, select **Add Device** from the **Modbus Devices** webpage. The following fields need to be configured:

Device Name: Enter a name for the device.

Serial Number: Enter the serial number of the device, the serial number must be unique and consisting of only letters and numbers.

Template: Select the correct device model.

Protocol: Select 'RTU' as the protocol.

Port: Select 'AcuMesh' as the port type.

Modbus ID: Enter in the Modbus ID that corresponds to the Modbus device.

AcuMesh MAC Address: Select the AcuMesh MAC address of the remote mesh transceiver of the Modbus device. Users can click on **Go to AcuMesh Scan & Configuration** hyperlink to discover remote AcuMesh transceivers.

Request Timeout: The default timeout setting for an AcuMesh device is ten seconds.

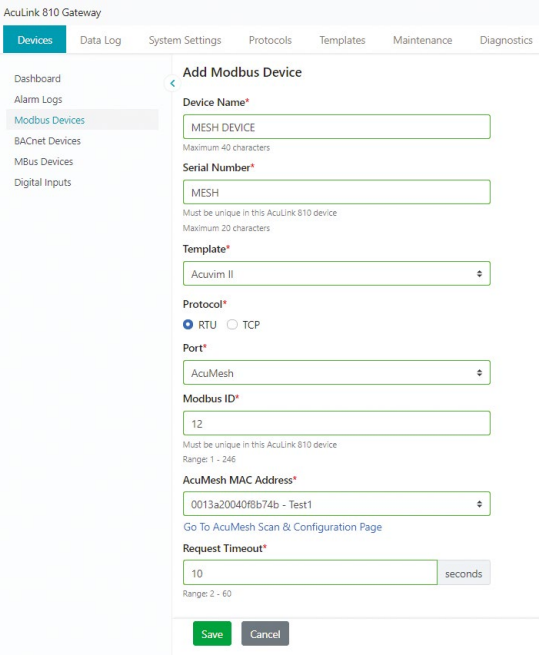


Figure 7-22 AcuLink 810 Add AcuMesh Device

After the device is added, it can be found in the **Modbus Devices** webpage. A device that is successfully connected and communicating with the gateway will have display a green **'ON'** status under the status column. A device that is offline will display a red **'OFF'** warning symbol under the status column.

NOTE: After adding a new device to the gateway, it may take up to four minutes for the status to show **'ON'**. If after four minutes the device still shows an **'OFF'** status, double-check the configuration settings to ensure everything is set correctly.

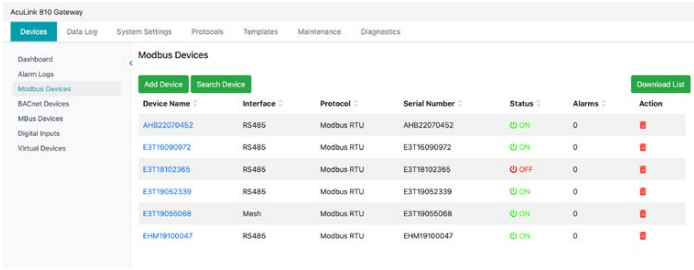


Figure 7-23 AcuLink 810 Modbus Device List

If users need to change the configuration of an added device, the user can click on the device on the list and then select the **Configuration** menu tab. From this webpage users can reset the device name, port type, AcuMesh MAC address, Modbus ID, and other fields.

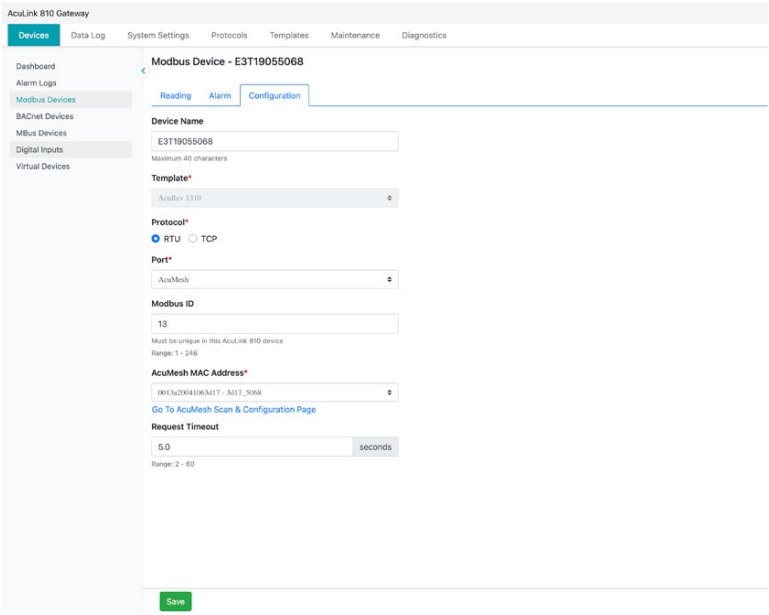


Figure 7-24 AcuLink 810 Modbus Device Edit

7.2.5 Search Modbus Device

There is a search device function in the AcuLink 810 gateway that allows the user to search for all Modbus devices that have been indexed. The search criteria are based on the template model, Modbus slave ID, baud rate, parity, and port. The search function can be useful for adding several devices to a large RS485/USB daisy chain or a large mesh network.

To access the search function, users need to click on **Search Device** on the **Modbus Device** webpage.

NOTE: 'Search Device' only supports the devices connected via Modbus RTU protocol.

The following search criteria will need to be specified:

Template: Select the Modbus template for the device.

Port: Select the port to scan for the Modbus search, users can select 'RS485', 'USB', or 'AcuMesh'.

Modbus ID Start: This will match starting slave address for the search.

Modbus ID End: This will match the ending slave address for the search.

Baud Rate: Select the baud rate(s) for the Modbus device search. Users can select multiple baud rates in the search.

Data Bit: Sets the data bit to either 7 or 8.

Stop Bit: Sets the number of stop bits to be either 0 or 1.

Parity: Users can select multiple parity in the Modbus search.

Request Timeout: Select the request timeout. The RS485 and USB default timeout is 0.5 seconds, and for AcuMesh the timeout is ten seconds.

Click on the **Scan** button once the search credentials are configured.

NOTE: Depending on the range of Modbus IDs, baud rate and parity selected the search may take several minutes to complete.

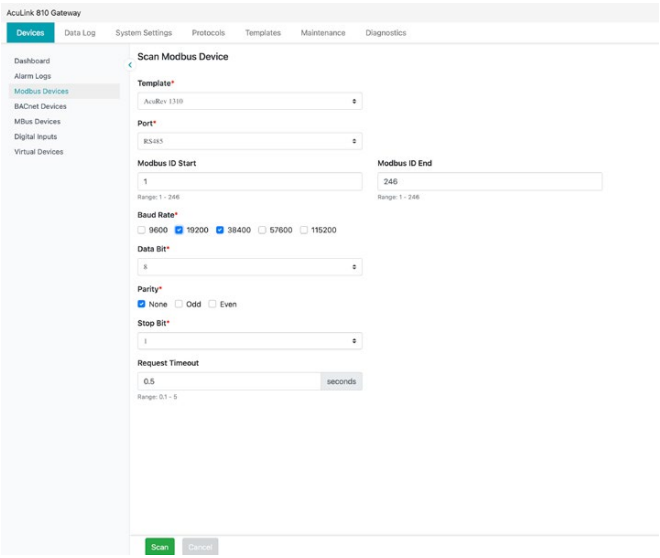


Figure 7-25 AcuLink 810 Scan Modbus Device

When the scan is complete all devices found will be displayed. Users have the option to individually add each found device and can also add all devices found by clicking on the **Add All Devices To Device List** button.

If a found device is already added to the AcuLink 810 it will be displayed as **Added** in the search results.

If a found device has an identical Modbus ID as a device that is already added to the AcuLink 810 it will be displayed as **Conflict** in the search results.

The search results show the device serial number and Modbus slave ID associated with the device. If the search is done on a AcuMesh network the AcuMesh MAC address is also displayed in the search.

Figure 7-26 AcuLink 810 Scan AcuMesh Device

7.3 Modbus Polling

The AcuLink 810 supports Modbus polling for the Digital Input registers. The user can select **Protocols**, then the subheading **Modbus** to access the Modbus Configuration webpage.

Modbus TCP Port: The default is 502, the range is from 2000 to 5999. This is also the port used for Modbus Gateway Function devices.

Modbus ID: The Modbus ID for the AcuLink 810 is 247, this cannot be changed.

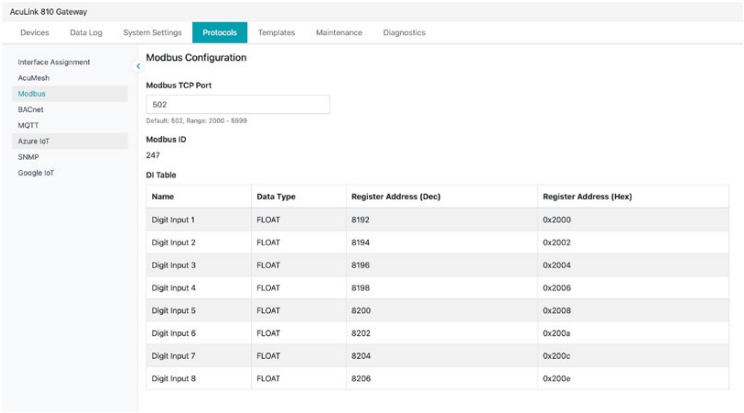


Figure 7-27 AcuLink 810 Digital Input Modbus Data Polling

The DI Modbus Registry Map is listed below:

Name	Data Type	Register Address (Dec)	Register Address (Hex)
Digital Input 1	UINT32	8192	0x2000
Digital Input 2	UINT32	8194	0x2002
Digital Input 3	UINT32	8196	0x2004
Digital Input 4	UINT32	8198	0x2006
Digital Input 5	UINT32	8200	0x2008
Digital Input 6	UINT32	8202	0x200A
Digital Input 7	UINT32	8204	0x200C
Digital Input 8	UINT32	8206	0x200E

7.4 BACnet

The AcuLink 810 supports the BACnet protocol via the BACnet MS/TP and BACnet IP. The gateway can also be configured as a BACnet gateway, as well as a BBMD (BACnet Broadcast Messaging Device). The following section will provide an overview on configuring the BACnet protocol on the AcuLink 810 from the webpage.

7.4.1 BACnet MS/TP Assignment

To use the BACnet MS/TP, the protocol must be assigned as BACnet for RS485 and USB devices from the **Interface Assignment** webpage under the **Protocols** menu tab.

NOTE: Users can have one of the ports selected as Modbus and the other selected as BACnet.

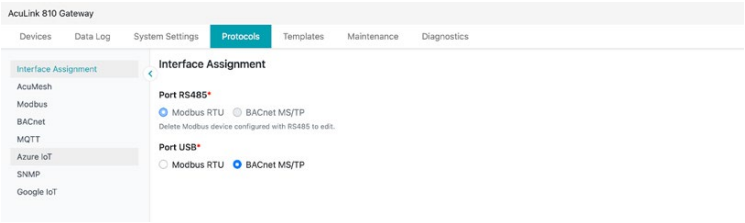


Figure 7-28 AcuLink 810 BACnet MS/TP Assignment

From the Protocols webpage select **BACnet** from the left side panel. In the BACnet webpage under the **Acquisitor** menu tab users can configure the BACnet MS/TP settings pertaining to RS485 and USB.

The following fields can be configured for BACnet MS/TP over both USB and RS485:

Client APDU Timeout: The time in seconds that the client will wait for a response after sending a request. The default time is 3-seconds, and the range is 250 milliseconds to 6 seconds.

Client APDU Retries: The number of times the client will retry a request when a response is not received. The default setting is 2 retries, and the range is from 0 to 10 retries.

MS/TP MAC Address: Used to address devices on the BACnet network, the default address is 1 and the range is from 1 to 127.

Max Master: Defines the number of allowable addresses for the MS/TP master nodes on the network, the default is 127 and the range is 1 to 127.

Max Info Frames: The maximum amount of information frames sent to a node before it passes

the token. The default is 1 and the range is from 1 to 100 information frames.

Baud Rate: Select the baud rate, the default is 19200 and the range is from 9600 to 11520.

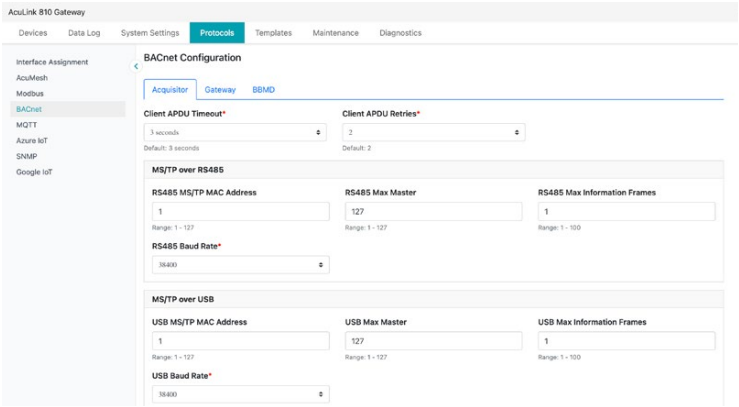


Figure 7-29 AcuLink 810 BACnet Setting

BACnet MS/TP via RS485

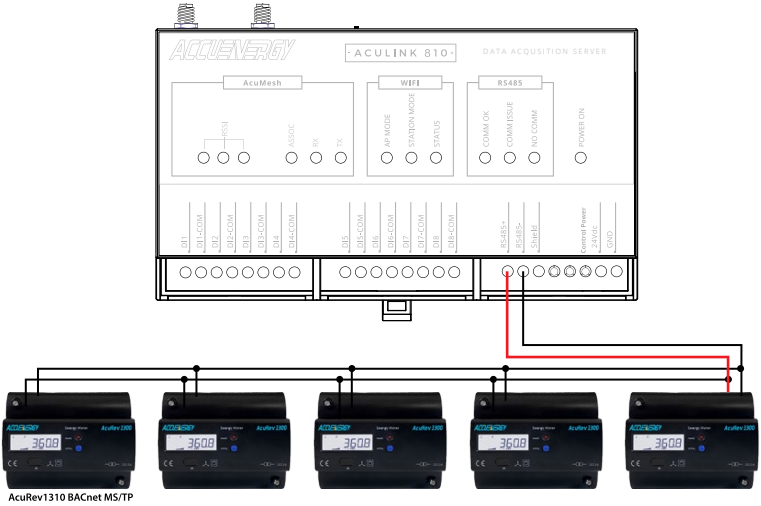


Figure 7-30 AcuLink 810 BACnet MS/TP via RS485 Protocol

BACnet MS/TP via USB

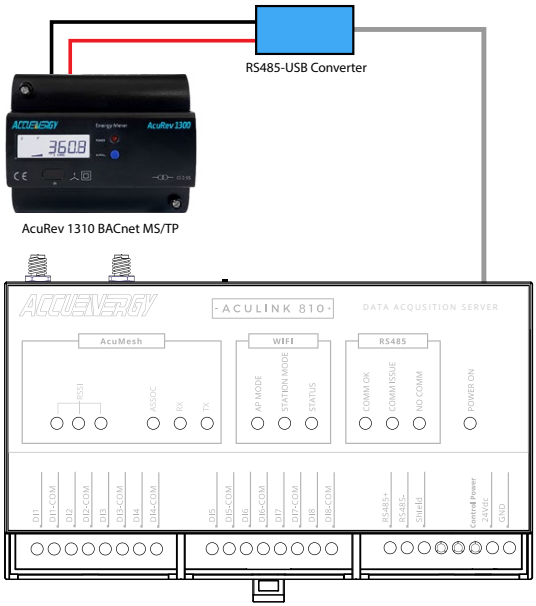


Figure 7-31 AcuLink 810 BACnet MS/TP via RS485 to USB Converter

7.4.2 Adding BACnet MS/TP Device

With the BACnet MS/TP protocol selected for either USB and/or RS485, users can add a BACnet device to the AcuLink 810 on the **BACnet Devices** webpage located under the **Devices** menu tab.

Click on **Add Device**, the following fields will need to be configured:

- **Device Name:** Enter a name for the meter.
- **Serial Number:** Enter the serial number of the device, the serial number must be unique and consisting of only letters and numbers.
- **Device Model:** Select the device model from the drop-down list.
- **Port:** Users can select either RS485 or USB.
- **Device Instance:** Enter the device instance number, the range is from 0 to 4194302. It must be unique to this AcuLink 810 device.
- **Auto Save Logger:** Select logger for the meter from drop-down list.

Click **Save** once all settings are entered correctly.

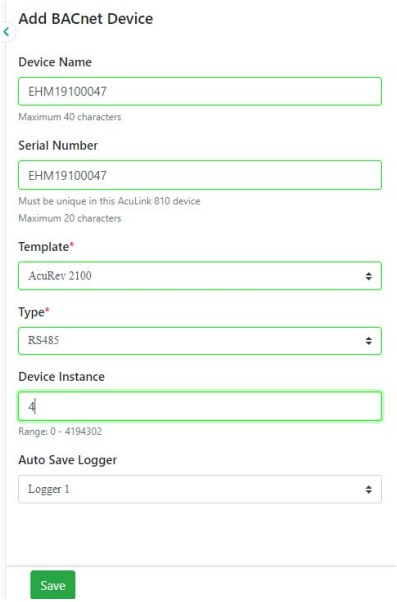


Figure 7-32 AcuLink 810 Add BACnet Device

After the device is added, it can be found in the **BACnet Devices** section under the **Devices** tab. A device that is successfully connected and communicating with the gateway will have display a green 'ON' status under the status column. A device that is offline will display a red 'OFF' warning symbol under the status column.

Figure 7-33 AcuLink 810 BACnet Device List

NOTE: After adding a new device to the gateway, it may take up to four minutes for the status to show **'ON'**. If after four minutes the device still shows an **'OFF'** status, check the configuration settings again to ensure everything is set correctly.

If changes to the configuration of the added device is needed, click on the device and then select the **Configuration**. From this webpage users can reset the device name, port type, and Device Instance. Click the **Save** button to confirm the changes.

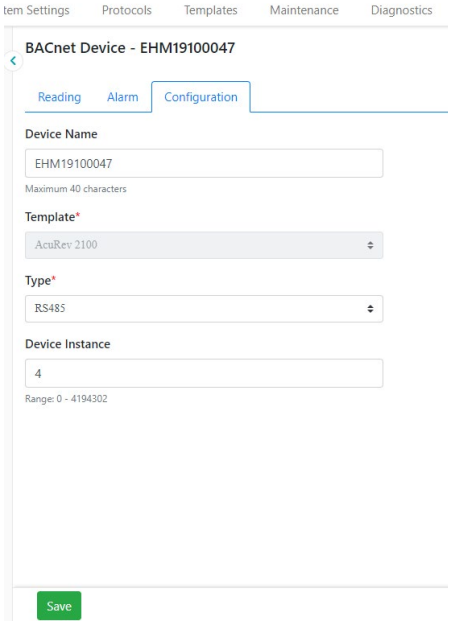


Figure 7-34 AcuLink 810 BACnet Device Edit

7.4.3 BACnet IP Configuration

The AcuLink 810 supports BACnet IP devices, users must configure and enable BACnet IP from the **BACnet** webpage from the **Protocols** menu tab.

BACnet IP Client Enable: Enable the BACnet IP protocol.

Figure 7-35 AcuLink 810 BACnet IP Configuration

BACnet IP Client Interface: Select which interface the BACnet IP network is on, users can select Ethernet 1, Ethernet 2, or Wi-Fi.

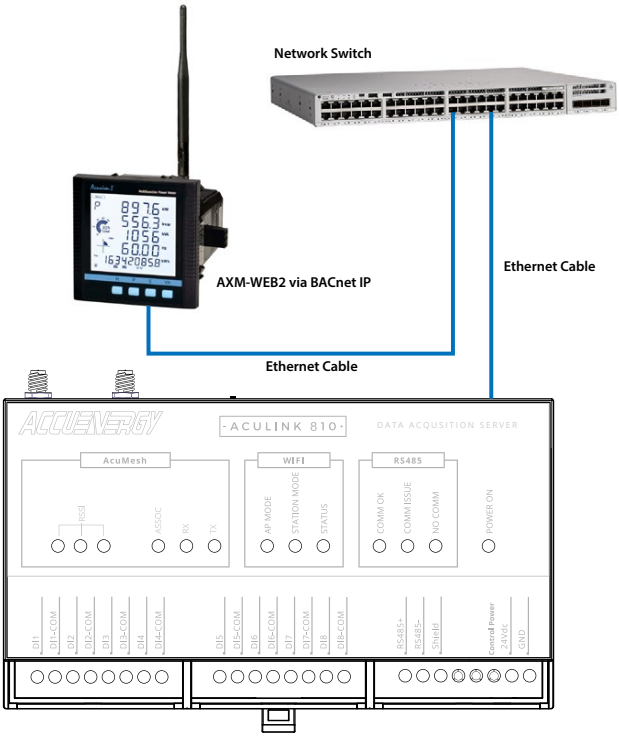


Figure 7-36 AcuLink 810 BACnet IP Networks

7.4.4 Adding BACnet IP Device

With the BACnet IP enabled, users can add a **BACnet device** to the AcuLink 810 on the **BACnet Devices** webpage located under the **Devices** menu tab.

Click on **Add Device**, and the following fields will need to be configured:

- **Device Name:** Enter the name of the meter.
- **Serial Number:** Enter the serial number of the device, the serial number must be unique and consisting of only letters and numbers.
- **Template:** Select the device model from the drop-down list.

- **Type:** Select the type as IP.
- **Port:** Enter in the BACnet port configured for the device, the range is from 47808 to 49000.
- **Device Instance:** Enter the device instance number, it must be unique in this AcuLink 810device. The range is from 0 to 4194302.
- **Auto Save Logger**: Select logger for meter from drop-down list.

NOTE: Ensure that BACnet IP Client is enabled in the BACnet Configuration webpage to add a BACnet IP device to the AcuLink 810.

Click on the **Save** button once all fields are configured.

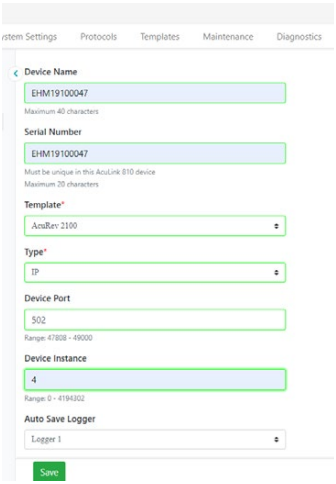


Figure 7-37 AcuLink 810 BACnet Device Editing

After the device is added, it can be found in the **BACnet Devices** section under the **Devices** menu tab.

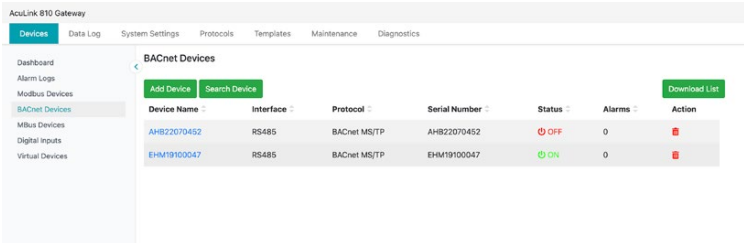


Figure 7-38 AcuLink 810 BACnet Device List

NOTE: After adding a new device to the gateway, it may take up to four minutes for the status to show **'ON'**. If after four minutes the device still shows an **'OFF'** status, check the configuration settings to ensure everything is set correctly.

If changes to the configuration of the added device is needed, click on the device and then select the **Configuration**. From this webpage users can reset the device name, port type, and Device Instance and Device port. Click on the **Save** button to confirm the changes.

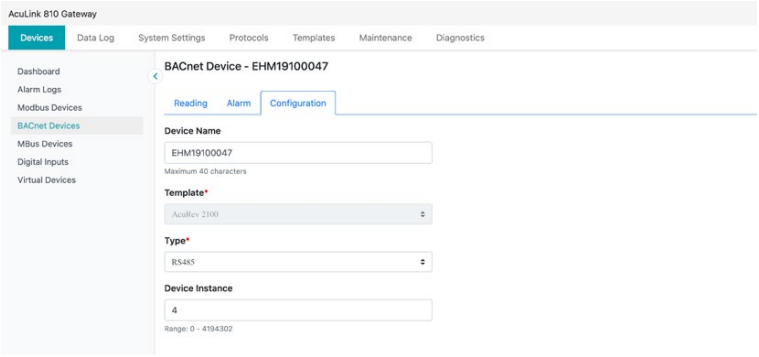


Figure 7-39 AcuLink 810 BACnet Device Configuration

7.4.5 Search BACnet Device

The AcuLink 810 supports a BACnet search function that allows users to add BACnet devices to the AcuLink 810 automatically by searching the BACnet network. This feature can be found on the **BACnet Device** webpage under the **Device** menu tab.

Click on **Search Device**, and the following search criteria will need to be specified:

Interface: Users can select 'Ethernet', 'RS485', or 'USB' for the device search.

NOTE: To use RS485 or USB for search ensure that the interface assignment is selected as BACnet. Also, to use Ethernet or Wi-Fi in the BACnet search, ensure that BACnet IP is enabled on the AcuLink 810.

Search From (Device Instance): Enter the starting instance number in the search, the range is from 0 to 4194302.

Search To (Device Instance): Enter the ending instance number in the search, the range is from 0 to 4194302.

Click on the **Scan** button once the search criteria has been entered correctly.

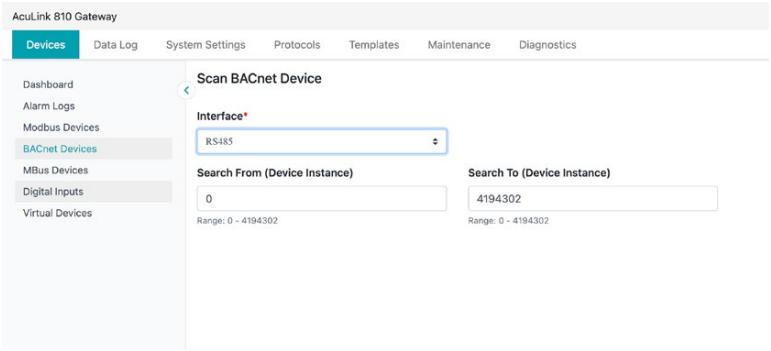


Figure 7-40 AcuLink 810 Search BACnet Device Setting

NOTE: Depending on the range and number of devices in the network the search may take several minutes to complete.

Users can individually add the found devices to the BACnet device list after the scan is complete. To add the BACnet device the template must be added and installed on to the AcuLink 810.

If a found device is already added to the AcuLink 810 the search will display **Added** in the search results.

If a found device has a device instance already added to the gateway the search will display **Conflict** in the search results.

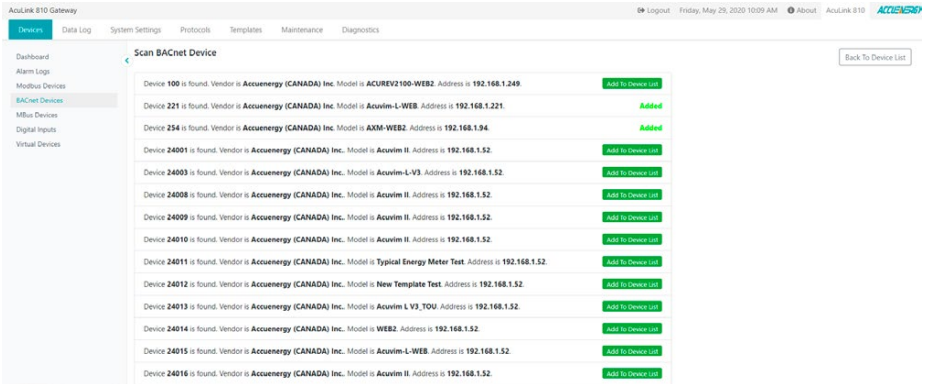


Figure 7-41 AcuLink 810 Search BACnet Device List

7.4.6 BACnet Gateway

AcuLink 810 can also work as a BACnet gateway device allowing it to read both Modbus and BACnet devices simultaneously in a BACnet network. Users can have both Modbus and BACnet devices simultaneously via USB and RS485 ports, as well as both Modbus TCP, BACnet IP, and MBus devices on the AcuLink 810.

To configure the BACnet gateway setting click on the **Protocols** menu tab, then select **BACnet** from the left menu, and select the **Gateway** menu tab. The following fields can be configured for the BACnet gateway settings:

Gateway Enable: Select Enable to set the AcuLink 810 as a BACnet gateway.

UDP Port: The default port is 47808, users can configure from 47808 to 49000.

Device Object Name: Users can configure the object name for the gateway.

Device Instance: Configure a unique device instance number for the AcuLink 810.

Network Number: The network number identifies a network within a BACnet system. The default number is 1 and the range is from 1 to 65534.

Advertised APDU Timeout: The default APDU timeout is 3 seconds, and the range is from 3-60 seconds.

Advertised APDU Retries: The default APDU retry is 2, and the range for the setting is from 0 to 10 retries.

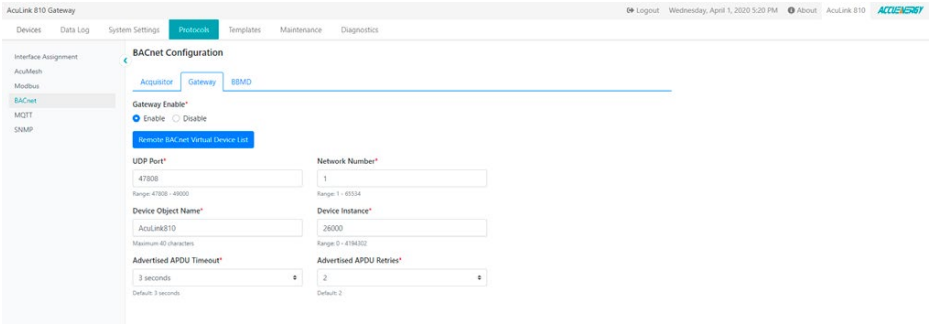


Figure 7-42 AcuLink 810 BACnet Gateway Function Setting

The **Remote BACnet Virtual Device List** allows users to see what devices are accessible via the BACnet gateway. The list provides the user with the device name, serial number, protocol that is used via the AcuLink 810 and the instance number assigned to it in the BACnet network. The BACnet virtual list can be exported as a .csv file for user reference.

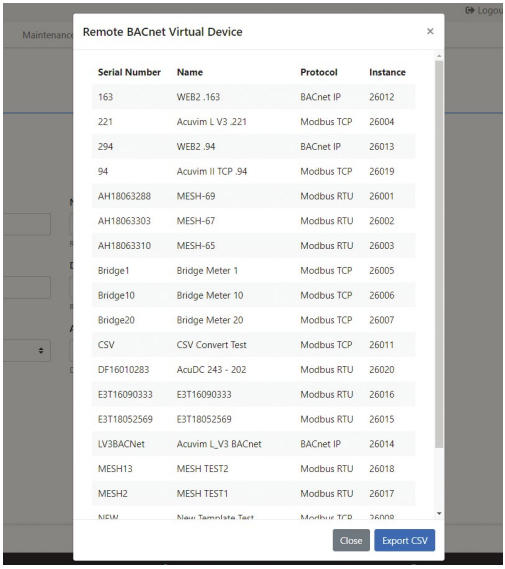


Figure 7-43 AcuLink 810 Remote BACnet Virtual Device List

7.4.7 BBMD

In BACnet IP systems there are several broadcast messages that are used; however, these messages are normally blocked since most BACnet IP devices are connected to an IP router. BBMD stands for BACnet Broadcast Management Device and is used to allow for IP broadcasting to locate and communicate with other BACnet devices.

BBMD Mode: Users can select the following options for BBMD:

- **Allowing incoming FDR:** Foreign Device Registration allows the AcuLink 810 to send its broadcast message to a BBMD.
- **Full BBMD:** Allows the AcuLink 810 to send broadcast messages to other BBMDs.
- **Disable:** Disables BBMD
- **BBMD Address List:** Users can enter the IP address of the BBMD.

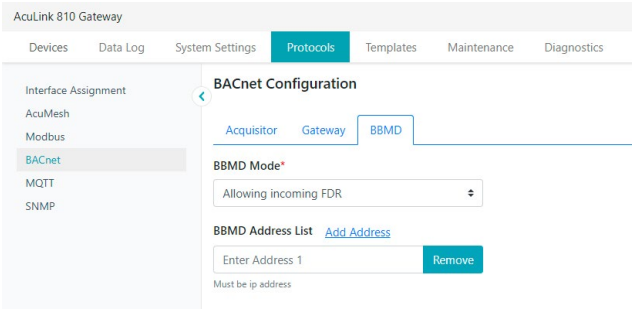


Figure 7-44 AcuLink 810 BACnet BBMD Setting

7.5 MQTT Protocol

The AcuLink 810 supports the MQTT protocol where the gateway can publish device data to a subscriber using an MQTT broker. The MQTT broker is a central server where all MQTT clients will connect to. The broker/server manages all message topics and updates new messages to all clients that are subscribed to a particular topic (AcuLink 810). All related MQTT settings can be configured in the **MQTT** webpage under the **Protocols** menu tab.

7.5.1 MQTT General Settings

Under the **General** menu tab in the **MQTT** webpage, users can enable the MQTT protocol and configure the broker settings.

Enable MQTT: Select Enable to use the MQTT protocol.

Broker Address: Enter the broker address of the MQTT server.

Broker Port: Enter the port number for the MQTT Broker.

Client ID: Enter the Client ID for the AcuLink 810; must be a unique ID number.

Keep Alive: The client communicates a time interval in seconds to the broker, "Keep-Alive" is the maximum length of time in seconds that the broker and the client cannot communicate with each other.

Timeout: Enter the timeout setting time in seconds.

Once all settings are configured click the **Save** button. The connection to the broker can be tested by using the **Test MQTT** button.

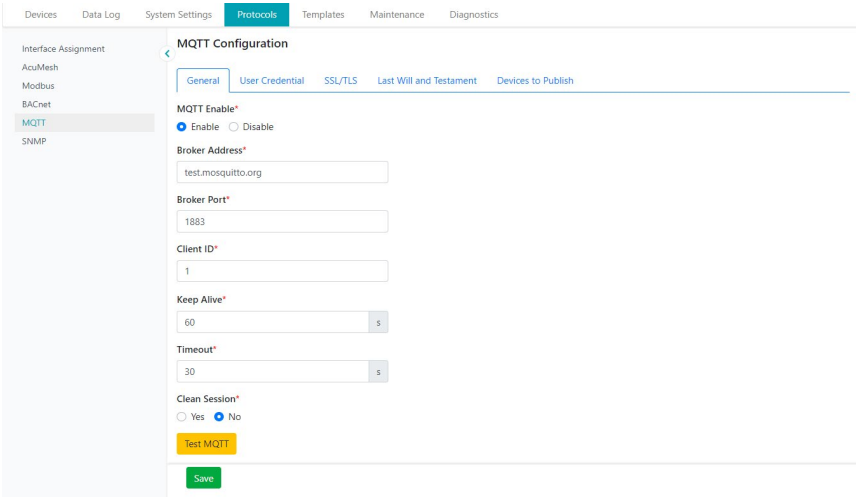


Figure 7-45 AcuLink 810 MQTT Setting

7.5.2 MQTT Authentication

The User Credential tab allows users to configure a Username and Password authentication if the broker can support it.

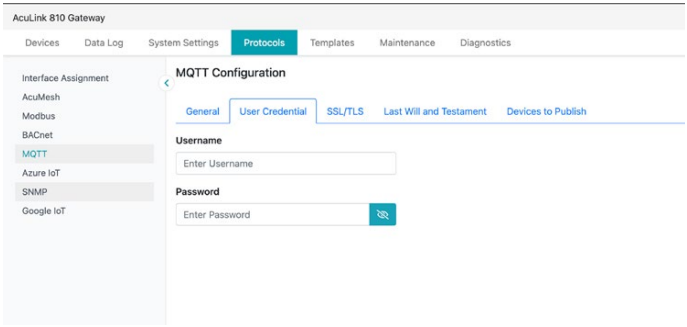


Figure 7-46 AcuLink 810 MQTT Authentication Setting

7.5.3 MQTT Encryption

The **SSL/TLS** tab allows users to use the MQTT protocol with an encryption.

In this webpage users will be able to upload the required certificate and key files.

File Name Identifier: For each file type. AcuLink 810 displays a valid filename to help users select the correct file for uploading.

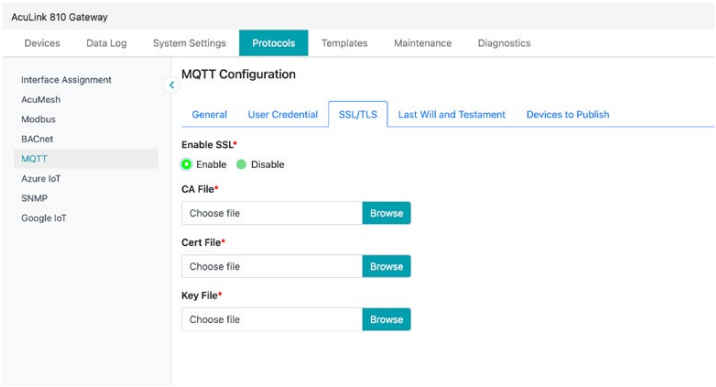


Figure 7-47 AcuLink 810 MQTT Encryption Setting

7.5.4 Last Will & Testament

The AcuLink 810 supports Last Will and Testament messages via the MQTT protocol. These settings can be configured under **the Last Will & Testament tab**.

The last will and testament message is used to notify other clients regarding other disconnected clients. The message is an MQTT message that contains a topic, a QoS level and a payload.

Topic: Refers to the path used to access the MQTT message.

QoS: Stands for Quality of Service and refers to the reliability of the message delivery between the publisher and subscriber.

There are three types of quality of service:

- **QoS 0:** The lowest level and is defined as “at most once” delivery. This level has the fastest message delivery, but the success rate of delivery is less reliable.
- **QoS 1:** Defined as “at least once” delivery. These types of messages are reliable and are

guaranteed, however the messaged may be sent as duplicates several times.

- **QoS 2** - Is the highest level and is defined as "exactly once" delivery. These messages are more reliable and are guaranteed to be sent once without any duplicates. This type of messaging sent are the most reliable, however it has a slower message delivery. Each client can optionally specify its own LWT message when it connects to a broker. The broker stores this message so that if the client disconnects ungracefully, the broker will send the disconnected client's LWT message to all the other clients that are subscribed to that last will message topic.

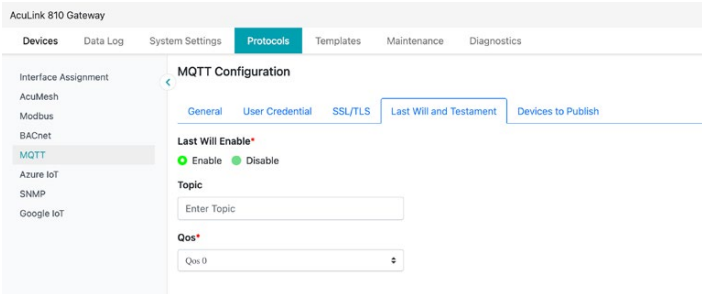


Figure 7-48 AcuLink 810 MQTT Last Will and Testament Setting

7.5.5 Device Publishing

Under the **Devices to Publish** menu tab users can configure the sending interval and devices data they want to publish to the broker.

All Meters Use One Topic: If selected as **Yes** users can use one topic for reading all published devices, however if **No** is selected users will need to configure a base topic.

Topic: Users will enter in the topic used to read all devices.

Base Topic: Users can enter in the topic, is usually a base topic followed by the serial number of the device.

QoS: Users can configure the quality-of-service level, where 'Qos 0' is the lowest level and 'Qos 2' is the highest level.

Retained: Users have the option retain messages or not. If a client retains messages that was published to topic, a second client that is subscribed to the same topic will be able to see the

retained message.

Interval: Users can select the publishing interval; the range is from 10 to 600 seconds.

Payload Format: Users can select from two different payload formats.

Select Devices to Publish: Users can select Modbus RTU/TCP devices, BACnet MS/TP, BACnetIP, or MBus devices and the Digital Input counter to publish to the MQTT broker.

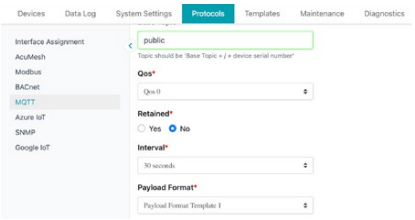


Figure 7-49a AcuLink 810 MQTT Device to Publish Setting-1

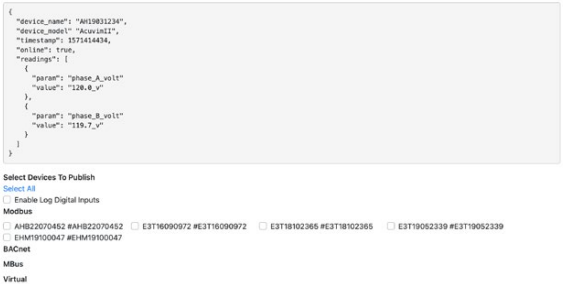


Figure 7-49b AcuLink 810 MQTT Device to Publish Setting-2

7.6 Azure IoT

The **Azure** Internet of Things (**IoT**) is a collection of Microsoft cloud services that allow the user to have reliable device to cloud communication. **Azure IoT hub** is a managed **IoT** service which is hosted in the cloud and allows for bi-directional communication between **IoT** applications and the devices. This cloud-to-device connectivity means that you can receive data from your devices, but you can also send commands back to the device. The AcuLink 810 supports **Azure IoT** device posting where users can send Modbus, BACnet, MBus, and Virtual Devices to the IoT Hub.

Once connected on Azure, users can also configure settings on the AcuLink 810 from Azure via device twin. The following settings need to be configured.

Azure IoT Enable: Allow users to enable or disable Azure IoT.

Primary Connection String: Enter in the primary connection string for the IoT Hub. Secondary Connection String: Enter in the secondary connection string for the IoT Hub.

Interval: Select how often to post to the IoT Hub, the range is from 10 to 600 seconds.

Enable SSL: When the AcuLink 810 connects to Azure X509 IoT device/IoT Edge device, users can enable SSL where they can upload a certificate and key file for encrypted posts.

Select Devices to Publish: Users can select Modbus RTU/TCP devices, BACnet MS/TP or BACnet IP devices, or MBus devices and the Digital Input counter to publish to the Azure IoT Server.

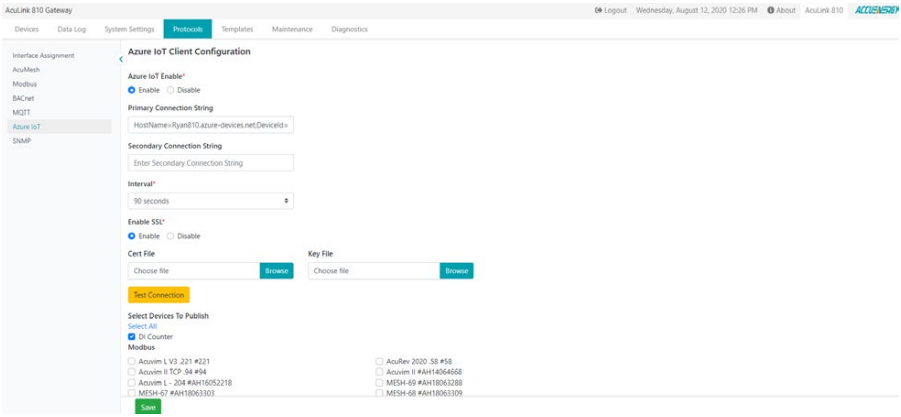


Figure 7-50 AcuLink 810 Azure IoT Client Configuration

7.6.1 Creating Azure IoT Device on Azure Portal Server

1. Sign into the Azure Portal (https://portal.azure.com).

2. From the Azure homepage, select the + **Create a resource** button, and then enter 'IoT Hub' in the **Search the Marketplace** field.

3. Select IoT Hub from the search results, and then select **Create**.

4. On the **Basics** menu tab, complete the fields as follows:

- **Subscription:** Select the subscription to use for your hub.
- **Resource Group:** Select a resource group or create a new one. To create a new one, select **Create new** and fill in the name you want to use. To use an existing resource group, select that resource group from the drop-down menu. For more information, see Manage Azure Resource Manager resource groups.
- **Region:** Select the region in which you want your hub to be located. Select the location closest to you. Some features, such as IoT Hub device streams are only available in specific regions. For these limited features, you must select one of the supported regions.
- **IoT Hub Name:** Enter a name for the IoT hub. This name must be globally unique. If the name you enter is available, a green check mark appears.

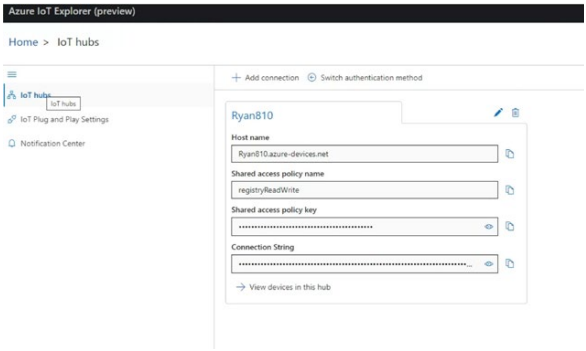


Figure 7-51 Azure IoT Hub Server Configuration

7.6.2 Create an IoT Devices /IoT Edge Device in the Azure Portal

In IoT Hub in the Azure portal, IoT Edge devices are created and managed separately from IoT devices that are not edge enabled.

1. Sign into the Azure Portal and navigate to IoT hub.
2. In the left panel, select **IoT devices/IoT Edge** from the menu.
3. Select **New/Add an IoT Edge device**.
4. Provide a descriptive device ID. Use the default settings to auto-generate authentication keys and connect the new device to the hub.
5. Select an authentication type.

Users can select Symmetric key or X.509 CA signed.

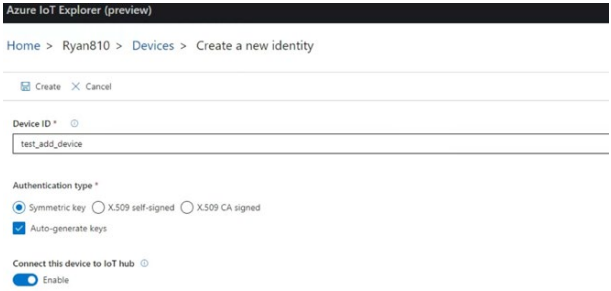


Figure 7-52 Create a Device on Azure IoT Hub Server

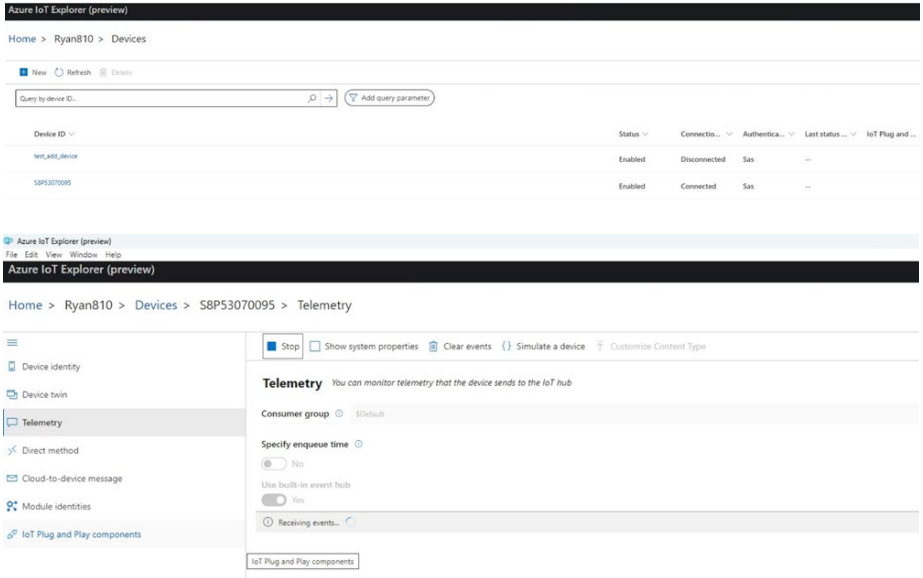


Figure 7-53 Azure IoT Hub Server Device List

7.6.3 Retrieving Connection String in the Azure Portal

SAS IoT device/IoT Edge device:

When users are ready to set up their device, users will need the connection string that links the user's physical device with its identity in the IoT hub.

1. From the **IoT devices/IoT Edge** webpage in the portal, click on the device ID from the list of IoT Edge devices.
2. Copy the value of either **Primary Connection String** or **Secondary Connection String**.

X.509 IoT device/IoT Edge device:

Connection string is defined as: "HostName=<host_name>;DeviceId=<device_id>;x509=true"

7.6.4 Configure AcuLink 810 from Azure

AcuLink 810 support device twins desired properties to synchronize device configuration or conditions, where the AcuLink 810 can configure the NTP and Azure IoT configuration from the Azure portal.

The configuration is defined in desired properties:

```
{
"properties": { "desired": {
        "ntpConfig": {
                "enable": true,
                "ntpServer1": "0.us.pool.ntp.org",
                "ntpServer2": "",
                "ntpServer3": "",
                "timeZone": "America/Toronto",
                "lastUpdateTimestamp": 1595876093
        },
```

```
        "azureConfig": {
                        "azureIoTEnable": true,
                        "primaryConnectionString": "HostName=AcuLink810.azure-devices.net;DeviceId=810pc;x509=true",
                        "secondaryConnectionString": "",
                        "sslEnable": true
                        },
        "existingProperty": "otherNewValue",
        "otherOldProperty": null
        }
    }
}
```


7.7 SNMP

The AcuLink 810 supports the Simple Network Management Protocol (SNMP) which allows for reporting the AcuLink 810 device data to the management station. The SNMP settings can be found on the **SNMP** webpage under the **Protocols** tab.

SNMP Enable: Select 'Enable' for the SNMP protocol.

SNMP Version: Users can select either 'SNMPv2c' or 'SNMPv3'.

Version 2: Requires a read only community string to be configured.

Version 3: Requires authentication and privacy protocol.

Port: The default SNMP port is 161, the range is from 16100 to 16199.

The AcuLink 810 also supports SNMP trap notifications, where the user can receive a trap notification for any alarms that are triggered for devices on the AcuLink 810.

Trap Enable: Select enable for trap notifications.

Trap Target 1-4: Users can configure up to four trap targets, where the trap targets must be an IP address.

Buffer Size: Enter the size of the buffer for the number of notifications will be stored before being sent to the management station. A maximum of thirty (30) notifications can be stored.

Report Hold Time: Enter the time in seconds for how long the notification will be in queued before it gets sent to the management station. By default, this setting is configured to 0 so the notification will be sent immediately after an event occurs. This setting could be configured from 0 to 30 seconds.

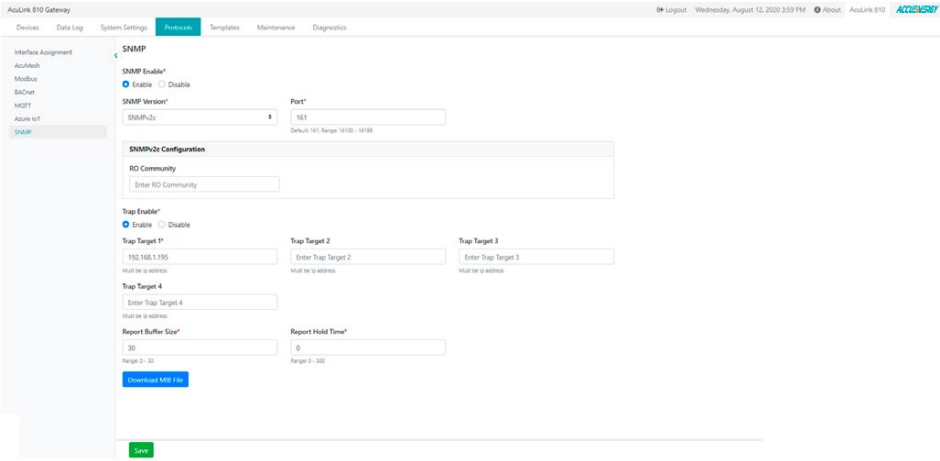


Figure 7-54a AcuLink 810 SNMP Setting-1

7.7.1 MIB File

The SNMP MIB file includes all the device data objects required to read the device on a SNMP system. The MIB file of the AcuLink 810 can be downloaded directly from the webpage in the **SNMP** webpage. When downloading the SNMP file, it will be downloaded as a zip folder including the individual MIB files that are all device models on the AcuLink 810.

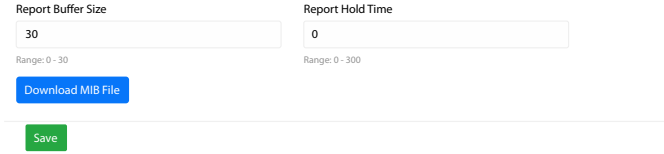


Figure 7-54b AcuLink 810 SNMP Setting-2

7.8 MBus

The AcuLink 810 supports MBus devices, where the user can add MBus devices to the AcuLink 810 via an Mbus TCP/IP master. Mbus meters are typically used for reading water, gas, and electricity.

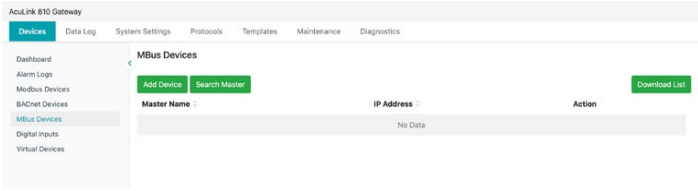


Figure 7-55 AcuLink 810 MBus Setting

7.8.1 Adding MBus Device

To add a MBus device, select **MBus** under the **Devices** menu tab. Users will first need to add the MBus master device, click on the **Add Device** button. Enter in the following:

Master Name: Enter the name for the master device.

Master IP Address: Enter the IP address of the master device.

Master Port: Enter the port number for the master device, the range is from 1 to 65535.

Click on the **Save** button once complete.

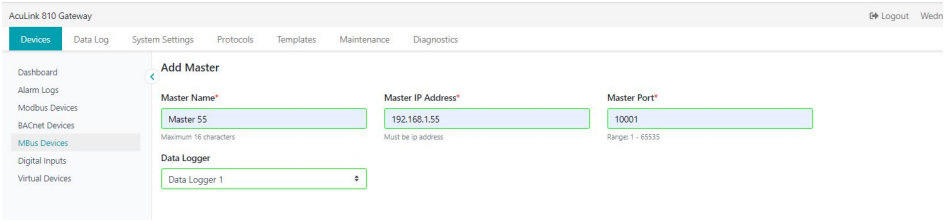


Figure 7-56 AcuLink 810 Add a MBus Device

The added master will show up on the MBus Device webpage.

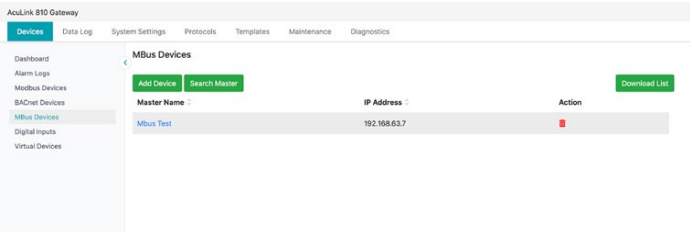


Figure 7-57 AcuLink 810 MBus Device List

Alternatively, Users can Search for the master device. Click on **Search Master**.

The following is required for the search criteria:

Start IP Address: Enter the starting IP range for the search.

End IP Address: Enter the ending IP range for the search.

Master Port: Enter the master port with a range from 1 to 65535.

Click on the **Scan** button once the search criteria has been completed.

When the scan has completed, all masters discovered will appear in the search results, users will have the option to add them individually or can use the **Add All Devices To Devices List** button to add all discovered MBus masters.

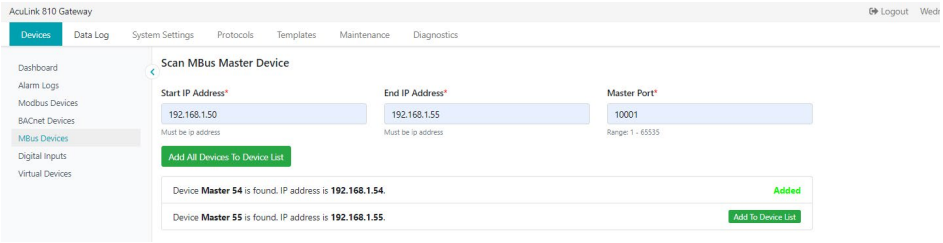


Figure 7-58 AcuLink 810 Search Master Device

To add the MBus slave devices, click on the Master from Mbus webpage to be redirected to the following webpage.

From this webpage users can change the Master Name, however the IP and Master Port cannot be modified. From here users can add Mbus devices to the AcuLink 810.

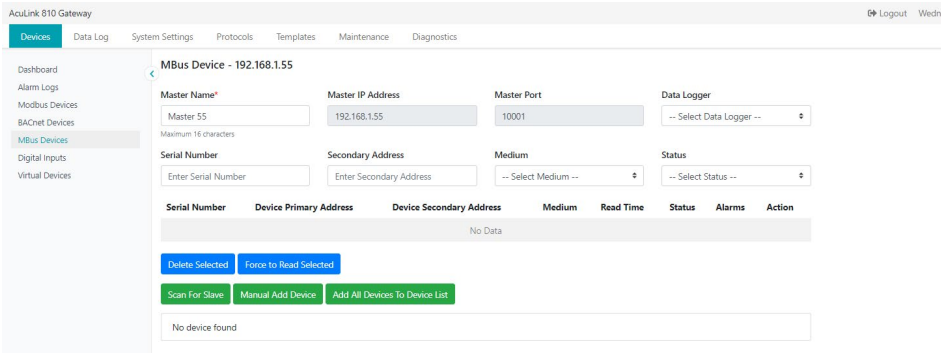


Figure 7-59 AcuLink 810 MBus Device Setting

Scanning for MBus Devices

Users can run a scan to search for all available Mbus slaves on the master by selecting the **Scan For Slave** button.

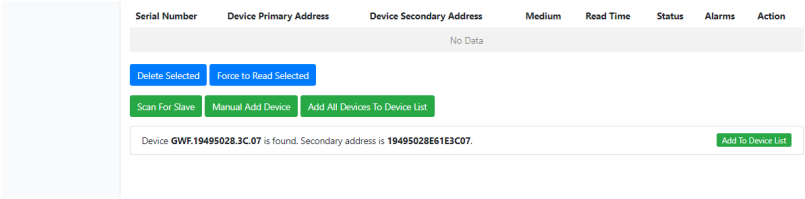


Figure 7-60 AcuLink 810 MBus Device Scanning

Once the slave device is added it will show up on this webpage under the **Added Slaves** section. The serial number, device primary address, and device secondary address will be displayed. The status **'ON'** will indicate the meter is online, **'OFF'** will indicate the meter is offline.

Users can delete the device from this webpage by clicking on the trash icon button under the Action column. If there are several Mbus devices added, users can use the filter to sort and filter the MBus devices by serial number, secondary address, medium, and status.

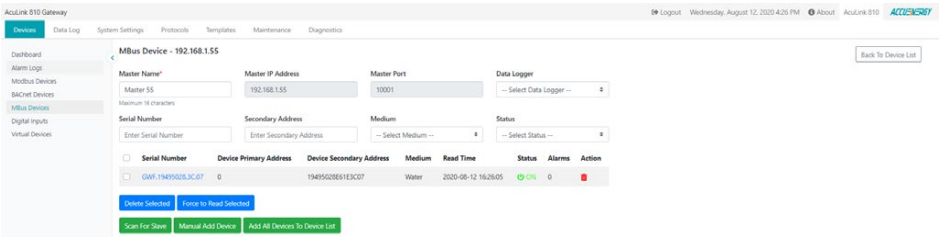


Figure 7-61 AcuLink 810 MBus Master Device Configuration

Users can perform a force read for the selected MBus devices; this will provide users with the latest data from the device. The read time will be updated to notify users of the read.

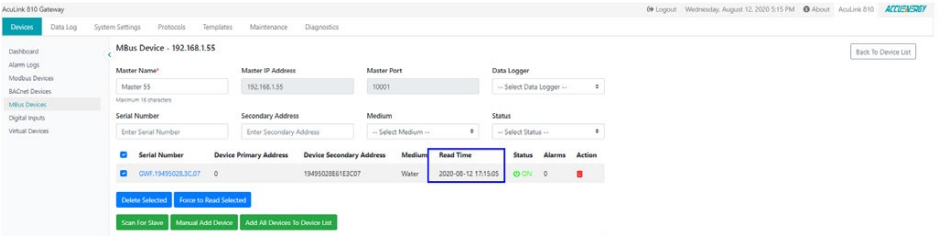


Figure 7-62 AcuLink 810 MBus Master Device Added

Adding MBus Device Manually

Users can add Mbus devices manually by entering the secondary address (required). Once the address is entered, click on **Add**.

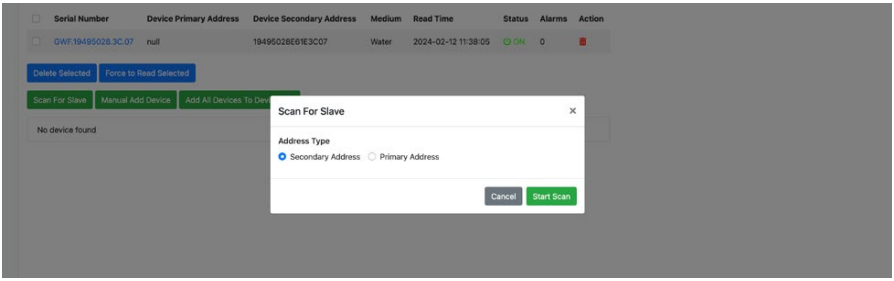


Figure 7-63 AcuLink 810 Add MBus Device Manually

Data Logging for MBus Devices

Data logging for MBus devices can be done directly from the **MBus Device** webpage. Under the **Data Logger** drop-down menu, users can select which data logger to use for the MBus device.

Alternatively, users can also specify which MBus devices to log under the Data Loggers configuration webpage (Data Log > Data Loggers).

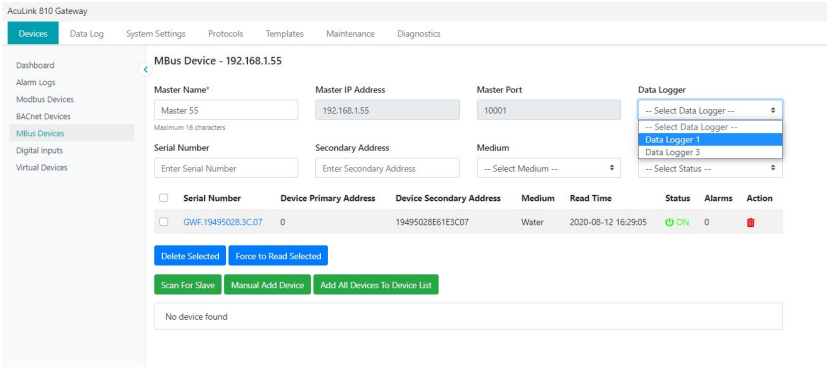


Figure 7-64 AcuLink 810 MBus Datalog Selecting

7.9 Virtual Device

The AcuLink 810 supports the creation of a virtual device which allows users to create a device based on certain calculations/formulas of the devices already added to the AcuLink 810. Select **Virtual Devices** under the **Devices** menu tab and click on **Add Virtual Device**.

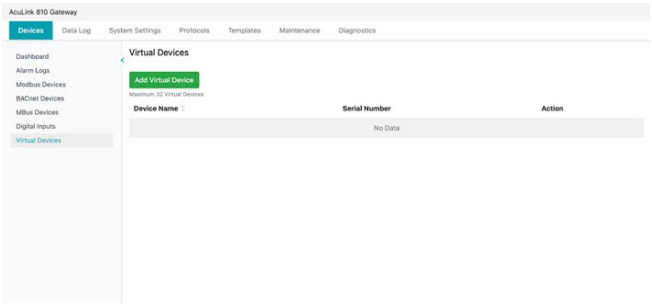


Figure 7-65 AcuLink 810 Virtual Device List

Users will be required to enter a device name for the virtual device. Once the name is entered for the device, click on the **Add Virtual Parameter** button to start creating and adding the virtual parameters.

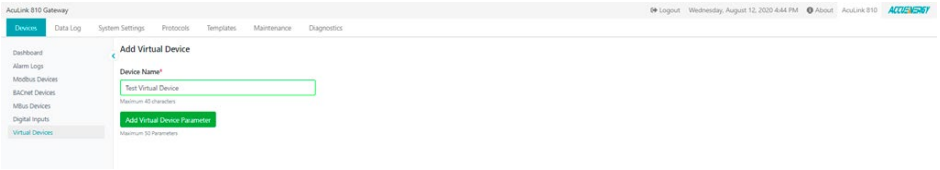


Figure 7-66 AcuLink 810 Add Virtual Device

7.9.1 Adding Virtual Parameter

The following settings will need to be configured to add the Virtual parameters.

- **Parameter Name** - Enter a parameter name for the virtual device.
- **Unit** - Enter the unit that will be used for the virtual parameter.
- **Parameter Type** - Can be selected as either 'Realtime' or 'Accumulative'.

Calculated Meter Formula - The meter formula can be created by clicking on the **Select Device Parameter** button. This will allow users to select existing parameters from Modbus, BACnet and MBus devices already added to the AcuLink 810. Once users have the parameters selected from the existing device click on **Select**, users will notice the parameter is added into the meter formula bar. Users also have the option to add math operators to their calculated meter formula such as addition (+), subtraction (-), multiplication (*), and division (/).

Users can add another parameter to the virtual device by clicking on the **Add Virtual Device Parameter**, and it can have up to fifty (50) Virtual Parameters per virtual device. Once all parameters are added, click on the **Save** button.

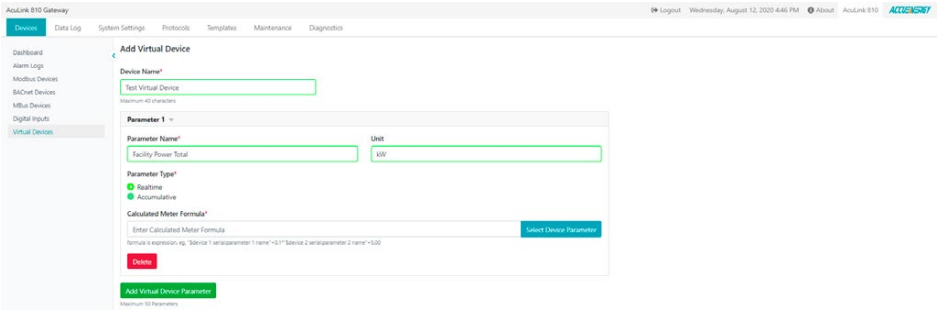


Figure 7-67 AcuLink 810 Virtual Parameters Setting

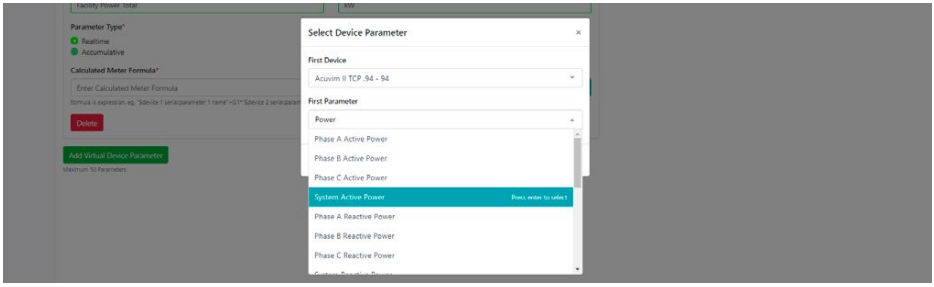


Figure 7-68 AcuLink 810 Select Virtual Parameters

Once the device is created it can be seen from the **Virtual Device** webpage, to view the readings click on the **Virtual Device** hyperlink from the left menu.

Under the **Readings** menu tab users can view the virtual device readings.

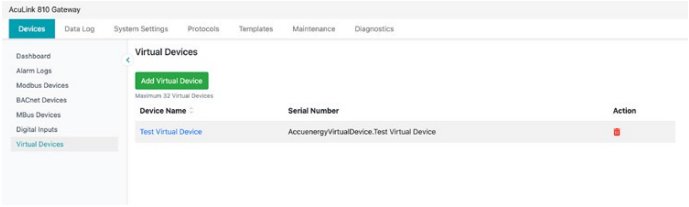


Figure 7-69 AcuLink 810 Virtual Device List

Users can edit the virtual device in the Configuration menu tab, from here the user can edit the parameter name, unit, parameter type, calculated meter formula, and delete virtual parameters.

NOTE: The virtual Device Name cannot be modified in the Configuration menu tab.

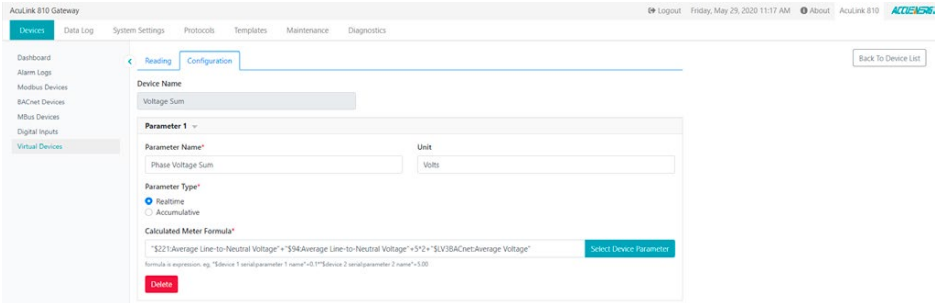


Figure 7-70 AcuLink 810 Virtual Device Configuration

7.10 Google IoT

The Google Internet of Things (**IoT**) is a collection of Google Cloud services that allow the user to have reliable device to cloud communication. **Google IoT Hub** is a managed **IoT** service which is hosted in the cloud and allows for bi-directional communication between **IoT** applications and the devices. This cloud-to-device connectivity means that you can receive data from your devices, but you can also send commands back to the device.

7.10.1 General

Configure all the basic settings in this webpage:

Broker Address: This is the endpoint to which your device will connect to communicate with Google's IoT core. It typically is mqtt.googleapis.com.

Broker Port: The port number is used to establish the connection with the broker. For Google IoT, it's commonly set to 8883 for secure MQTT communication.

Google Cloud Project ID: The project ID is a unique identifier assigned to each project created in the Google Cloud Platform.

Cloud Region: This parameter specifies the Google Cloud region where the user's IoT Core registry is located. Common regions include us-central1, urope-west1, and asia-east1.

Registry ID: A registry is a logical container for the devices. The user should create a registry within the project and provide its unique name.

Device ID: The device ID is a unique identifier for the user's individual IoT device. It should be associated with a registry.

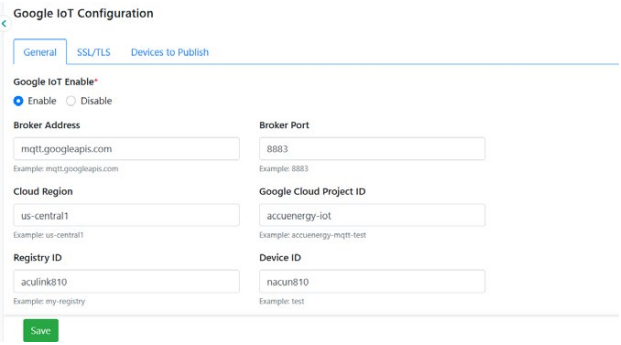


Figure 7-71 AcuLink 810 Google IoT Configuration

7.10.2 SSL/TLS

The user shall upload the security key in this webpage to establish secure communication with Google IoT server.

Google CA File: This file contains the certificate authority (CA) public key used to establish a secure connection with Google's IoT core. Ensure it is correctly configured on your device.

Private Key File: This file stores your device's private key for secure communication. Keep this file secure and configure it properly.

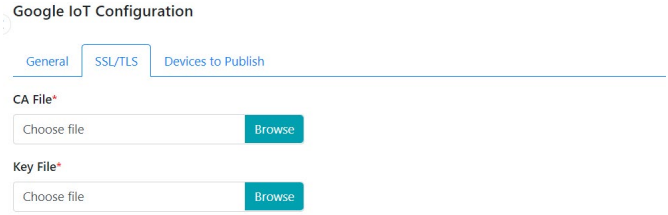


Figure 7-72 AcuLink 810 Google IoT SSL/TLS Configuration

7.10.3 Device to Publish

Users will use this webpage to configure the device which they would like to push data to the Google IoT server.

Topic: This is the communication channel within the Google IoT system, where IoT devices publish messages in the cloud.

Qos: Select the Qos in the drop-down menu to choose the communication quality with the IoT server.

Interval: Use this to select the frequency for pushing data to the server.

Payload Format: Select the data format that the user would like to use for the data being pushed to the server.

Select Devices To Publish: User will check the box next to the meter which they would like to push data to the server.

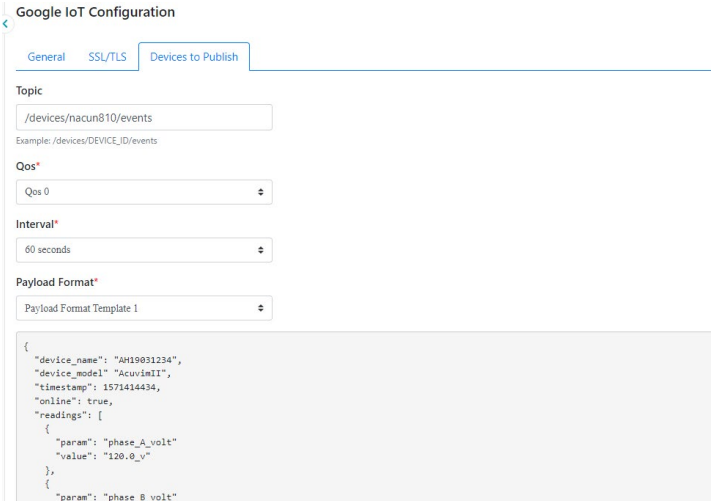


Figure 7-73 AcuLink 810 Google IoT Device to Publish Configuration

Chapter 8: Device Readings

The device readings can be seen directly on the AcuLink 810 webpage. The device data updates every minute on the webpage. To view the device readings, click on the **Devices** menu tab and select either **Modbus/BACnet Devices**.

Users can simply click on the device they wish to view the data under the **Readings** menu tab. Depending on the device, users can click on the **Reading Type** drop-down menu to select different types of parameters to read from the device.

Users can immediately force read parameters to the current webpage by clicking the "Refresh" button.

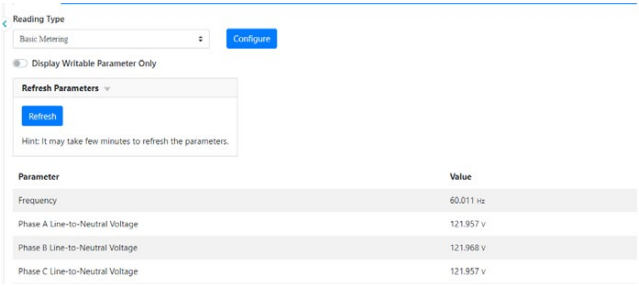


Figure 8-1 AcuLink 810 Device Readings

For **MBus Devices**, users will need to first click on the MBus master and then select the MBus devices to view the readings.

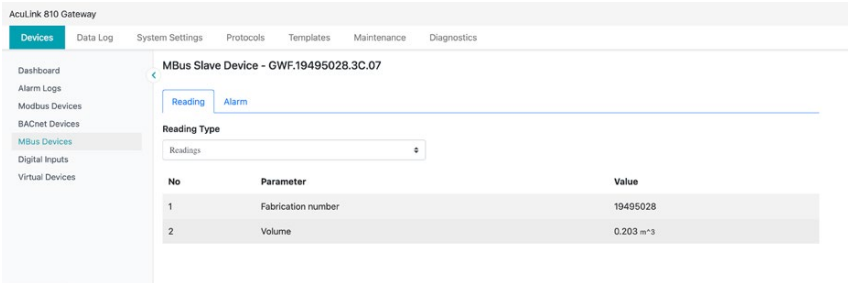


Figure 8-2 AcuLink 810 Read MBus Device

8.1 Parameter Configuration

Use the **Configure** function to configure each parameter on the list and allow it to display on the AcuLink 810 or to record on the data log.

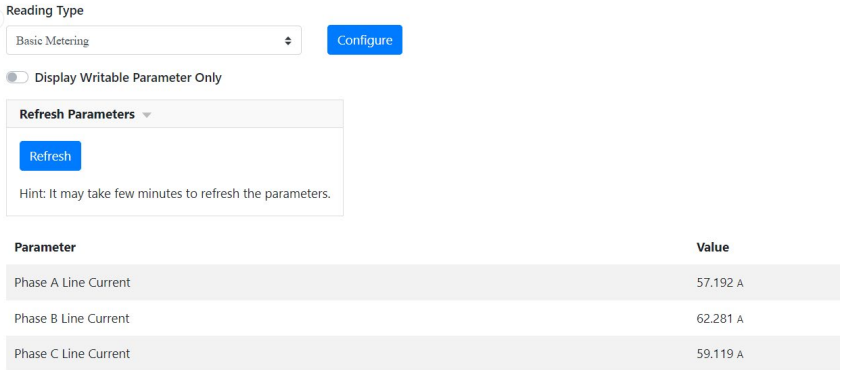


Figure 8-3 AcuLink 810 Parameter Configuration

Select the “Reading Type” then click the Configure button, the following webpage will then show up.

Users can check which parameters to be included, as well the option to create custom labels.

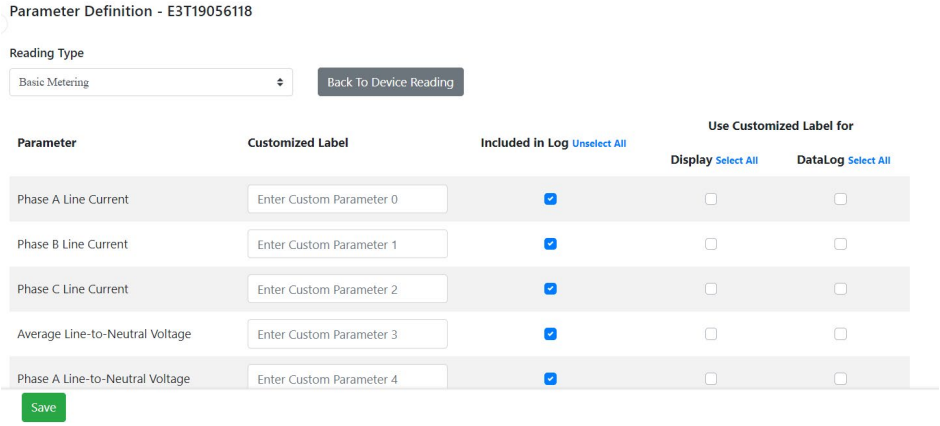


Figure 8-4 AcuLink 810 Parameter Definition

- **Included in Log** - Select if the parameter needs to be included in the data log file.
- **Customized Label** - Where users can create a custom label for the parameter listed in the template.
  - Display: Display the customized label on the AcuLink 810 reading webpage.
  - DataLog: Display the customized label on the AcuLink 810 data log file.

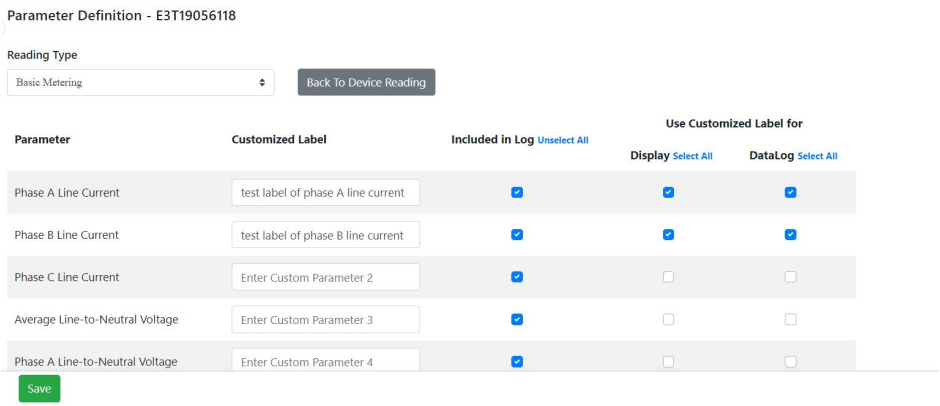


Figure 8-5 AcuLink 810 Parameter Definition (Display, Datalog)

Click the **Save** button after everything is set up, then click on the **Back To Device Reading** button. In the readings webpage to see the custom labels implemented.

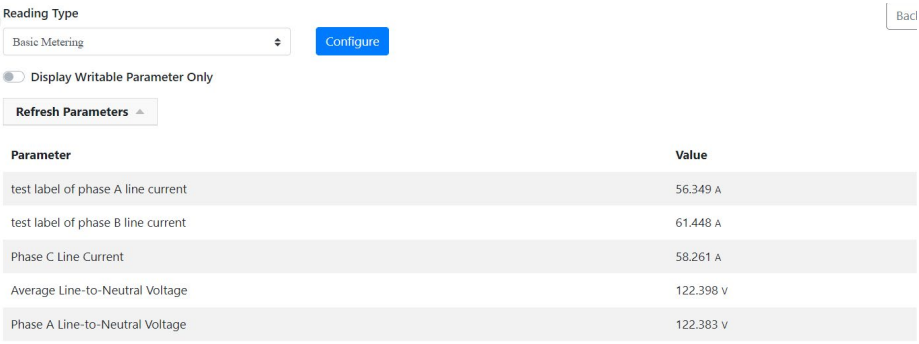


Figure 8-6 AcuLink 810 Device Reading Webpage

When downloading the data log file, the name in the header will be changed according to the custom label configured.

	A	B	C	D	E	F
1	Time	test label of phase A line current	test label of phase B line current	Ic_A	Vnavg_V	Va_V
2	2023-11-29T00:00:00-0500	58.997	64.296	60.997	123.52	123.506
3	2023-11-29T00:01:00-0500	58.919	64.231	60.929	123.587	123.575
4	2023-11-29T00:02:00-0500	58.849	64.163	60.859	123.575	123.561
5	2023-11-29T00:03:00-0500	58.841	64.145	60.838	123.595	123.582
6	2023-11-29T00:04:00-0500	58.79	64.106	60.802	123.911	123.897
7	2023-11-29T00:05:00-0500	58.859	64.166	60.874	123.848	123.836
8	2023-11-29T00:06:00-0500	58.841	64.15	60.838	123.796	123.783
9	2023-11-29T00:07:00-0500	58.81	64.125	60.828	123.773	123.76
10	2023-11-29T00:08:00-0500	58.925	64.218	60.929	123.93	123.918
11	2023-11-29T00:09:00-0500	58.946	64.265	60.934	123.986	123.973
12	2023-11-29T00:10:00-0500	58.992	64.308	60.997	123.89	123.878
13	2023-11-29T00:11:00-0500	58.881	64.205	60.877	123.81	123.796
14	2023-11-29T00:12:00-0500	58.94	64.241	60.935	123.445	123.432
15	2023-11-29T00:13:00-0500	58.806	64.116	60.817	123.585	123.572
16	2023-11-29T00:14:00-0500	59.099	64.371	61.079	123.489	123.477
17	2023-11-29T00:15:00-0500	59.09	64.36	61.064	123.44	123.427
18	2023-11-29T00:16:00-0500	58.914	64.217	60.917	123.456	123.444
19	2023-11-29T00:17:00-0500	58.911	64.191	60.898	123.372	123.359

Figure 8-7 AcuLink 810 Datalog File

8.2 Writing to Modbus Device

Adding the device

After the template with Modbus Function code 16/15 is created, add a new device with the template. Then specify the connection method (Protocol) to that Modbus device (Modbus RTU/ Modbus TCP).

NOTE: Refer to chapter 7 on how to add or create Modbus Templates on the AcuLink 810.

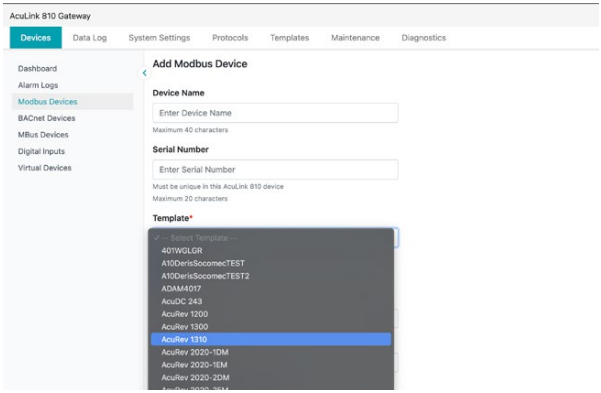


Figure 8-8 AcuLink 810 Add Devices

Users will be able to view the device connected under the Modbus device list. In this example, the writing template is connected to an AcuRev 1310 meter.

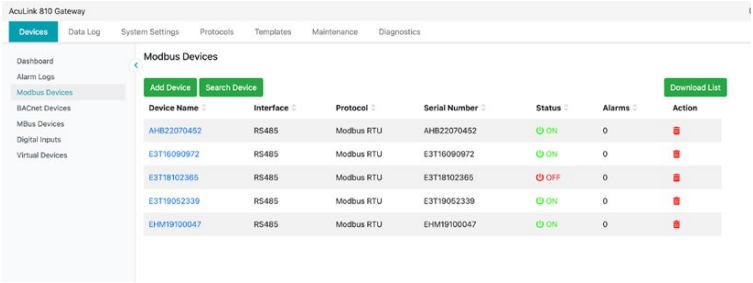


Figure 8-9 AcuLink 810 Modbus Device List

Click on the device to view all parameters, the writable parameters will have the blue write icon located next to the value as seen below.

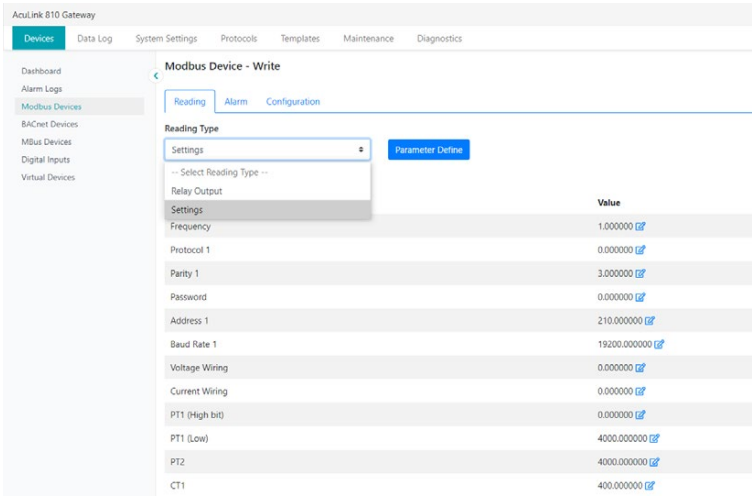


Figure 8-10 AcuLink 810 Reading Type Selection

The blue Write icon button next to the value allows the user to update and write a register value into the device. For example, by clicking the write icon button for CT1 parameter, a "Change Modbus Register Value" prompt will appear. The user can then edit the value from 5000 to 10000. Click on the **Submit** button to confirm the change.

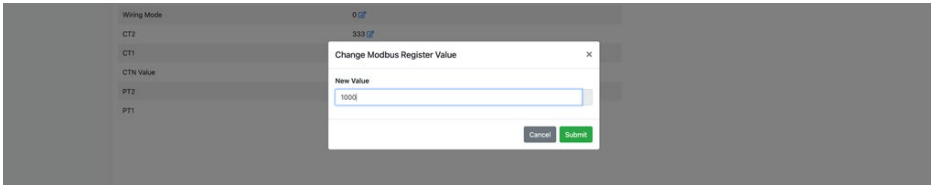


Figure 8-11 AcuLink 810 Change Modbus Register Value

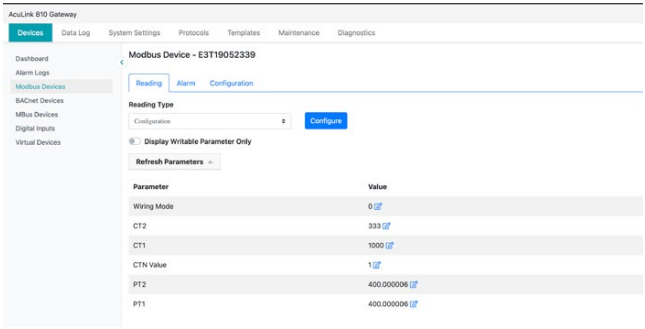


Figure 8-12 AcuLink 810 Reading Modbus Register Values After Change

Chapter 9: Digital Inputs

The AcuLink 810 has eight (8) digital input (DI) channels. Each digital input can be used as an input pulse counter or a digital status monitor.

Each channel has two terminals, a DI terminal and a DI COM terminal. The digital input channels are dry contact inputs, meaning that a voltage supply is required to generate a pulse or digital status.

The image below shows a closed circuit on digital inputs 1 and 6. The positive output is connected to the DI1 and DI6 channel inputs and negative output is connected to the DI1-COM and DI6-COM common input respectively.

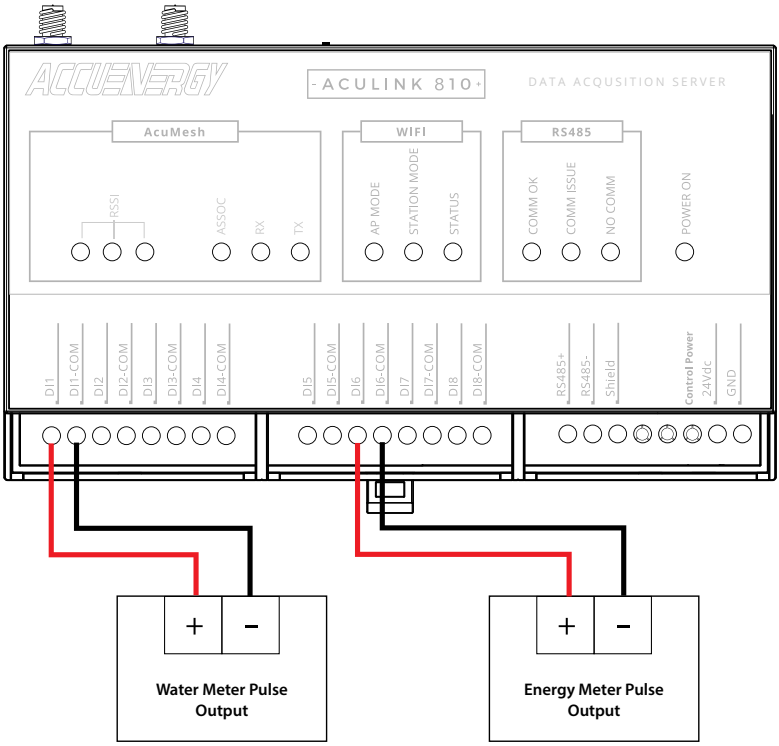


Figure 9-1 AcuLink 810 Digital Input Connections

On the AcuLink 810 webpage, the Digital Inputs connected are shown as seen below.

The Type column indicates whether the DI channel is configured for Pulse or Digital Status. A channel labeled as "counter" is configured for pulse input, while a channel labeled as "Status" is configured for Digital Status input.

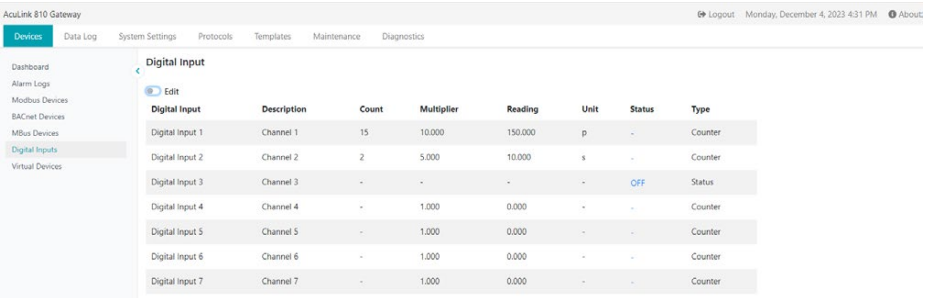


Figure 9-2 AcuLink 810 Digital Input Webpage

Users can switch between pulse counter and digital status by enabling the **Manual Edit** slider. The digital input channel settings can also be modified, details such as the channel description, count, multiplier, and unit can be configured.

NOTE: If the user manually edits DI, all changes must be saved for them to take effect.

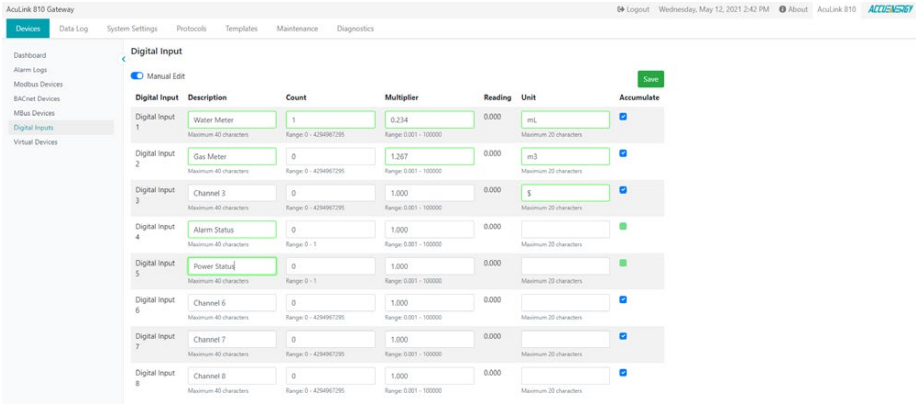


Figure 9-3 AcuLink 810 Digital Input Editing

When the **Manual Edit** slider is enabled, the user can manually configure each digital Input's Description, Count, Multiplier, Reading, and Unit, respectively.

If the user manually edits DI, all changes must be saved for them to take effect.

9.1 Device Alarm

To configure over/under alarms in the AcuLink 810, users must log in with administrative access. Alarms can be added to all devices including Modbus, BACnet and MBus devices.

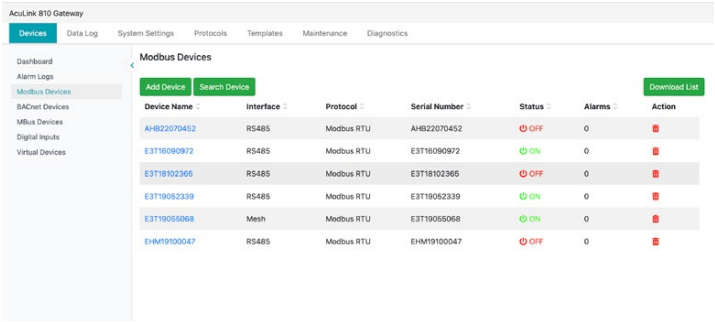


Figure 9-4 AcuLink 810 Modbus Devices

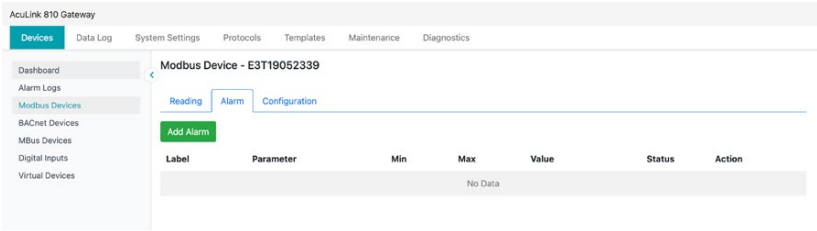


Figure 9-5 AcuLink 810 Device Alarms

To create a device alarm, users need to select the device from the **Devices** webpage, then select the **Alarm** menu tab. Click the "Add Alarm" button to be redirected to the following webpage to configure.

Label: Users can configure the label for the alarm.

Parameter: Select the Parameter you wish to monitor for over/under limit.

Minimum: Enter the minimum value the parameter should be at in the 'Min Value' field. Any value lower than the minimum value will trigger the alarm.

Maximum: Enter the maximum value the parameter should have before it triggers the alarm in the 'Max Value' field.

Click on the **Save** button to create the device alarm.

NOTE: Alarms are scanned every minute, if there is a change in data a couple seconds apart the AcuLink 810 may not be able to register the alarm.

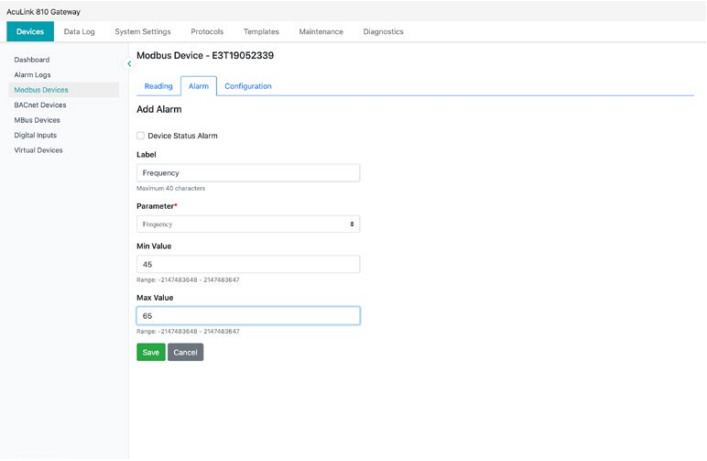


Figure 9-6 AcuLink 810 Edit Device Alarm

Once the alarm has been configured, it will appear in the Parameter list under the Alarms menu tab. This webpage will give you a summary of the alarm by letting the user know the alarm maximum and minimum values, the parameter alarm mode and the status of the alarm. Users can delete the alarm and reconfigure the alarm setting under the Action column.

If the parameter is in alarm mode, the value will be displayed in red, and the Alarm status will show a red caution symbol. The AcuLink 810 will also display when devices are in alarm mode from the **Dashboard** as well as the **Devices** webpage.

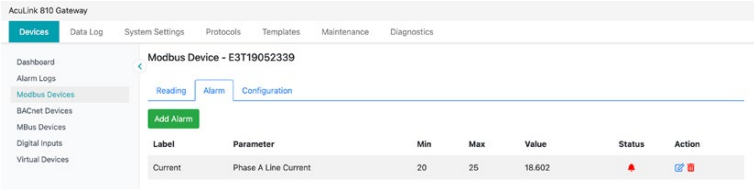


Figure 9-7 AcuLink 810 Device Alarm List

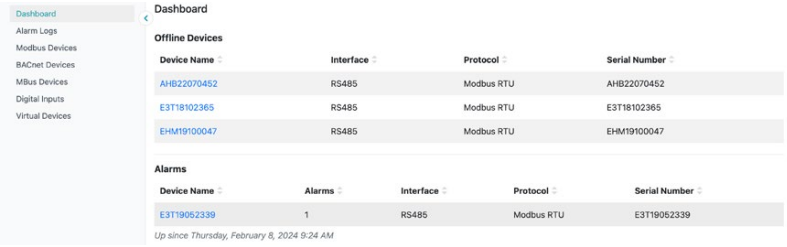


Figure 9-8 AcuLink 810 Device Alarm Dashboard

9.2 Alarm Log

When the alarm is triggered, the user will be able to see the triggering detail under the **Alarm Log** webpage.

From here users can search and filter all device alarms by entering in the interval, serial number and monitor ID into the search criteria. Click on the Reset button to clear the filtered search.

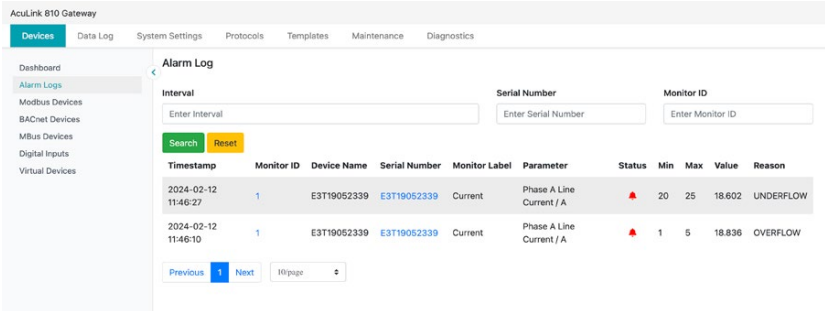


Figure 9-9 AcuLink 810 Alarm Logs

9.3 Email Alarm Notifications

The AcuLink 810 can send emails based on reports or if there is an alarm event. To configure the AcuLink 810 to send emails, log into the AcuLink 810 webpage with administrative access. To configure the alarm emails, users need to click on the **System Settings** menu tab and select Email.

The user must first configure their email server and details for the gateway to send the emails.

Email Server: Enter the SMTP Server for the email account.

Email Port: Enter the outgoing port number the SMTP uses to send emails.

TLS/SSL: Users can choose to turn on or off the TLS encryption or keep it on auto.

Sender Name: Enter the name of the email sender.

From Email Address: Users can specify the email address from the email receiver.

Username: Enter the email address for the email's authentication.

Password: Enter the password for the email address in Username.

Click on the **Save** button once all settings are configured.

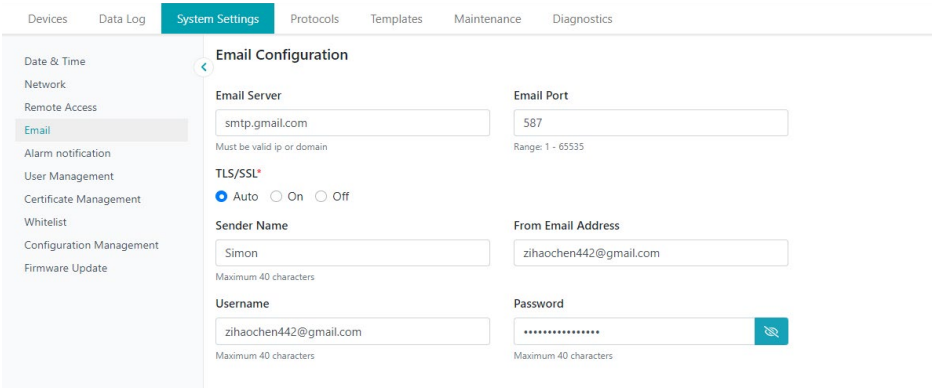


Figure 9-10 AcuLink 810 Email Configuration

Next, configure the alarm notification settings for the email addresses recipients when the alarm is triggered. This can be done by clicking on the **Alarm notification** hyperlink from the left menu.

Enable the alarm notification and configure the following:

Recipients 1 to 3: Enter the name of the email address in the Email Recipient fields. There can be a maximum of three email recipients.

Email Interval: Select the email interval, by default it is five minutes, the range is from 1 to 10 minutes.

Click the **Save** button to confirm the settings. Users can test the emails by clicking on the **Test Emails** button, this will let the user know if the AcuLink 810 can reach the emails listed in the recipients list or not. If successful a test email will be received.

If emails were configured for alarm events, an email notification will be sent to the recipients.

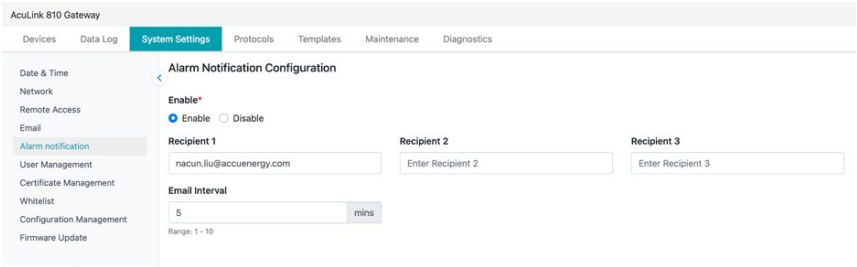


Figure 9-11 AcuLink 810 Alarm Notification Configuration

Chapter 10: Data Logging

10.1 Data Loggers

The AcuLink 810 supports data logging to its 8 GB of internal memory. When the memory has reached full capacity the first data log entries will be overwritten with the latest entries.

The AcuLink 810 has three data loggers, where the user can either save device data to its internal memory as well as post the data to an external HTTP/FTP server. The three data loggers allow users to configure different types of loggers with different logging intervals, log file formats, and other settings as desired.

To configure the AcuLink 810 to log the device data click on the **Data Log** menu tab and select **Data Loggers**.

- **Data Log Enable:** Select Enable to **Enable** the data log.
- **Post Channel:** Select the Post Channel from the drop-down list:
  - **None:** AcuLink 810 will log and store the data on its memory.
  - **Post Channel 1/2/3:** AcuLink 810 will log and push the data to the configured post channel. Users will not be able to select the post channel if it is disabled.
- **Timestamp Format:** Select the format for the timestamp for the data that is logged. The format for the timestamp can be based on the Local Time, UTC Seconds or based on ISO8601 format.
- **Log File Name Format:** Select the format for the log file name for the data that is logged. The format for the log file name can be based on UTC Timestamp or Time interval format. An example of each file name format is shown next to each setting.
- **Log File Format:** For users sending external data to HTTP or FTP servers they have the option to select the type of file format for the log files. The two formats are CSV and JSON.

NOTE: The log data is saved directly to the AcuLink 810 memory, and the CSV file will be created when downloading the log. JSON is only supported when posting the log file to an HTTP or FTP server.

- **Log Interval:** Select how frequently the module will log data to the file from the drop-down list. The logging interval can be from one minute to one month. For logging intervals faster than one minute please see Rapid logger in section .10.1.1 of the user manual.
- **Log File length:** Select the length of the log file, it can be from one minute to one month. The log file length is in reference to the post channels sending interval, for example if the log interval is one minute and the log file length is five minutes the log file will be sent to the external server every five minutes. If the user is only configuring the logger to save data on

the AcuLink 810's internal memory the log file length setting is irrelevant and can be ignored.

NOTE: The log interval must be less than or equal to the log file length.

- **Log File Name Prefix:** Provide a name for the log file which will be appended to the beginning of the log file. By default, **logger1** will be appended to the beginning of the log file. If configuring data **logger2** the default name prefix is **logger2**, and if configuring data **logger3** the default name prefix is **logger3**.
- Select the type of devices to log the data. Users have the option to log Modbus, BACnet, and MBus devices.

When all the settings are entered correctly, click on the **Save** button.

NOTE: For more information on downloading and deleting the data logs, please refer to the 'Data Management' section of this user's manual.

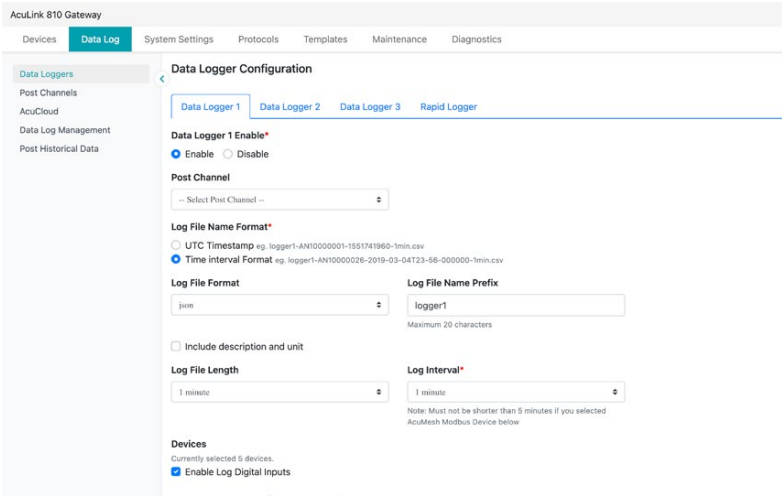


Figure 10-1 Data Log Configuration

10.1.1 Rapid Logger

The AcuLink 810 supports the rapid logging function for Modbus devices using the serial RS485 port, where the user can log data at intervals as fast as one second.

- **Rapid Data Logger Enable:** Select **Enable** to begin the rapid logging function.
- **Post Channel:** Select the Post Channel from the drop-down list:
  - **None:** AcuLink 810 will log and store the data on its memory.
  - **Post Channel 1/2/3:** AcuLink 810 will log and push the data to the configured post

channel. Users will not be able to select the post channel if it is disabled.

- **Timestamp Format:** Select the format of the timestamp for the data that is logged. The format for the timestamp can be based on the Local Time, UTC Seconds or based on ISO8601 format. An example of each time format is shown next to each setting.
- **Log File Name Format:** Select the format of the log file name for the data that is logged. The format for the log file name can be based on UTC Timestamp or Time interval format. An example of each file name format is shown next to each setting.
- **Log Interval:** Select how frequently the module will log data to the file from the drop-down list. The logging interval can be from 1-second to 30-seconds.
- **Log File Length:** Select the length of the log file, it can be from one minute to one month. The log file length is in reference to the post channels sending interval, for example if the log interval is one minute and the log file length is five minutes the log file will be sent to the external server every five minutes. If the user is only configuring the logger to save data on the AcuLink 810's internal memory the log file length setting is irrelevant and can be ignored.
- **Log File Name Prefix:** Provide a name for the log file which will be appended to the beginning of the log file. By default, the prefix for the rapid logger is **loggerRapid**.
- **Devices:** The user can select the device for the rapid logger.

NOTE: Only Modbus devices connected via RS485 can be logged using the Rapid Logger.

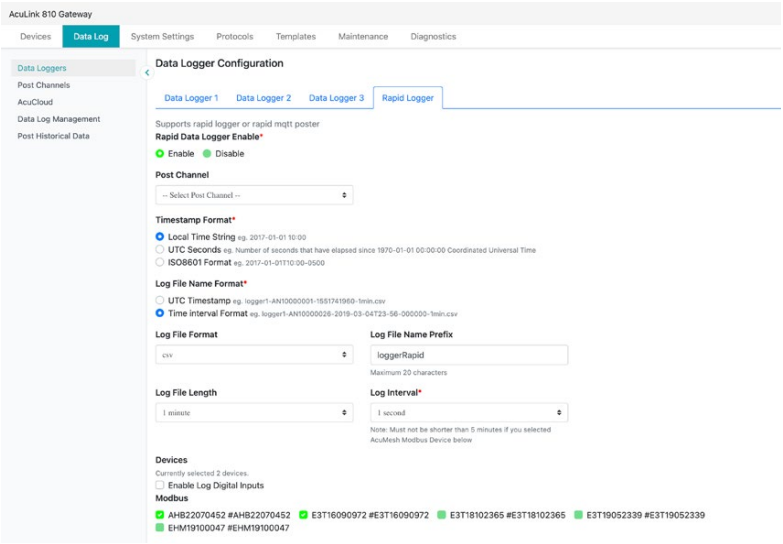


Figure 10-2 Data Log Configuration-Rapid Logger

10.2 Post Channels

The AcuLink 810 supports three Post Channels that will allow users to post device data to external HTTP/FTP/SFTP servers. To configure the HTTP/FTP/SFTP data forward from the webpage click on the **Data Log** menu tab and select **Post Channels** from the left side menu.

To configure the post channels, users need to select the corresponding **Post Channel 1/2/3** tabs.

10.2.1 HTTP Post Method

The HTTP post method allows the user to post meter data to an HTTP/HTTPS server.

Post Channel Enable: Select Enable to enable the post channel data forward.

Post Method: Select HTTP/HTTPS from the drop-down menu.

Post Name Fixed: Select 'Yes' or 'No' to enable a fixed post name, if yes is selected enter the post name. There is a maximum of forty (40) characters allowed for the fixed post name.

Authorization: Users must enter a valid token to post data to the desired HTTP server.

HTTP/HTTPS URL: Select either the HTTP or HTTPS protocol from the drop-down menu before entering in the URL. Next, enter in the URL of the server.

HTTP/HTTPS Port: Enter the correct port for the HTTP server.

HTTP/HTTPS Meter ID: Enter in the meter ID.

Once the settings are entered correctly click on the **Save** button. After the settings are saved, users can use the **Test Post Channel** button to test whether the AcuLink 810 can successfully reach the HTTP/HTTPS server.

NOTE: If users receive a failure message, please verify the server URL, port number, and double-check the network connectivity.

NOTE: If the AcuLink 810 loses its network connection the gateway can back up 3,000 post files on its internal memory. After 3,000 post files the data will start to overwrite from the oldest post file. Users can clear the cached post files by using the **Clear Post Channel Logs** button.

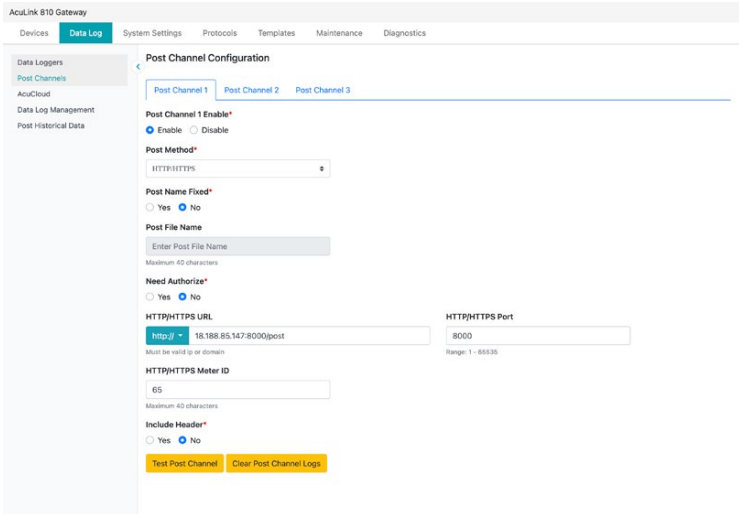


Figure 10-3 Post Channels HTTP Configuration

10.2.2 FTP Post Method

The FTP post method allows the user to post meter data to an FTP server.

Post Channel Enable: Select **Enable** to enable the post channel data forward.

Post Method: Select 'FTP' as the protocol.

FTP URL: Enter in the FTP URL.

FTP Port: Enter the FTP port number.

Enable Anonymous Mode: Username and password are not required once this mode is activated.

FTP Username: Enter the username credential to access the FTP server.

FTP Password: Enter the password credential to access the FTP server.

Once all settings have been entered correctly, click on the **Save** button. Users can use the **Test Post Channel** button to determine whether the AcuLink 810 can reach the FTP server.

NOTE: If users receive a failure message, please verify the server URL, port number, username, password and double-check the network connectivity.

NOTE: Like the HTTP posting method, if the AcuLink 810 FTP loses its network connection the gateway can back up 3,000 post files on its internal memory, after 3,000 post files the data will start to overwrite from the oldest post file. Users can clear the cached post files by using the Clear Post Channel Logs button.

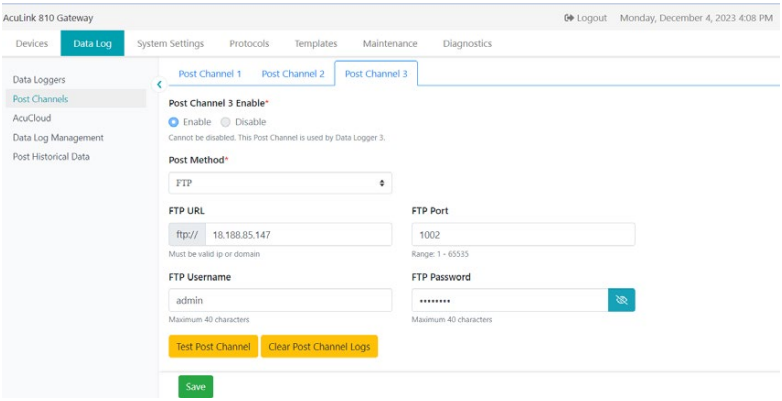


Figure 10-4 Post Channels FTP Configuration

10.2.3 SFTP Post Method

The SFTP post method allows the user to securely post meter data to an FTP server.

Post Channel Enable: Select **Enable** to enable the post channel data forward. Post Method: Select 'SFTP' protocol.

SFTP URL: Enter in the FTP URL.

SFTP Port: Enter the FTP port number.

SFTP Username: Enter the username credential to access the FTP server.

SFTP Password: Enter the password credential to access the FTP server.

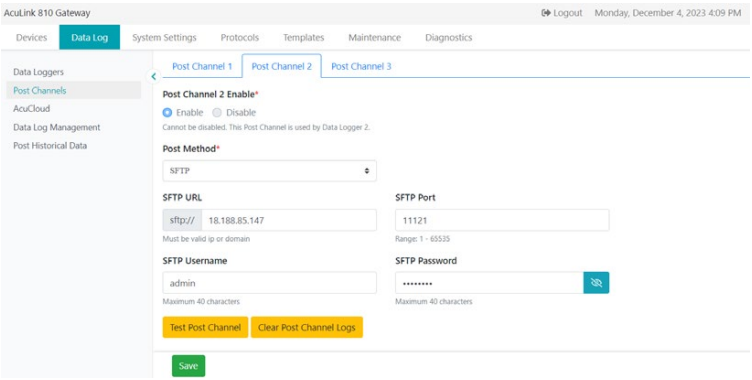


Figure 10-5 Post Channels SFTP Configuration

10.3 Downloading Data

Under the **Data Log** menu tab, the user has the option to download data that has already been logged. Click on **Data Log Management** from the left side menu to configure the **Download Log** webpage.

Device: The user can select the device to download data from.

Log Interval: The user can choose the interval from which to download.

Download: Click the **Download** button to download the selected file from the device as a CSV file format.

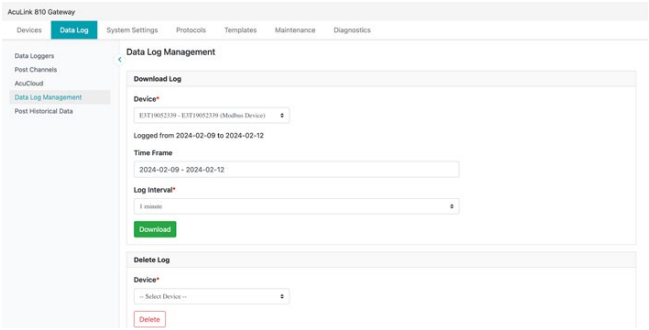


Figure 10-6 Datalog Management Webpage

The user has the option to delete previously stored logs.

Device: The user can select the device to erase data from.

Delete: Click the **Delete** button to erase all data from the device selected.

10.4 AcuCloud

This section will provide instructions on connecting the AcuLink 810 gateway device to the AcuCloud EMS software to allow select devices connected to the gateway to send data to the software. This process requires the user to have an existing AcuCloud account, if the user does not have an account, they can sign up for AcuCloud directly on our website at: https://www.accuenergy.com/acucloud

This procedure requires users to add the gateway to the software in which a token will be generated through AcuCloud and will act as verification when sending data from the gateway. Finally, this generated token will be used to configure the gateway from the AcuLink 810 webpage.

Once the token has been successfully added, the user will be able to monitor, compare and trend the data from devices connected to the gateway.

NOTE: Only Modbus devices connected to the AcuLink 810 can be posted to AcuCloud.

Under the **Data Log** menu tab select **AcuCloud** from the left side menu to access the AcuCloud Configuration webpage. The user then will first need to select **Enable** under AcuCloud Enable.

- Then copy the Module Serial Number that appears below.

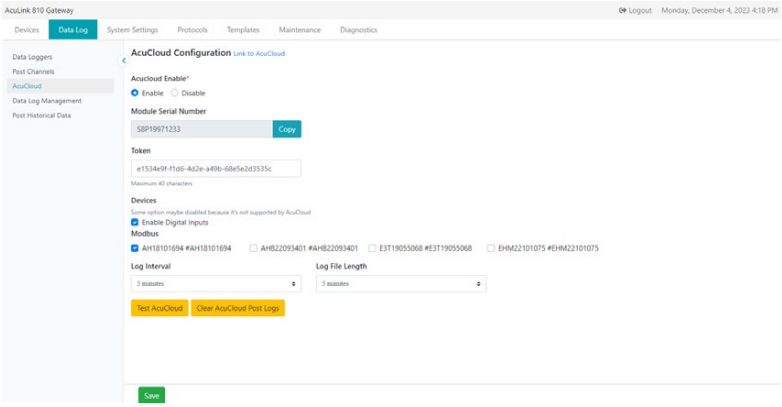


Figure 10-7 AcuCloud Configuration Webpage

- Next, the user will need to login to AcuCloud with administrative access in order to add the devices.

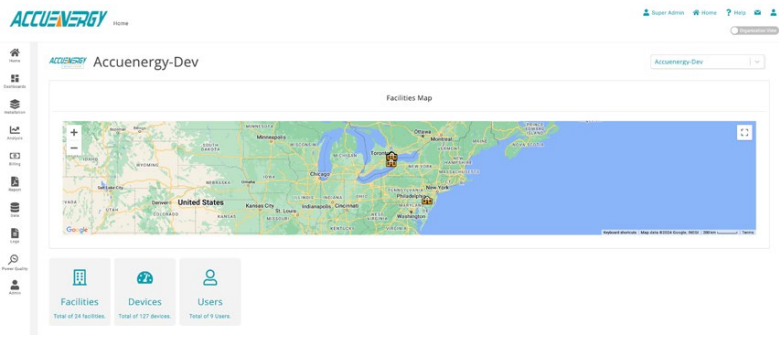


Figure 10-8 AcuCloud Home Page

- Adding a new device can be done under the **Facilities** menu tab by selecting the desired facility and clicking on the **Devices** menu tab.

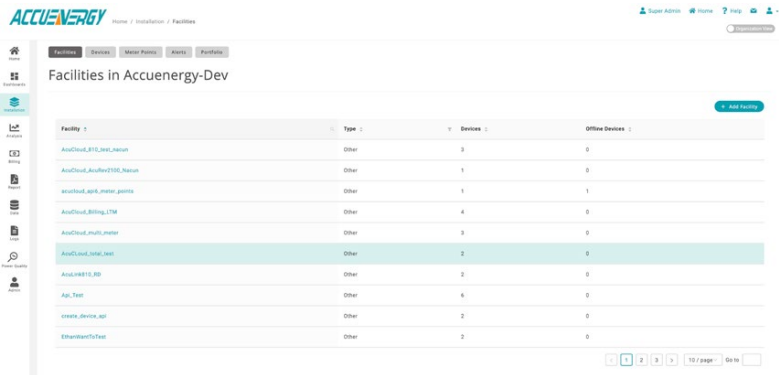


Figure 10-9 AcuCloud Device Lists

Clicking on the **+ New Device** button, the details need to be entered:

- Select the name of the facility in which the device will be added from the **Facility** drop-down list.
- Select the AcuLink 810 from the **Choose a Model** drop down list.
- Select **This is a gateway Device** box.
- Provide a name for the device under **Device Name**.

- Paste the serial number that was copied from the AcuLink 810 webpage under the Serial Number field.
- Provide a description for the location of the device under **Location**.
- Click the **SUBMIT** button.

Figure 10-10 AcuCloud Add Device

Once the gateway has been successfully added, a token will be returned on the ensuing page. The user will need to copy the token as it will be used in the next step to configure the gateway to send its data to AcuCloud.

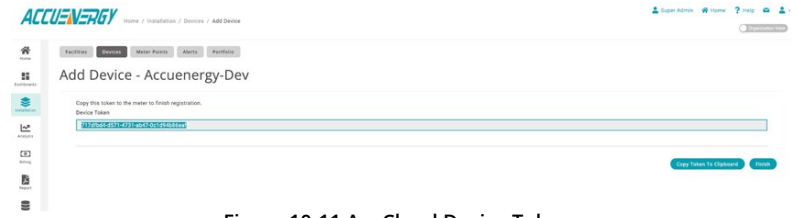


Figure 10-11 AcuCloud Device Token

Go back to the AcuLink 810 webpage and paste the token that was generated into the AcuCloud **Token** field.

- Click the **Save** button.
- Then click on **Test AcuCloud** button to see if the AcuLink 810 can reach the AcuCloud server.

NOTE: *If the test connection fails, please check the network settings of the AcuLink 810 and make sure the AcuCloud URL and token was entered correctly.*

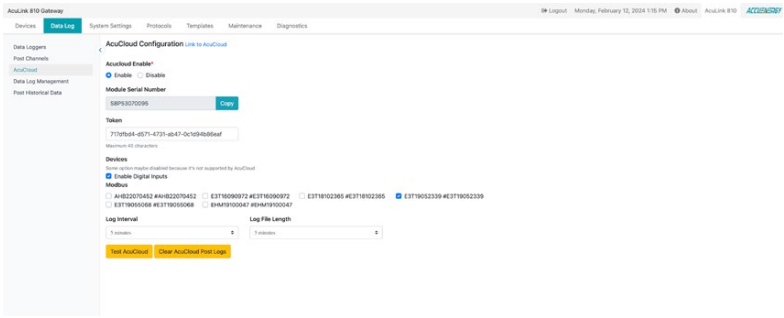


Figure 10-12 AcuCloud Configuration Webpage

The AcuLink 810 gateway is now successfully configured to report to the AcuCloud EMS software. Once a report is created in the AcuLink 810, the report for the devices will be posted to AcuCloud.

Check to see if AcuCloud is receiving data from the gateway by going to the **Devices** webpage in AcuCloud and observing whether the name of the selected devices from the gateway appear in AcuCloud with a Last Received Data timestamp as seen below.

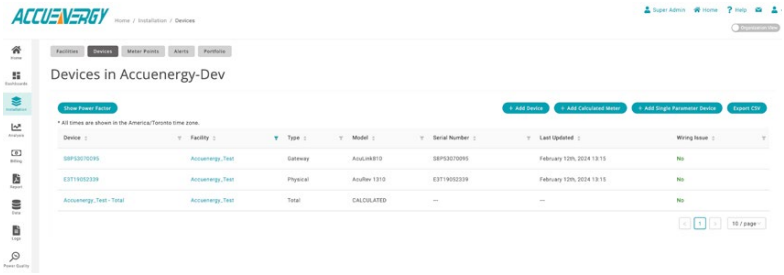


Figure 10-13 AcuCloud Device List (Devices Added)

10.5 Post Historical Data

The AcuLink 810 supports user to post logged data to their server in the scenario that AcuLink 810 is configured to log data, but the post channel is not yet setup or configured. User can select time frame and interval they need for the logged data to repost to their server.

To configure the **Post Historical Data** webpage, users need to select the corresponding tab.

Post Channel: Select the Post Channel from the drop-down list.

Post Channel 1/2/3: AcuLink 810 will push the data to the configured channel.

AcuCloud: AcuLink810 will push data to Cloud and only time frame can be selected, all other settings will be default if this post channel is selected.

- **Device:** Select the device for the data that user would like to push to AcuCloud.
- **Time Frame:** User can select the time frame for data they would like to push to the server.

Timestamp Format: Select the format of the timestamp for the data to be pushed. The format for the timestamp can be based on the Local Time, UTC Seconds or based on ISO8601 format.

- **Log Filename Format:** Select the format of the log file name for the data that to be pushed. The format for the log file name can be based on UTC Timestamp or Time interval format. An example of each file name format is shown next to each setting.
- **Log File Format:** Users have the option to select the type of file format the log file is pushed as. The two formats are CSV and JSON.
- **Log File Length:** Select the length of the log file, it can be from one minute to one month. The log file length is in reference to the post channels sending interval, for example if the log interval is one minute and the log file length is five minutes the log file will be sent to the server every five minutes.
- **Log Interval:** User can select the frequency of the data pushed in the drop-down list. The minimum interval is five minutes for AcuMesh device and interval must not be shorter than the log file length.

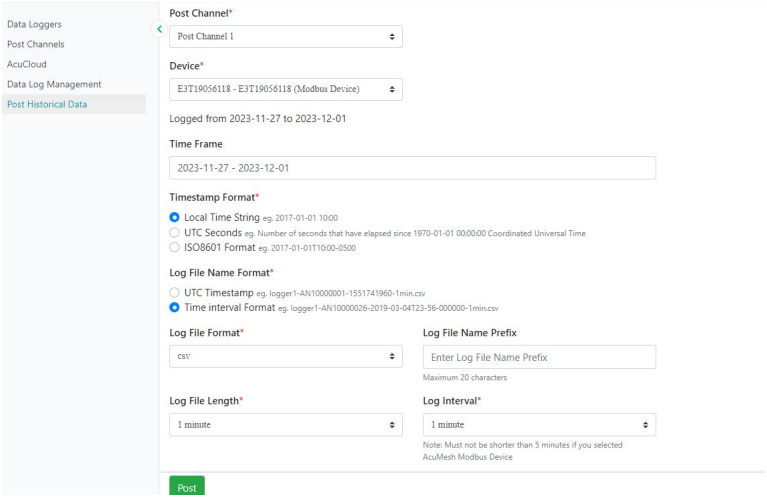


Figure 10-14 Data Post Historical Data Setting Webpage

Chapter 11: Network Diagnostics

The AcuLink 810 network diagnostics webpage can be used to monitor the status of the gateway device.

In the **Network Status** webpage under **Diagnostics** the menu tab, users can check the **Ethernet Network**, **Routing Table**, **DNS Server**, and **Network Status**.

NOTE: To check the ***Wi*-Fi Network Status**, the AcuLink 810 must be configured for Station Mode.

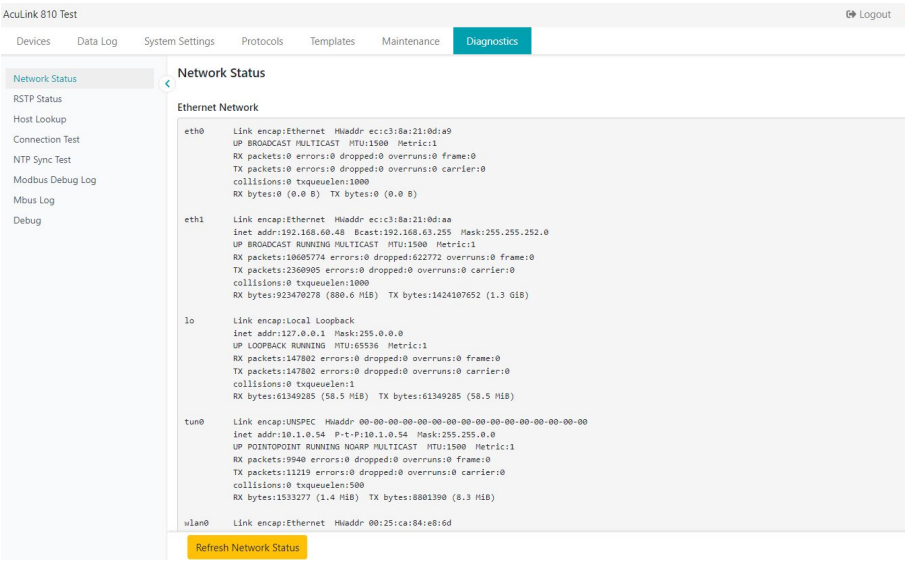


Figure 11-1a AcuLink 810 Network Diagnostics Status 1

Figure 11-1b AcuLink 810 Network Diagnostics Status 2

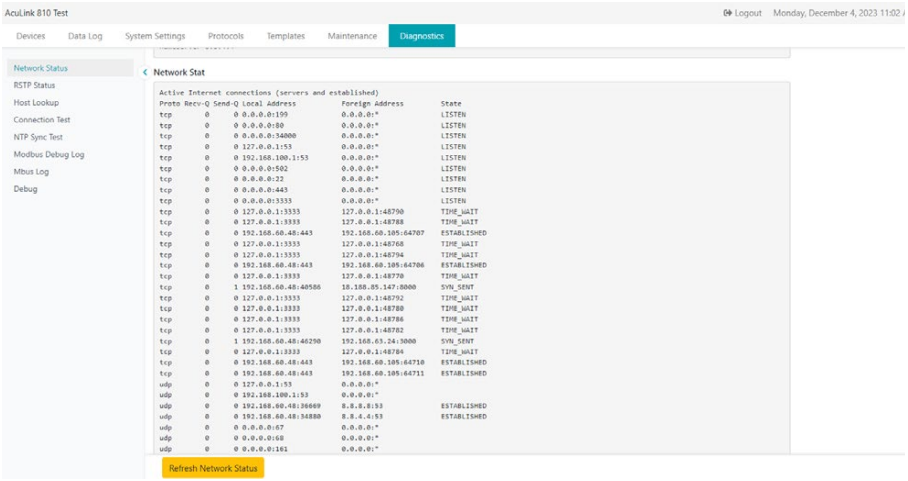


Figure 11-1c AcuLink 810 Network Diagnostics Status 3

In the **RSTP Status** menu tab, users can check the status of the Rapid Spanning Tree Protocol, if it is being used for the topology of the Ethernet network.

Figure 11-2 AcuLink 810 Network Diagnostics RSTP Status

In the **Host Lookup** menu tab, users can use the ping function to check if the AcuLink 810 can communicate over the connected network.

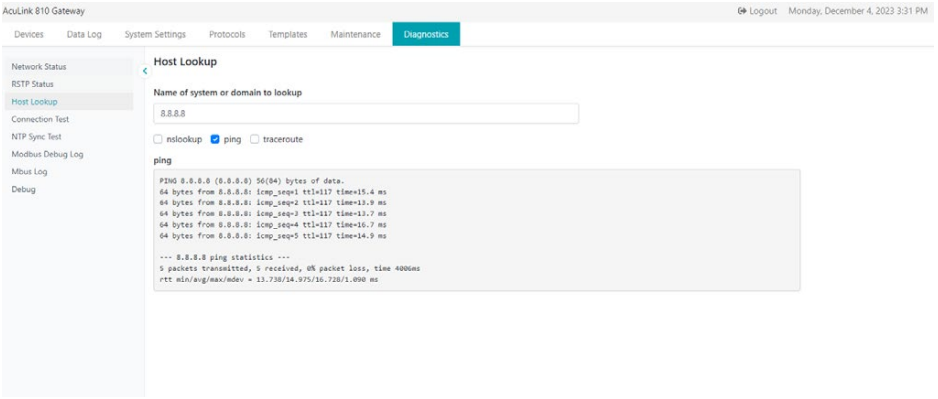


Figure 11-3 AcuLink 810 Host Lookup

In the **Connection Test** menu tab, users can test the local network connection of the AcuLink 810. The test will show 'SUCCESS' and 'PASS' if the network test is successful. Otherwise, the test will show 'FAIL' if network issues are found.

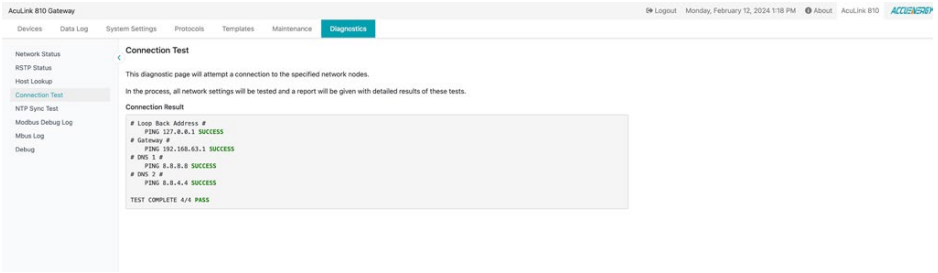


Figure 11-4 AcuLink 810 Network Connection Test

In the **NTP Sync Test** webpage, users can determine if the Network Time Protocol is functioning correctly, as seen below.

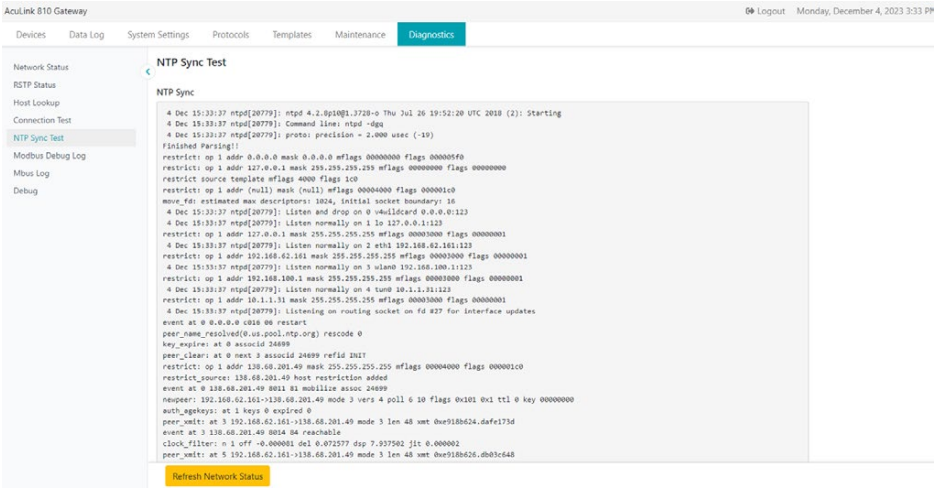


Figure 11-5 AcuLink 810 NTP Sync Test

In the **Modbus Debug Log** webpage users can view the Modbus packet requests from the AcuLink 810 to the connected Modbus devices. The Modbus Debug Trace can be enabled to keep track of the Modbus activity for the AcuLink 810. The Modbus debug logs can be exported and downloaded for further analysis.

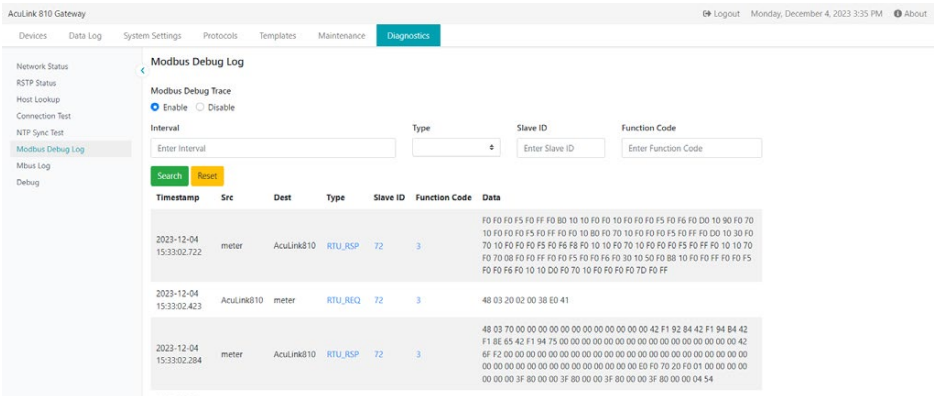


Figure 11-6 AcuLink 810 Modbus Debug Log

In the **Debug** webpage, users can enable SSH connection. Users can also download the AcuLink 810 diagnostic file.

The debug diagnostic options are recommended to be set to 'All Off', as this feature is used for troubleshooting and can affect the performance of the gateway if turned on.

By clicking the **Download Diagnostic File** button, users can download a full overview of the AcuLink 810 network. If users are experiencing any issues with the AcuLink 810, the diagnostic file can be sent to Accuenergy technical support for further analysis.

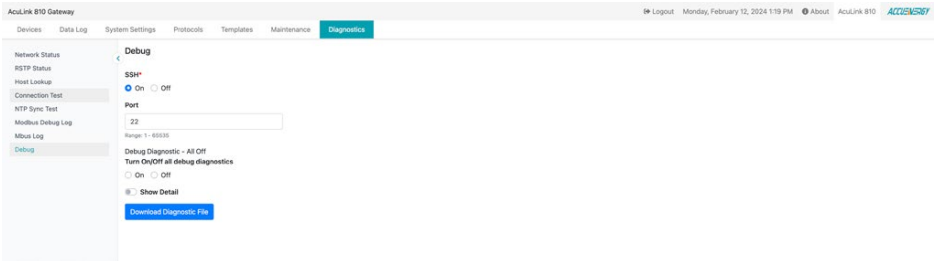


Figure 11-7 AcuLink 810 Debug Webpage

Chapter 12: Maintenance

12.1 System Status

Users can check the AcuLink 810's memory usage under **System Status** webpage located under the **Maintenance** menu tab.

The **System Status** webpage allow users to monitor an overview of the AcuLink 810 internal processing for CPU, RAM, Disk, and RS485 usage.

Devices can also be manually rebooted by clicking the **Reboot System** button at the bottom.

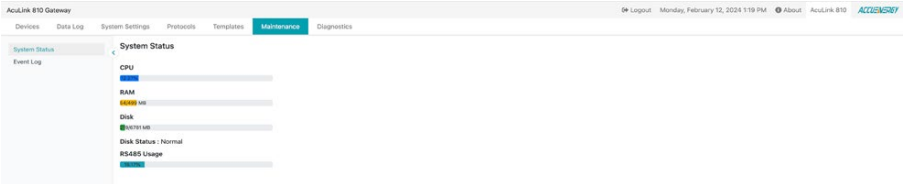


Figure 12-1 AcuLink 810 System Status

12.2 Event Log

Historical data of the system event can be checked y clicking on the **Event Log** button under the **Maintenance** menu tab. Event logs can be filtered by entering the Interval number and selecting a Level from the drop-down list. The level includes either 'Error' or 'Info'. Users can also clear and export the event logs by clicking the buttons at the bottom of the webpage.

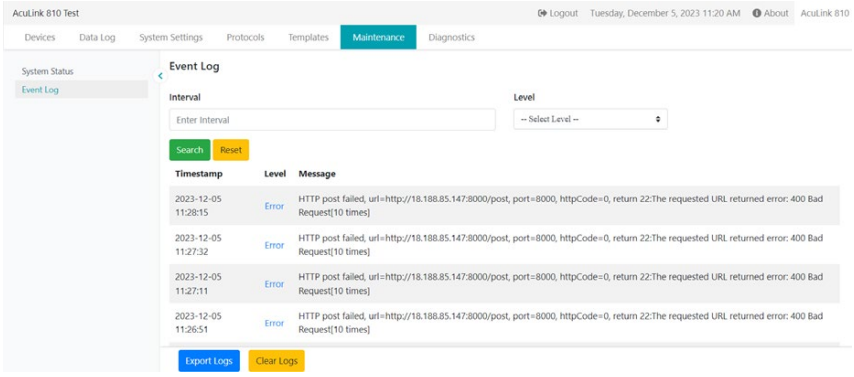


Figure 12-2 AcuLink 810 Event Logs

Chapter 13: Firmware Update

The AcuLink 810 firmware can directly be updated from the webpage. Click on the **System Settings** menu tab and select **Firmware Update** from the left side menu.

The **Firmware Update** webpage lists the current firmware version for the gateway. There are three methods to update the AcuLink 810 firmware, either by selecting the auto firmware update options, the remote firmware function, or by manually updating the firmware.

13.1 Auto Firmware Update

The Auto Firmware Update function allow users to configure the types of automatic firmware updates to the AcuLink 810.

- **Disable:** This option disables all auto firmware updates.
- **Critical Update Only:** Automatically updates the firmware for critical issues only.
- **Automatically Keep Firmware to Latest Version:** The firmware will automatically update whenever there is an update available for the AcuLink 810.
- **Check Time:** Set a time frame for AcuLink 810 to check whether it has the latest firmware update. If a new firmware version is available, it will automatically update the firmware to the latest version.

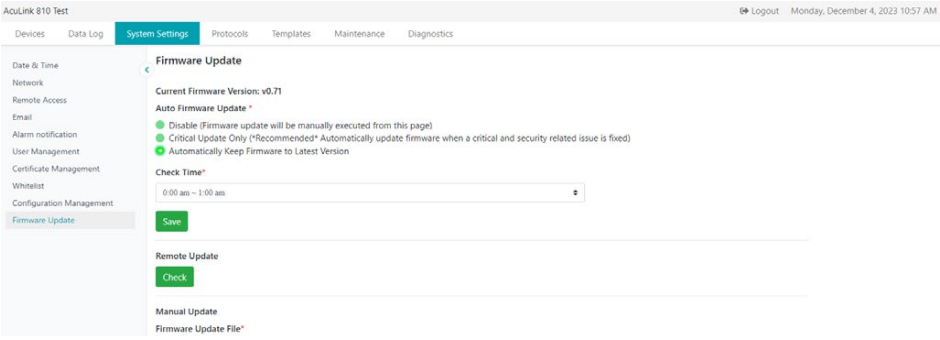


Figure 13-1 AcuLink 810 Firmware Update Webpage

13.2 Manual Update

To update the firmware manually, navigate to the Manual Update section and have the required firmware file ready. Start by clicking on the **Browse** button, and then locate the .aup firmware file. Click the **Open** button to add the file path.

NOTE: For firmware files please contact **Accuenergy Technical Support**.

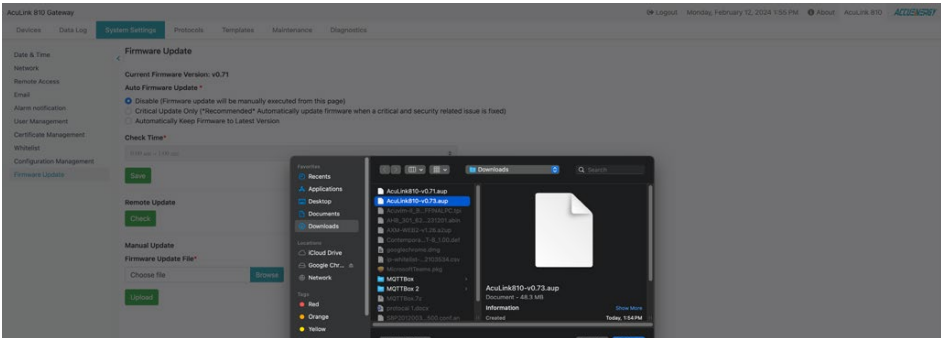


Figure 13-2a AcuLink 810 Firmware Manual Update -1

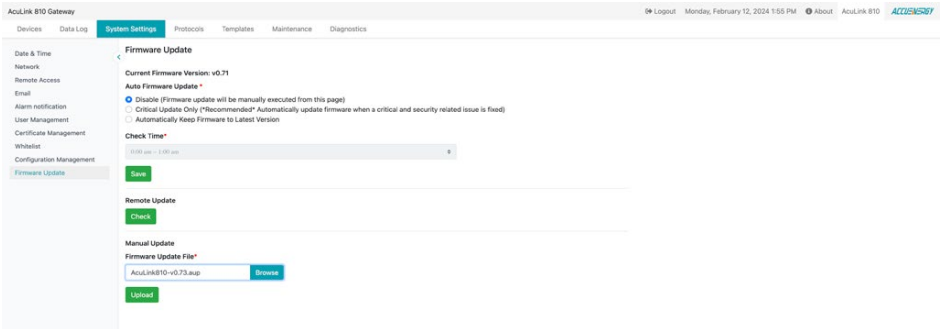


Figure 13-2b AcuLink 810 Firmware Manual Update -2

Next, click on **Upload** once the file is selected.

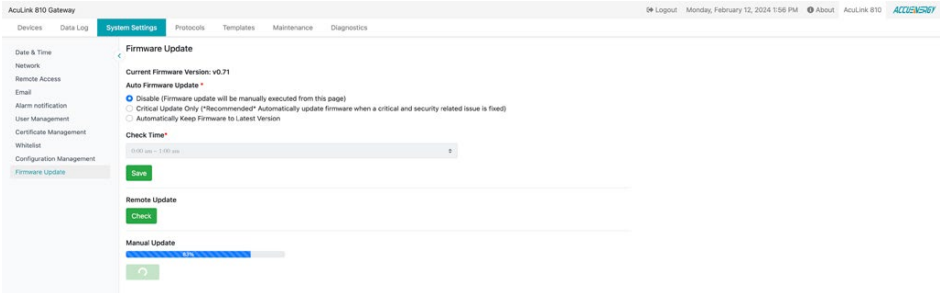


Figure 13-2c AcuLink 810 Firmware Manual Update -3

After the firmware has been uploaded successfully, click on **Update** to begin the firmware installation.

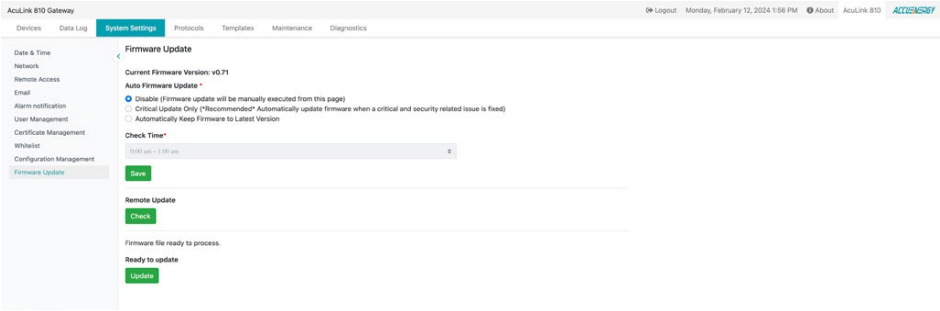


Figure 13-3 AcuLink 810 Firmware Update

The firmware update will take roughly about five minutes to complete.

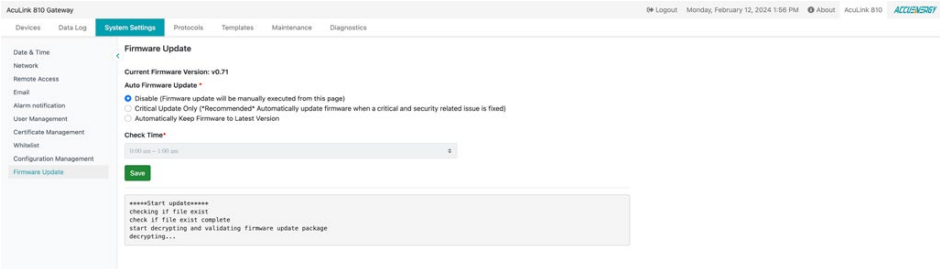


Figure 13-4 AcuLink 810 Firmware Updating

A green banner at the top of the webpage will notify the user that the update was successful.

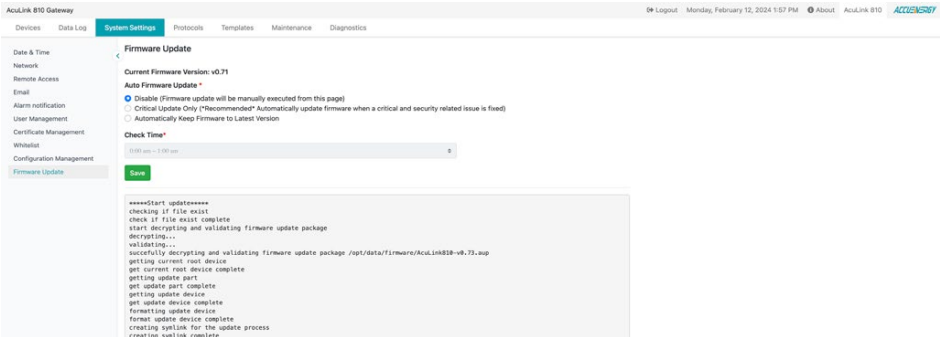


Figure 13-5 AcuLink 810 Firmware Updated

The AcuLink 810 will reboot after the firmware update. The reboot will take approximately about two minutes to complete, the user will be directed to the login screen after the reboot.

13.3 Remote Update

To use the remote firmware update there needs to be an internet connection to the AcuLink 810 for it to access Accuenergy remote firmware server.

Click on the **Check** button.

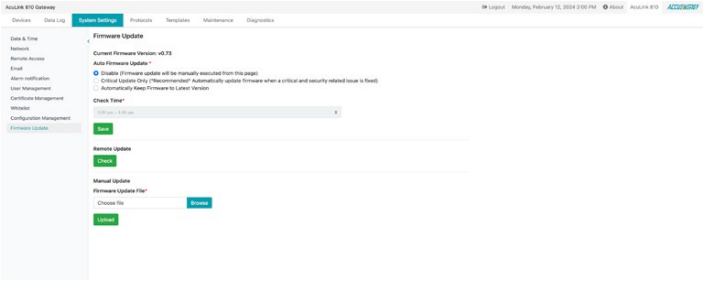


Figure 13-6 AcuLink 810 Firmware Remote Update Check

If an update is available, it will display “Update Available!” along with the latest version and update detail link to the firmware.

Click on **Update** to begin the updating process.

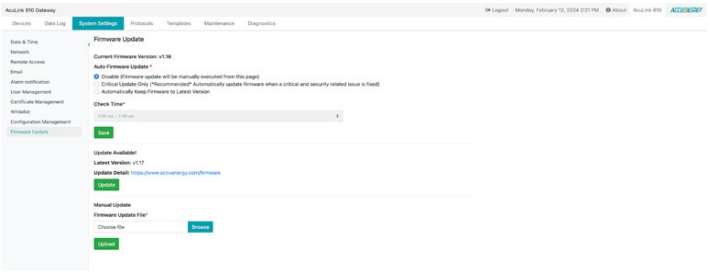


Figure 13-7 AcuLink 810 Firmware Remote Update Available

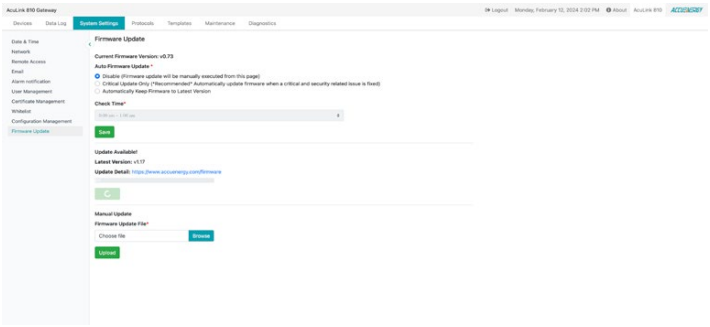


Figure 13-8 AcuLink 810 Firmware Remote Updating

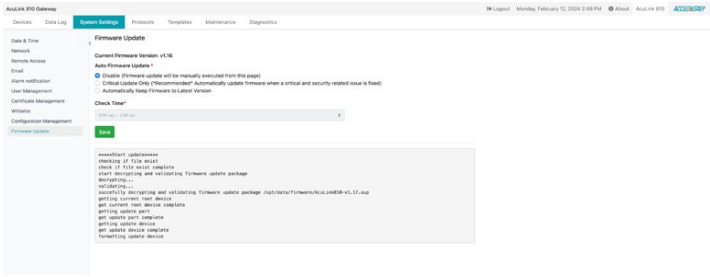


Figure 13-9 AcuLink 810 Firmware Remote Updated

After the update is complete the AcuLink 810 will reboot, and users will be required to login to the webpage again.

Chapter 14: Reset Button

The AcuLink 810 has a red reset button located at the top of the unit located next to the Ethernet and USB ports. This button will reset the AcuLink 810 back to its factory default. This will permanently delete all devices, data logs, alarms, event logs, and device templates. The only device template that will remain after the reset is the Modbus Gateway Function, however all other Modbus templates will be removed.

After the reset all network communications on the AcuLink 810 will be restored back to its default setting:

- Wi-Fi Mode - Access Point (AP) mode.
- Ethernet 1 - 192.168.8.101
- Ethernet 2 - DHCP enabled.

NOTE: It is recommended to refer to Configuration Management in the system settings section for backing up system and device configuration before performing the factory reset.

To successfully perform a reset on the AcuLink 810 data acquisition server and gateway, press and hold the reset button for ten seconds until all LED lights on the unit are flashing. The reset will be complete when the LED lights stop flashing.

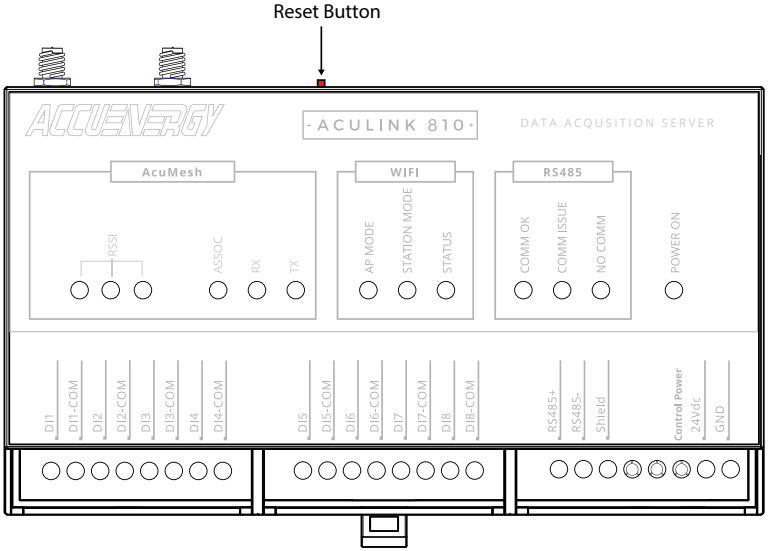


Figure 14-1 AcuLink 810 Reset Button

ACCUENERGY

MAKE ENERGY USAGE SMARTER

ACCUENERGY INC.

440 Comstock Road
Toronto, ON M1L 2H6, Canada

TF: 1-877-721-8908
INT: +1-416-497-4100
FAX: +1-416-497-4130
E: marketing@accuenergy.com

ACCUENERGY SOUTH AFRICA (PTY) LTD

Castle Walk Corporate Park,
Block B, Cnr. Nossob & Swakop Street
Erasmuskloof, Pretoria, 0181
South Africa

TF: +27 (0) 87 802 6136

Revised Date: September 2024