AcuRev 2100
Smart Metering System
Web Manual

ACCUENERGY

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Please read this manual carefully before installation, operation and maintenance of the AcuRev 2100 Series Power Meter. The following symbols in this manual are used to provide warning of danger or risk during the installation and operation of the meters.

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.

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Chapter 1: Introduction

1.1 Introduction to Ethernet

Chapter 1: Introduction

The AcuRev 2100 meter provides a dual Ethernet and WiFi communication channel. Users will be able to use both Ethernet ports and WiFi simultaneously with different networks and data acquisition systems.

1.1 Introduction to Ethernet

Ethernet was originally developed by Xerox and then further developed by DEC and Intel. This networking technology uses Carrier Sense Multiple Access with Collision Detection (CDSM/CD) protocol and provides transmission speeds up to 100Mbps.

Ethernet is not a network but more of a standard. It is the most current communication standard Local Area Network (LAN). This standard defines the type of cable that is used and the method of Signal Processing. The AcuRev 2100 meter supports two Ethernet channels.

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Chapter 2: Functional Description of the Ethernet Module

Chapter 2:
Functional Description of the Ethernet module

The AcuRev 2100 meter supports a wide range of communication protocols. Some of the more commonly used protocols are briefly explained below.

This module supports the Modbus-TCP protocol. When connected to the AcuRev 2100 series meter, it is a slave device that can only respond to queries. The default value for the Modbus Port is 502. The user-defined range is 2000~5999.

The AcuRev 2100 grants users the ability to send emails based on a time interval or when there is a triggered event using the SMTP protocol. It can send mail from encrypted servers and servers that use different SMTP ports.

The AcuRev 2100 supports HTTPS protocol. It is used as an HTTPS server and where the default value of the protocol port is 443. Using the HTTPS protocol, the AcuRev 2100 can send post requests to both HTTP and HTTPS servers.

The following are all the protocols supported by the AcuRev 2100:

- **Modbus TCP**
- **BACnet-IP**
- **SNMP V2**
- **HTTP/HTTPs**
- **FTP**
- **sFTP**
- **Wi-Fi WPA, WPA Enterprise**
- **NTP**
- **SMTP**
- **MQTT**

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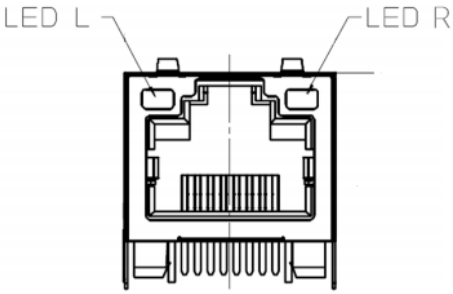
Chapter 3: Installation Method

3.1 Definition of RJ45

Chapter 3: Appearance and Dimensions

3.1 Definition of RJ45

The AcuRev 2100 uses two standard RJ45 connectors to access the Ethernet network. The mechanical and electrical characteristics of the connector are consistent with the requirements of IEC 603-7.



(Top View)

Script	ID	Content
1	TX+	Tranceive Data+
2	TX-	Tranceive Data-
3	RX+	Receive Data+
4	n/c	Not connected
5	n/c	Not connected
6	RX-	Receive Data-
7	n/c	Not connected
8	n/c	Not connected

LED_L (Yellow): Displays the speed status. When the LED is on it indicates 100Mpbs, whiles an off LED represents a speed of 10Mbps.

LED_R (Green): Displays the link and activity status. When the LED is on it indicates the link status. When the LED is flashing it indicates that there is activity.

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Chapter 4: Initializing the Ethernet Module

4.1 Cable

Chapter 4: Initializing the Ethernet module

The default settings in the AcuRev 2100 meter series meter are as follows:

Ethernet 1 (Static IP address)

- IP Address (192.168.1.254)
- Subnet Mask (255.255.255.0)
- Gateway (192.168.1.1)
- DNS Server 1 (8.8.8.8)
- DNS Server 2 (8.8.4.4)
- Modbus Port 502

4.1 Cable

An RJ45 cable is needed to connect the meter to the network.

A shielded twisted pair cable (standard 568A or standard 568B) is recommended as a reference to the EIA/TIA standard.

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Chapter 5: Connection Method

5.1 Direct Connect to a Computer

5.2 Direct Connect to a Router/Switch

5.3 Connect through WiFi

5.4 Description of Modbus-TCP Protocol

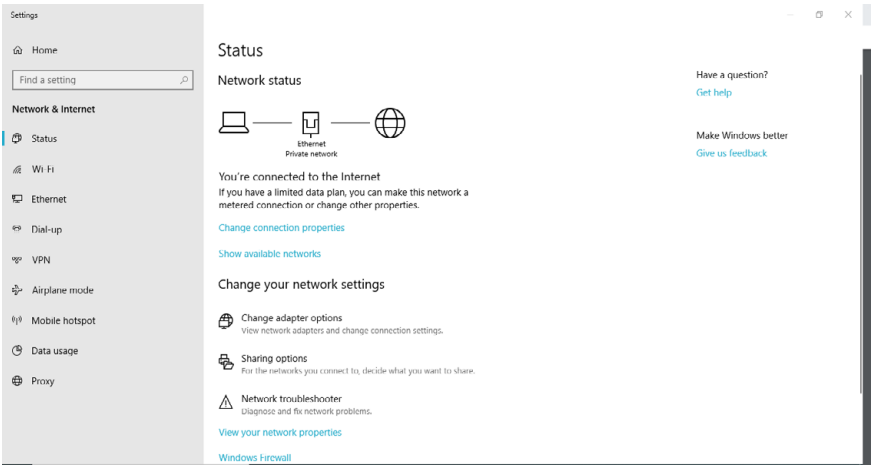
Chapter 5: Connection Method

5.1 Direct Connect to a Computer

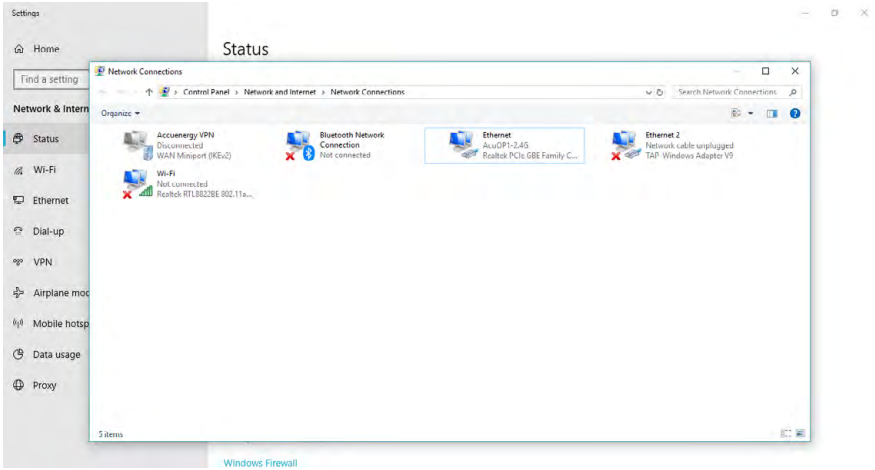
The AcuRev 2100 can be connected to a computer using a crossover cable (standard 568A). The AcuRev 2100 module supports Modbus-TCP and HTTPS Functions for this method of connection.

To connect the meter directly to the computer, the computer's IP must be within the same subnet as the meter's IP address. The following steps outline how to change the computers IP using a computer running the Windows OS:

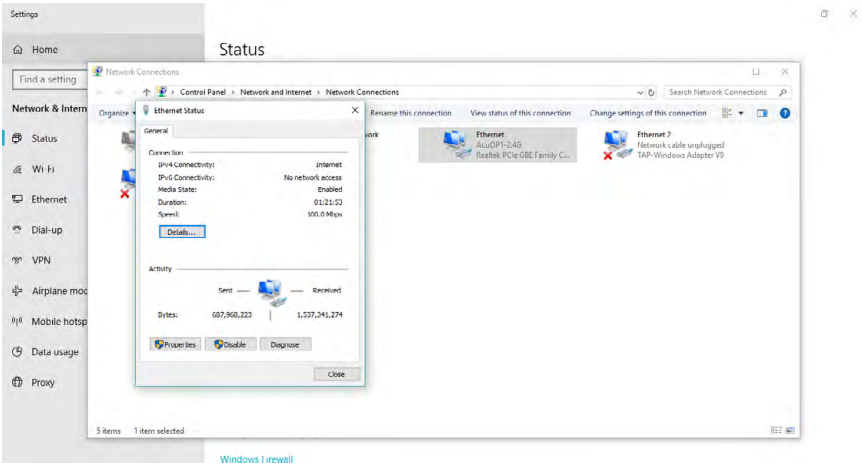
- Manually connect the meter via Ethernet cable to the computer
- Right-click on the connection icon
- Select "Open Network Sharing Center"



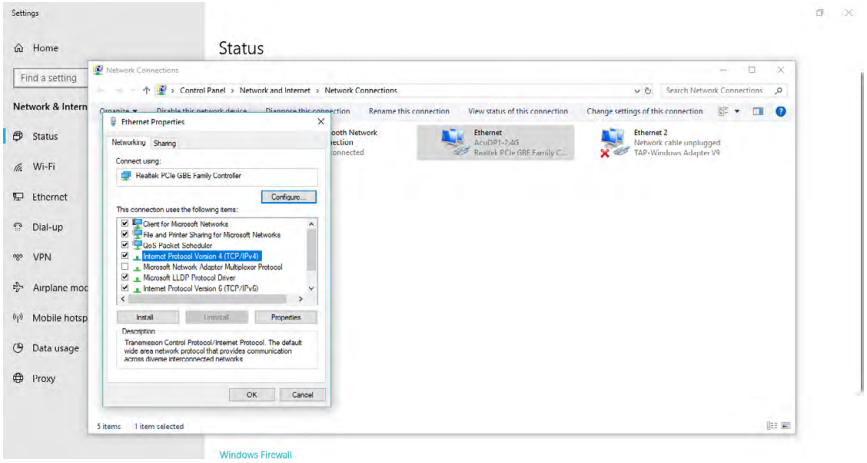
- Click on Change adapter options



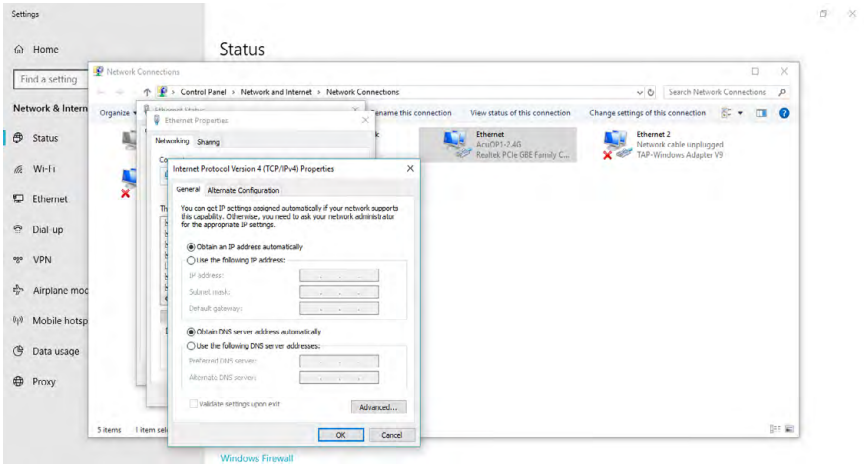
- Once there, right-click on the local area connection icon and select properties.



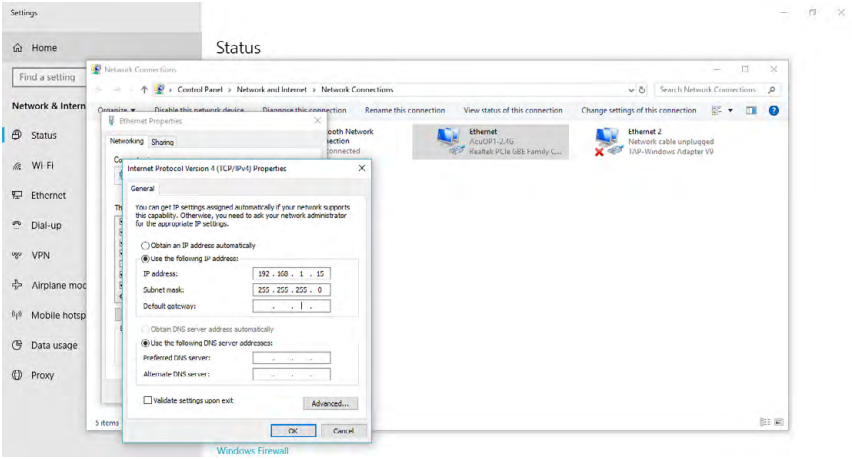
- Select the icon that says Internet Protocol Version 4 TCP/IP



- The Internet Protocol Version 4 (TCP/IP) Properties box will pop up



- Click on ''Use the following IP address'' and enter an IP number so that the meter and computer are in the same local network range. For example, if the meter has an IP address of 192.168.1.254, then the computer must be assigned with an IP 192.168.1.xxx, where xxx can be any number but cannot be the same as the value the meter has.



- Once you have entered in the IP address, press the Tab key on your keyboard until you hit the bottom and click OK
- Before selecting the OK button make note of the IP address you have assigned to the meter and then press OK.

NOTE: *The meter and computer cannot have the same IP address, they must be different.*

5.2 Direct Connect to a Router/Switch

The AcuRev 2100 can be connected to a router or switch using a patch cable. The DHCP can be configured to Auto to have the router assign the meter with an IP address or the DHCP can be configured to Manual to set an IP address and network settings manually.

AcuRev 2100 has two Ethernet ports, Ethernet 1 is set to have the static DHCP, and Ethernet 2 is set to have the dynamic DHCP. Both of the Ethernet ports have the same functionalities, you can use either of them according to the requirement.

5.3 Connect through WiFi

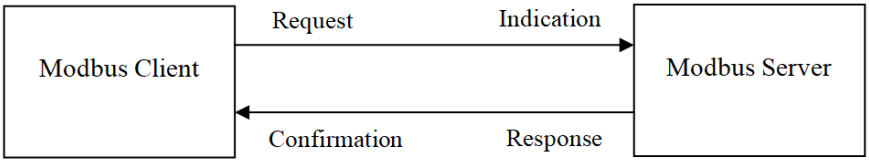
The AcuRev 2100 can be connected through a WiFi network.

By default, the AcuRev 2100 will be in Access Point mode with the default IP address of 192.168.100.1. Ensure the device connecting to the AcuRev 2100 has DHCP enabled or it should be in the same subnet as the AcuRev 2100. The module will appear in the WiFi network as AcuRev 2100-WIFI-(serial number of the module) as the SSID or name of the wireless network. By default, the network key or password will be ''accuenergy''.

- Once connected to the network, open an internet browser and type in the IP address of the WIFI module: ***192.168.100.***1
- Log in at Admin access level, using the default password of '***admin***'.

5.4 Description of Modbus-TCP Protocol

The Modbus-TCP protocol is used as one of the communication protocols in the AcuRev 2100. The protocol establishes a master and slave connection in Ethernet. The master device (client) first sets up a TCP-IP link with the slave device(server). The master device then sends a request to the slave device and the slave device in return sends a response to the master device. The figure below shows how the Modbus-TCP protocol works.



5.4.1 Protocol

a. Data Frame Format

MBAP Header	Function	Data
7x8 bits	8-bits	Nx8 bits

b. Modbus Application Header (MBA Header) Field

The Modbus application header field is the start of the data frame and consists of seven bytes.

Field	Length	Description
Transaction Identifier	2 Bytes	Identification of a Modbus Request/Response transaction
Protocol Identifier	2 Bytes	Modbus Protocol = 0
Length	2 Bytes	Number of following bytes
Unit Identifier	1 Bytes	Slave address, in the range of 0-247 decimal

c. Function Field

The function code field of a message frame contains eight bits. Valid codes are in the range of 1-255. When a message is sent from a client to a server device, the function code field tells the server what kinds of action to perform.

Code	Meaning	Action
05	Control Single Relay Output	Force Relay to a state of ON or OFF
01	Read Relay Output Status	Obtain current status of Relay Output
02	Read Digital Input (DI) Status	Obtain current status of Digital Input
03	Read Data	Obtain current binary value in one or more registers
16	Write Multiple Registers	Place specific value into a series of consecutive multiple registers

d. Data Field

The data field is constructed using sets of two hexadecimal digits, in the range of 00 to FF. The data field of messages sent from a master to a slave contains additional information that the slave must use to take the action defined by the function code. This can include information such as the register addresses, the number of registers to query and the count of the actual number of data bytes. For example, if the master requests a slave to read a group of holding registers (function code 03), the data field specifies the starting register and how many registers are to be read.

If the master needs to write data (function code 10 hexadecimal) to a group of registers in the slave, the data field specifies the starting register, how many registers to write, the count of data bytes to follow in the data field and the data to be written into the registers.

5.4.2 Format of Communication

Explanation of frame

Transaction identifier hi	Transaction identifier lo	Protocol identifier hi	Protocol identifier lo	Length hi	Length lo	Unit identifier
00H	00H	00H	00H	00H	06H	01H

Function Code	Data start register hi	Data start register lo	Data # of registers hi	Data # of registers lo
03H	40H	00H	00H	48H

The meaning of each abbreviated field above is:

Transaction identifier hi: High byte of the transaction identifier

Transaction identifier lo: Low byte of the transaction identifier

Protocol identifier hi: High byte of the protocol identifier

Protocol identifier low: Low byte of the protocol identifier

Length hi: High byte of length

Length lo: Low byte of length

Unit identifier: Slave address

Fun: Function code

Data start register hi: High byte of starting register address

Data start register lo: Low byte of starting register address

Data # of registers hi: High byte of number of registers

Data # of registers lo: Low byte of number of registers

Chapter 6: Web Interface Readings and Parameter Settings

6.1 User Access Login

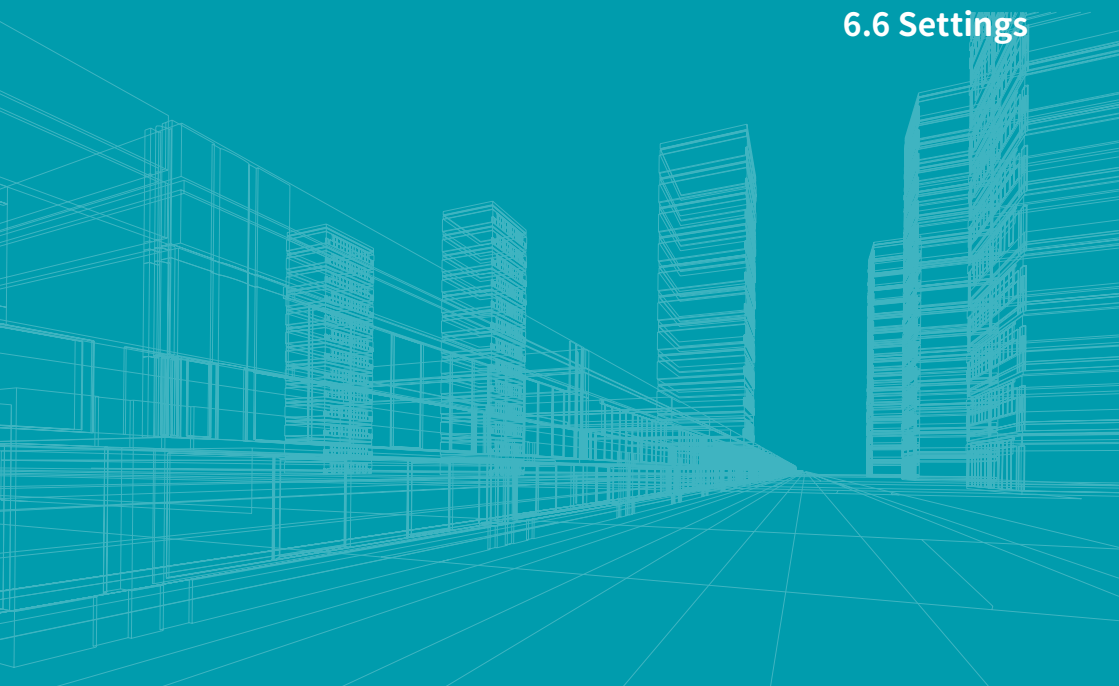
6.2 Dashboard

6.3 Metering Web Page

6.4 Logs

6.5 About

6.6 Settings



Chapter 6:
Web Interface Readings and Parameter Settings

The AcuRev 2100 supports the HTTPS protocol to allow for the use of a web interface. The user will need to access the AcuRev 2100 interface to configure the module and use its functions. The web interface allows for remote initial setup of the AcuRev 2100 meter.

The AcuRev 2100 interface allows for different user access levels.

To access the web interface the IP address for the AcuRev 2100 either Ethernet 1, Ethernet 2 or a WiFi IP address must be known.

6.1 User Access Login

Enter the correct IP address of the module in the search bar of the internet browser to access the web interface of the AcuRev 2100.

The user will be redirected to a web page prompting to select the Access Level and enter the appropriate password for that level.

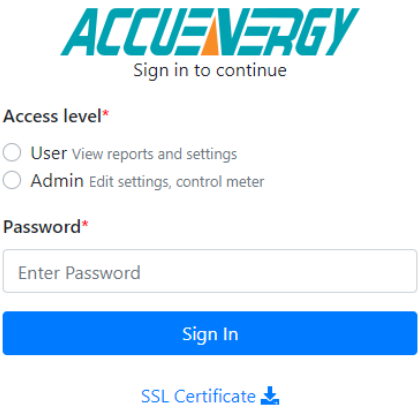
The ***User*** level is ideal for users who need only to take readings and view status from the meter.

The default password for the User level is ***view***.

It is recommended that no more than 5 users are logged in at the same time for this level to ensure the optimal performance of the web interface.

The ***Admin*** level is ideal for users who need access to configurations on the meter or the web interface and to view readings.

The default password for the Admin level is ***admin***.



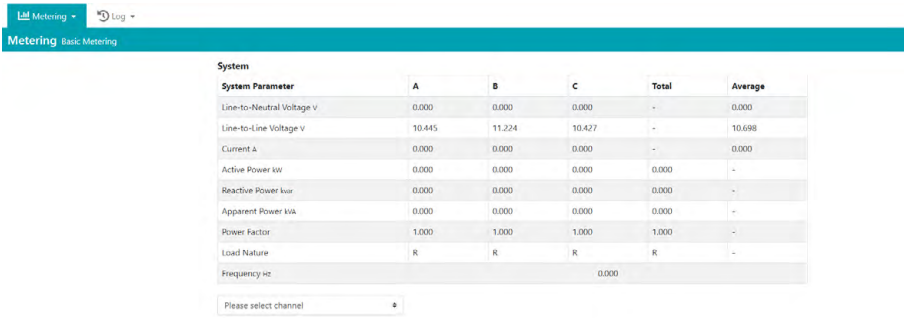
The two different access levels are summarized below:

Access Level	Default Password	Read Parameter/Status	Configure Settings
User	view	Yes	No
Admin	admin	Yes	Yes

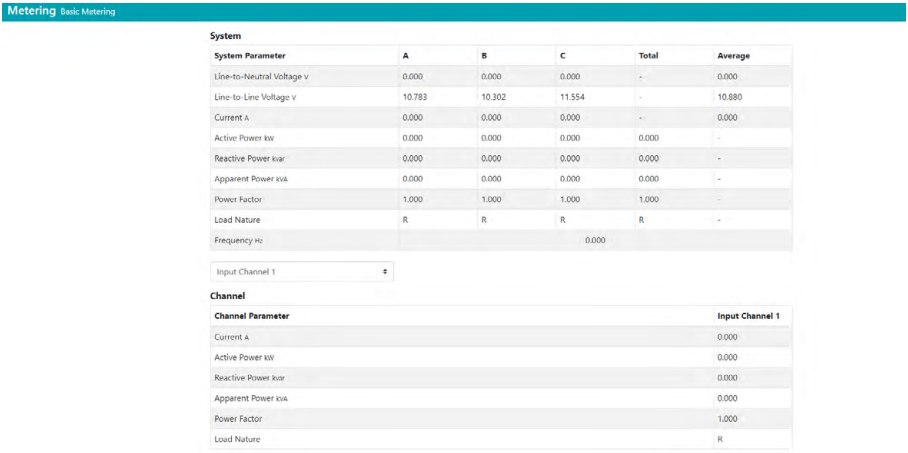
6.2 Dashboard

In the dashboard, the user will find the tabs to access different pages in the web interface such as ***Metering, Logs,*** and ***Settings***. The dashboard is the first page the user will see once they have entered the correct password for the appropriate access level and is the same for both access levels.

The dashboard displays the basic metering page which allows users to view the real time readings such as voltage, current, power and power factor. This table is a summary of all user channels (circuits) connected to the AcuRev 2100 meter.



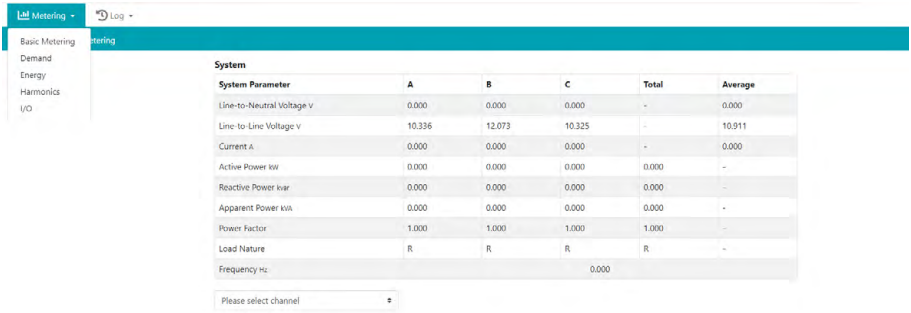
By clicking on "Select Channel" under the chart, the user will be able to see each input channel's reading or three-phase User reading below.



The parameters on this page are updated every 5 sec.

6.3 Metering Web Page

Click on the **Metering** menu option to visit the metering data web pages. There are 5 kinds of metering parameter web pages. They are "Basic Metering", "Demand", "Energy", 'Harmonics' and "I/O". Each web page shows data from the AcuRev 2100 meter.

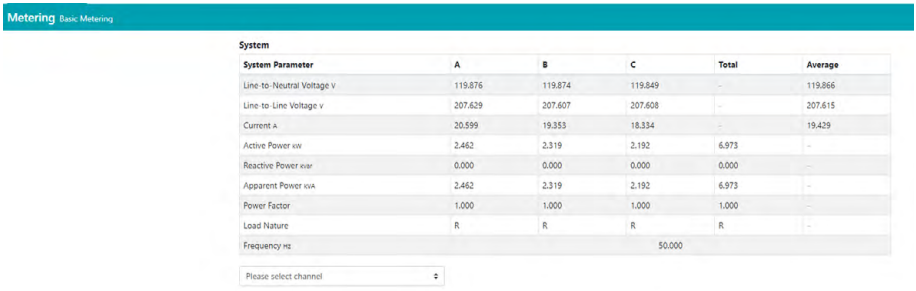


6.3.1 Basic Metering

The Basic Metering webpage includes the data of real-time parameters for the AcuRev 2100 meter. This includes the Line Voltages, Phase Voltages, Current, Active, Reactive and Apparent Power, Power Factor, Frequency and Load type.

The parameters on this page are updated every 5 sec.

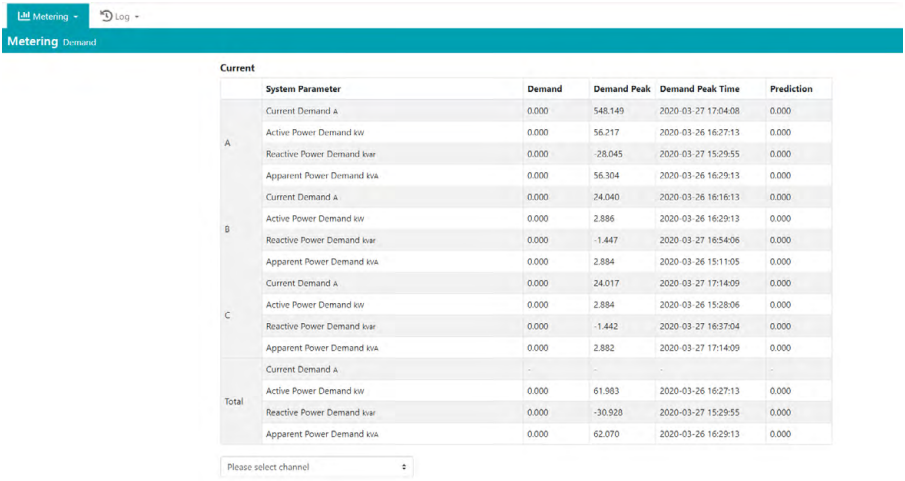
Users can use the select a channel drop down menu to select a desired channel or circuit.



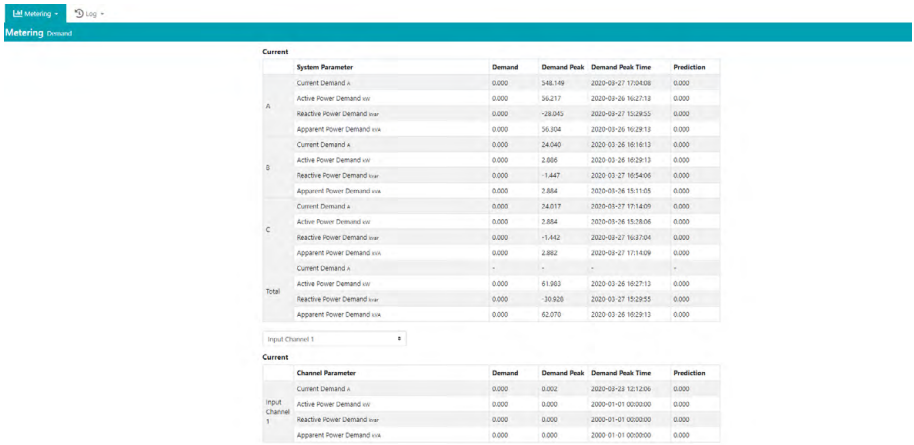
6.3.2 Demand

The demand page shows the Current Demand, Active Power Demand, Reactive Power Demand and Apparent Power Demand for each phase.

The demand table also includes the peak demand, the peak demand timestamp, and the demand prediction. This table provides the overall demand for all circuits connected to the AcuRev 2100 meter.



User can select and view the demand for specific circuits by using the drop down menu option on the demand page. The demand table for the specific circuit will be displayed below the meter demand readings.

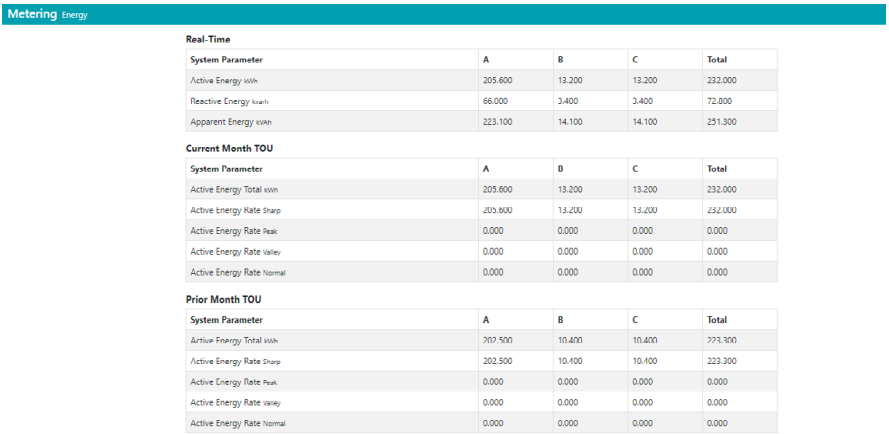


6.3.3 Energy

The Power & Energy webpage shows the energy data for the AcuRev 2100 meter such as the Active, Reactive and Apparent energy that is consumed. The energy data is displayed as the total as well as per phase. If users have configured TOU (Time of Use) on the meter, the TOU energy can be viewed from the energy page as well.

The AcuRev 2100 does not support bi-directional energy and is only able to view the consumed energy.

The parameters on this webpage are updated every 5 sec.



Users can select and view the energy for each circuit by using the drop-down menu below the main energy table. The individual circuit energy table is presented below the main table.

User Channel 1

Real-Time

Channel Parameter	A	B	C	Total
Active Energy kWh	3.100	2.800	2.800	8.700
Reactive Energy kvarh	0.200	0.000	0.000	0.200
Apparent Energy kVAh	3.100	2.800	2.800	8.700

Current Month TOU

Channel Parameter	A	B	C	Total
Active Energy Total kWh	3.100	2.800	2.800	8.700
Active Energy Rate Sharp	3.100	2.800	2.800	8.700
Active Energy Rate Peak	0.000	0.000	0.000	0.000
Active Energy Rate Valley	0.000	0.000	0.000	0.000
Active Energy Rate Normal	0.000	0.000	0.000	0.000

Prior Month TOU

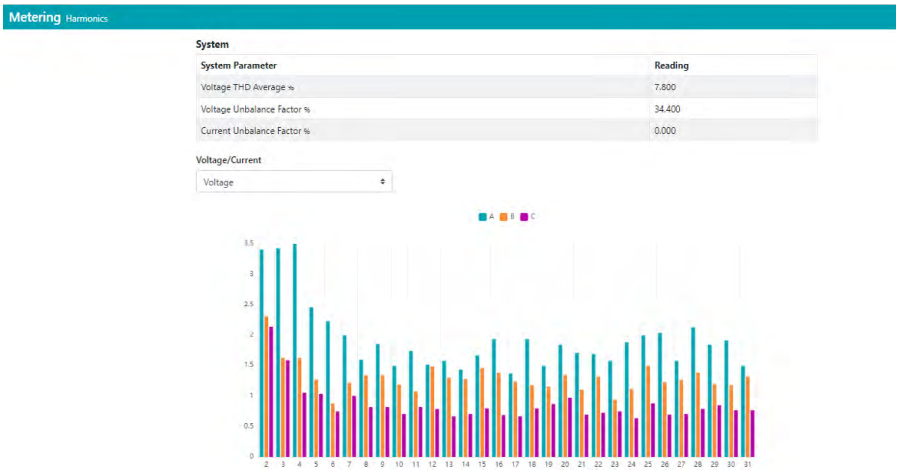
Channel Parameter	A	B	C	Total
Active Energy Total kWh	0.000	0.000	0.000	0.000
Active Energy Rate Sharp	0.000	0.000	0.000	0.000
Active Energy Rate Peak	0.000	0.000	0.000	0.000
Active Energy Rate Valley	0.000	0.000	0.000	0.000
Active Energy Rate Normal	0.000	0.000	0.000	0.000

6.3.4 Harmonics

The Harmonics web page will show the harmonics of the voltage and the current waveform being measured. It will display the harmonics of each phase in graphical and tabular format. Select between voltage and current to view their respective harmonics.

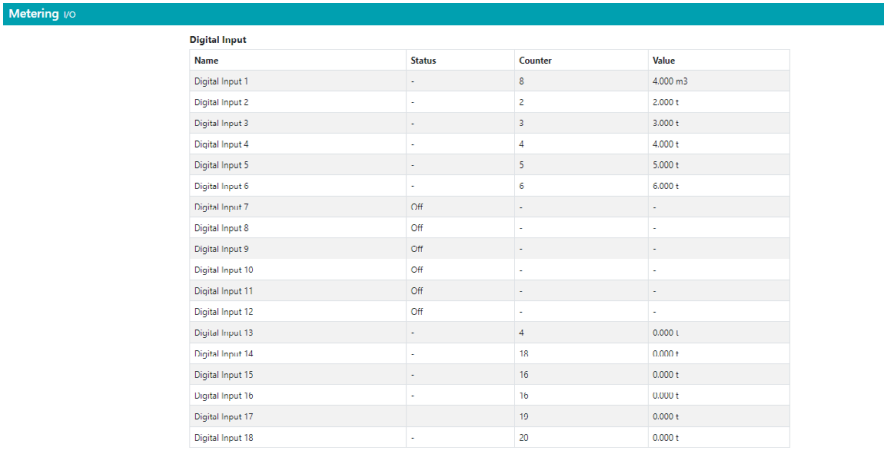
In the harmonic page users can view the THD, Voltage/Current unbalance factor, Even/Odd THD, Crest Factor and THFF readings.

The parameters on this web page are updated every 15 sec.



6.3.5 I/O

There are 18 digital inputs for AcuRev 2100 series meter. Each digital input channel can be programmed as either a status indicator or a DI pulse input counter. Users can view the pulse count or digital status as well as reset the DI count from this page.



Name	Status	Counter	Value
Digital Input 1	-	8	4.000 m3
Digital Input 2	-	2	2.000 t
Digital Input 3	-	3	3.000 t
Digital Input 4	-	4	4.000 t
Digital Input 5	-	5	5.000 t
Digital Input 6	-	6	6.000 t
Digital Input 7	Off	-	-
Digital Input 8	Off	-	-
Digital Input 9	Off	-	-
Digital Input 10	Off	-	-
Digital Input 11	Off	-	-
Digital Input 12	Off	-	-
Digital Input 13	-	4	0.000 t
Digital Input 14	-	18	0.000 t
Digital Input 15	-	16	0.000 t
Digital Input 16	-	16	0.000 t
Digital Input 17		19	0.000 t
Digital Input 18	-	20	0.000 t

There are also two Relay Outputs that can be toggled On/Off or configured as an alarm output.

Relay Output

Name	Status
Relay Output 1	Off toggle
Relay Output 2	Off toggle

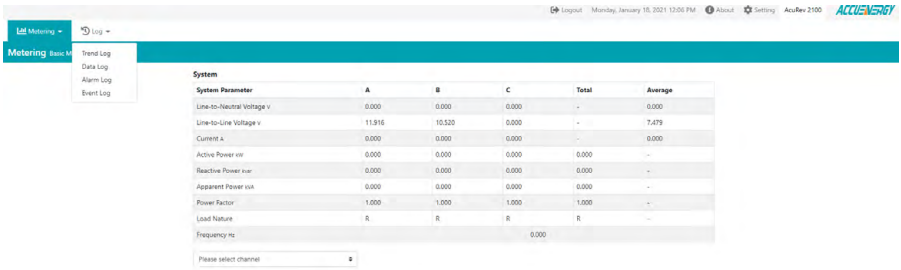
NOTE: *The DI and RO settings must be configured on the Acuview software.*

6.4 Logs

Click on the 'Logs' tab to visit the metering logs web pages.

There are four kinds of logs that can be viewed, they are "Trend Log", "Data Log, "Alarm Log", and "Event Log".

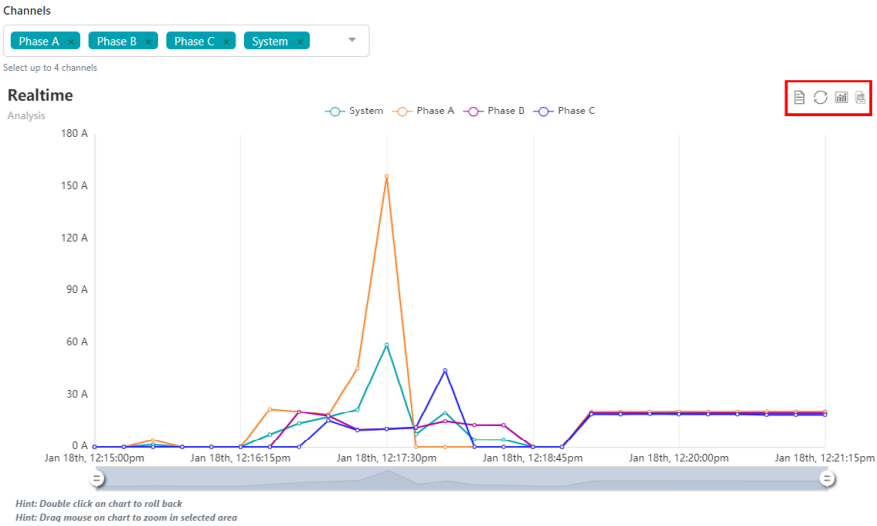
Each web page shows data from the AcuRev 2100 meter series meter.



6.4.1 Trend Log

The Trend Log web page includes the real-time and energy trend diagram. The real-time trend log diagram can be selected to show the following parameters phase voltage, line voltage, current, active power, reactive power, apparent power and power factor for each phase as well as the totals. The energy trend log shows the imported and exported active energy, reactive energy, total energy, net energy and apparent energy.

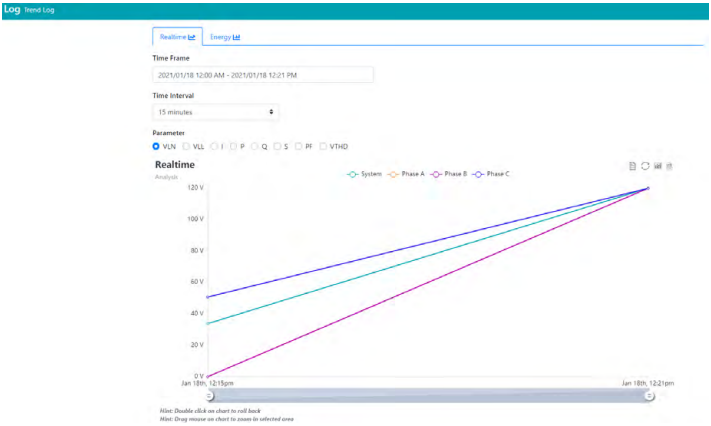
The data of the trend log can be previewed and downloaded as a .csv file by clicking the 'Data Review' and 'Data' icons on the right top side of the diagram. The trend log diagram can also be saved as an image by clicking the 'Image' icon. See the icons outlined (red box) in the image below.



6.4.1.1 Real-Time Parameters

The real-time parameters can be trended at different time intervals depending on the Time Frame selected. Listed below are the time intervals for each possible time frame setting:

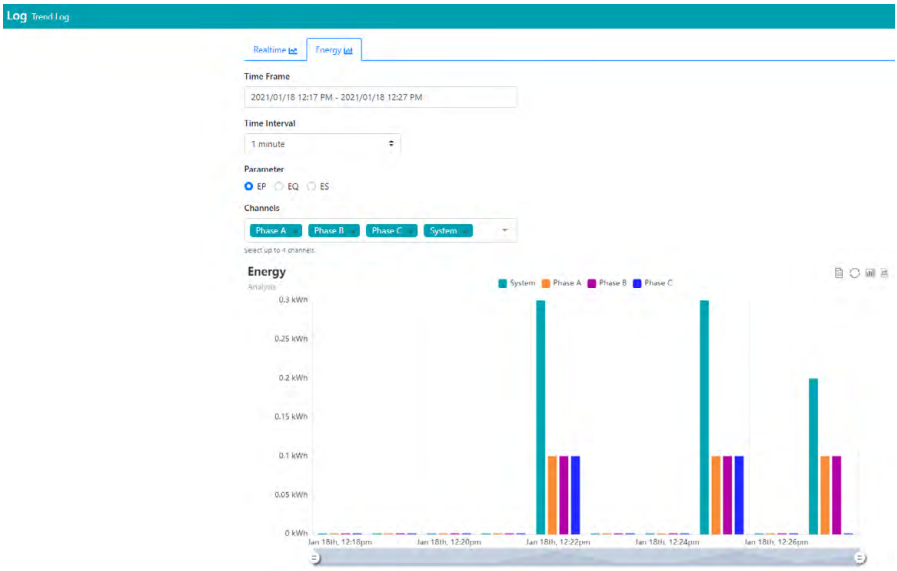
Time Frame	Time Intervals
Last 1 Hour	1 minute
Last 30 days	1 hour 1 day
Last Month	1 hour 1 day
Last 10 minutes	15 seconds 1 minute
Today	15 seconds 1 hour
Yesterday	15 seconds 1 hour
Last 7 days	15 minutes 1 hour 1 day
Custom Range	Dependent on range specified



6.4.1.2 Energy

Similarly, the energy parameters can be trended at different time intervals depending on the Time Frame selected. The table below displays the time intervals:

Time Frame	Time Intervals
Last 10 minutes	15 seconds 1 minute
Last 1 Hour	1 minute
Today	15 seconds 1 hour
Yesterday	15 seconds 1 hour
Last 7 days	15 minutes 1 hour 1 day
Last 30 days	1 hour 1 day
This Month	1 hour 1 day
Last Month	1 hour 1 day
Last Year	1 day 1 month
Custom Range	Dependent on range specified



6.4.2 Data Log

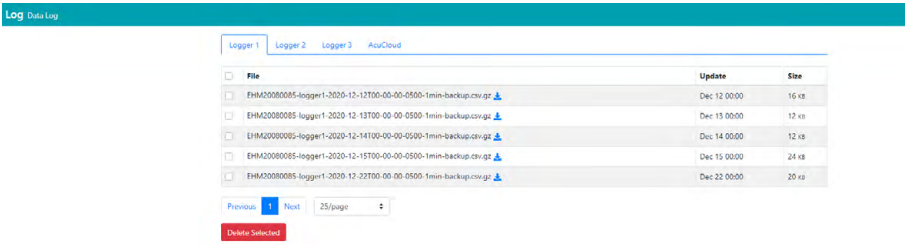
The data log web page includes all the data files for three different loggers and AcuCloud.

Users can select the different loggers by clicking the logger tab. After the logger is selected, the log file for this logger will show on the screen with the update time and file size. To download the file, click on the download icon to save the file on the computer. The data log will be saved as a compressed CSV file.

To delete the data logs users can check the box next to the data log file and click on the 'Delete Selected' button at the bottom of the page.

Users will be prompted by a window asking to confirm the data log delete.

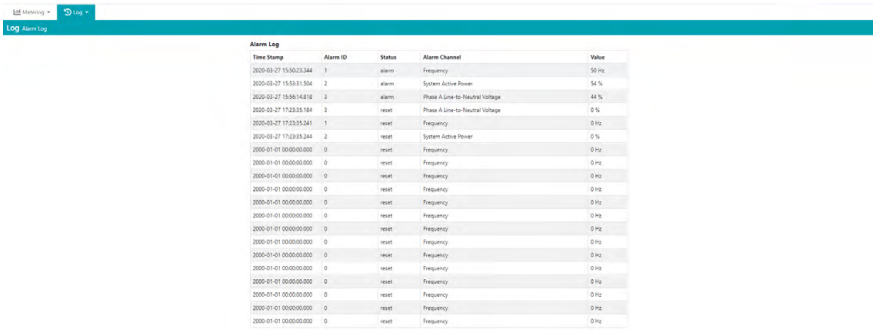
NOTE: *Deleting the data log is permanent, this cannot be undone once deleted.*



6.4.3 Alarm Log

The Alarm Log web page provides the user with a summary of the alarm events that have occurred with the meter. It will show the status of up to 16 alarm events indicating the alarm ID, status, parameter, value that exceeded or went below the threshold and the timestamp of the alarm event.

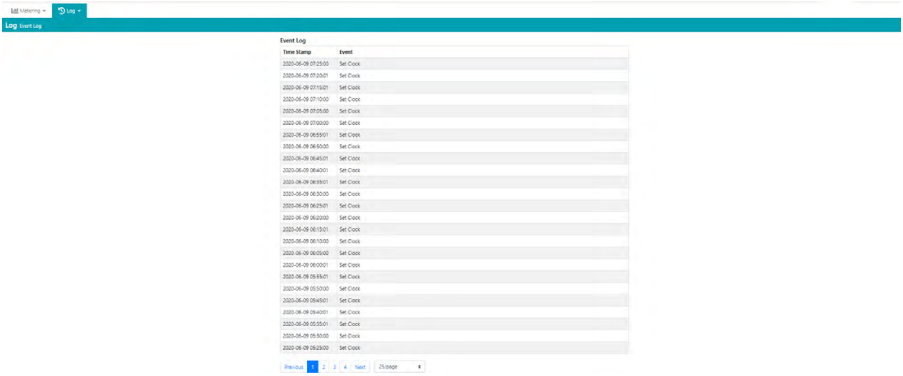
Once all 16 alarm events are full, the newest alarm event will then wrap around to alarm 1. The parameters in the alarm status web page are updated every 10 seconds.



6.4.4 Event Log

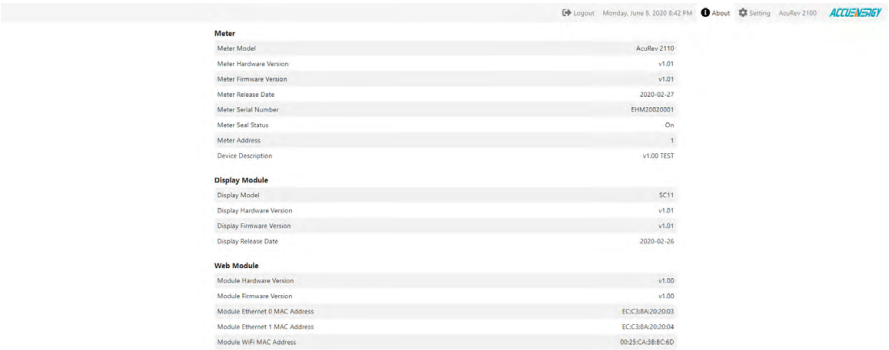
The event log web page will display the event log that involved in the parameter and setting changes.

The event log parameters are updated every 10 sec.



6.5 About

The About tab located at the top right corner of the web interface allows users to view the Device Information page. This page provides users with information about the AcuRev 2100 series meter. The Device Information contains the model of the AcuRev 2100 meter, serial number, firmware version and the meter addresses. It also contains the serial number, firmware version, hardware version and the MAC addresses of the AcuRev 2100 web module.



6.6 Settings

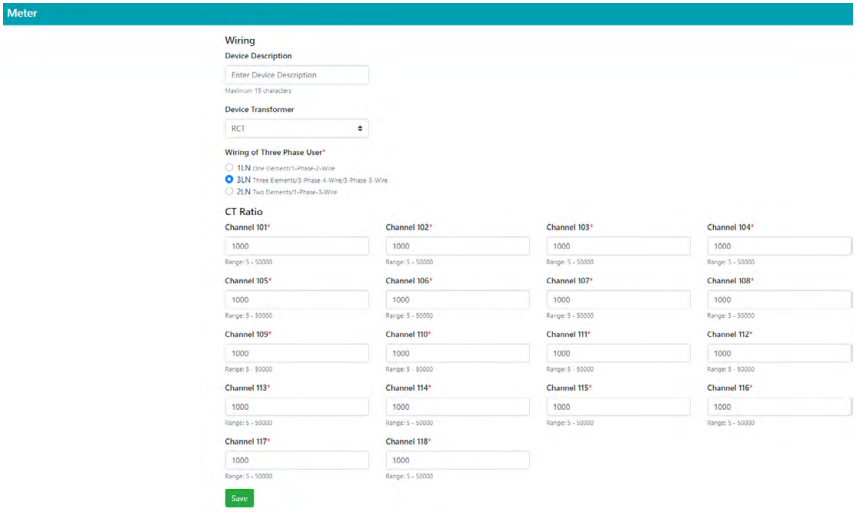
6.6.1 Meter

The basic metering configurations needed to set up the meter can be applied from the web interface by clicking on the **Settings** and selecting the **Meter**. The meter settings page includes the following settings:

- **Device Description:** A description for the meter can be provided in this field which will display on the Dashboard page.
- **Device Transformer:** Users can select the secondary output of the CTs being used on the meter. Users can select RCT or 333mV for the mV model and 80mA/100mA/200mA for the mA model.

NOTE: *Users cannot mix and match CTs, for example if users have the mV current input model they cannot mix and match RCT and 333mV CTs.*

- **Wiring of Three Phase User:** Select the type of wiring that the meter will be monitoring from the modes available. Users can select 1LN, 2LN, 3LN.
- **CT Ratio:** Set the rating of the CT that is connected to the meter to measure the current for each channel. For example if a 200A:333mV CT is being used, "200" must be entered in the CT ratio setting.



Chapter 7: Communications

7.1 Network

7.2 Email

7.3 Time/Date

7.4 Data Log

7.5 Post Channel

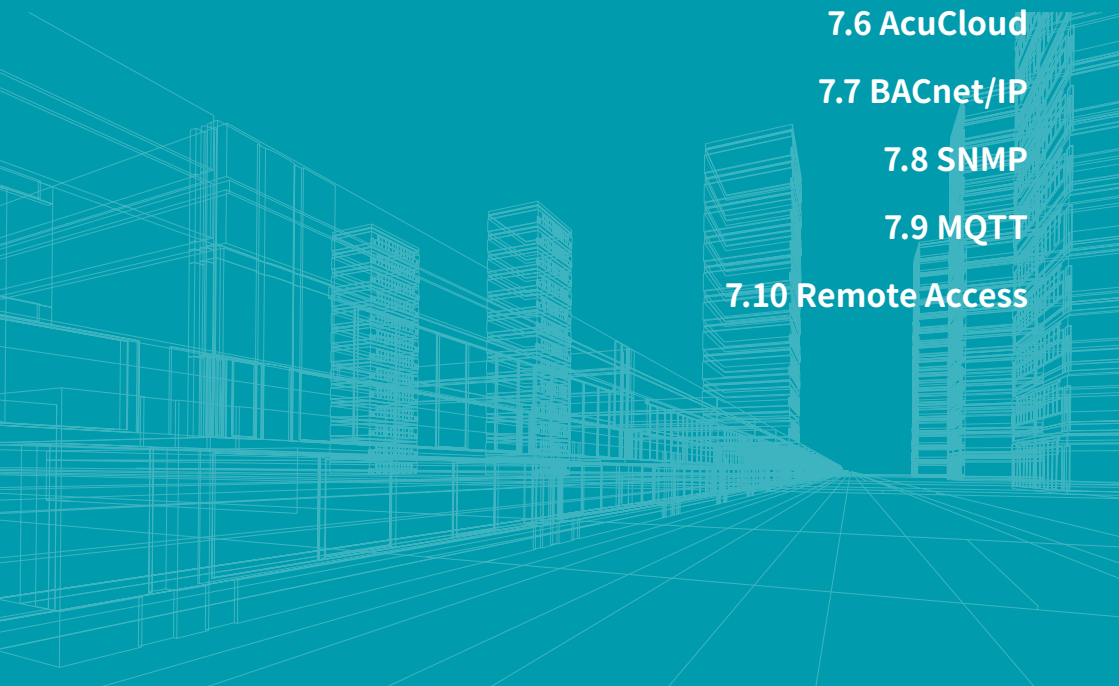
7.6 AcuCloud

7.7 BACnet/IP

7.8 SNMP

7.9 MQTT

7.10 Remote Access



Chapter 7: Communications

The communication setting web page will allow the user to configure settings related to the Ethernet networks and the Wireless network. The functions and protocols that the AcuRev 2100 supports can be configured by selecting the corresponding tab such as Emails, Time/Date, Datalog, AcuCloud Post for communicating with the AcuCloud software, BACnet-IP, SNMP.

7.1 Network

The first page the user will see after selecting the Communications option under the Settings tab is the Network page. The network settings allow users to configure all network-related settings including both Ethernet 1 and Ethernet 2 as well as WiFi.

7.1.1 Network Settings

The settings for the Ethernet 1 and Ethernet 2 are as follows:

- Ethernet 1 DHCP: Select 'Manual' to manually configure the IP address to access the meter. If set to 'Manual', you'll also need to set the Subnet Mask and Gateway. By default, the IP address for ETH1 will be 192.168.1.254. By default Ethernet port 1 is set to Manual. Select “Auto” to have the meter assigned an IP address automatically. With this selection, the Subnet Mask, and Gateway will also be automatically assigned.

NOTE: *After changing DHCP to Auto, check the display of the meter (N02 NET Settings) to obtain the new IP address that has been assigned. The new IP address will be displayed only after a module reboot is performed and completed.*

- **IP Address:** If the DHCP is configured to “Manual”, the IP address can be configured from this page. Default is 192.168.1.254
- **Subnet Mask:** If the DHCP is configured to “Manual”, the Subnet Mask can be configured from this page. Default is 255.255.255.0
- **Gateway:** If the DHCP is configured to Manual, the Gateway can be configured from this web page. Default is 192.168.1.1

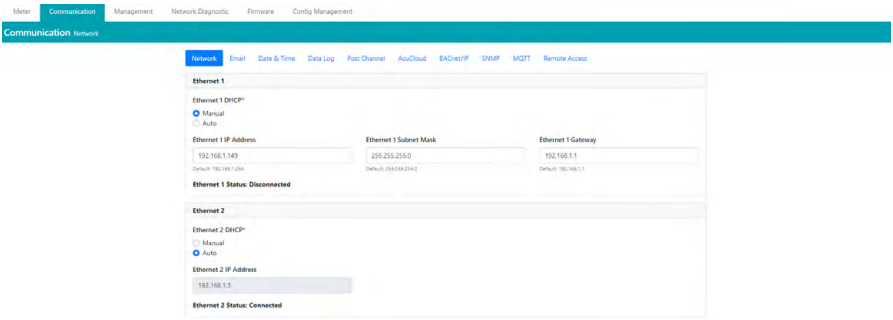
The status of the Ethernet 1 port will display if it is connected or disconnected.

- **Ethernet 2 DHCP:** By default, the Ethernet 2 port is configured to have its DHCP set to “Auto”. If configured to “Manual” the default Manual IP address is 192.168.1.253. Users can configure the IP address to any IP once the DHCP is configured for “Manual”, users will also need to set the Subnet Mask and Gateway if using this method.

NOTE: *The IP address of the Ethernet 2 can be found on page N12 of the NET Settings. The AcuRev 2100 meter protocol setting must be configured to AcuRev 2100 to view this from the meters NET settings.*

- **IP Address**: By default, the IP address is configured by DHCP, this field will be grayed out. If the DHCP is configured to Manual, the IP address can be configured from this page.
- **Subnet Mask:** If the DHCP is configured to Manual, the Subnet Mask can be configured from this page.
- **Gateway:** If the DHCP is configured to Manual, the Gateway can be configured from this web page.

The status of the Ethernet 2 port will display if it is connected or disconnected.



The AcuRev 2100 also supports WIFI communication where the WIFI setttings can also be configured on the Network settings page. The following WIFI settings are configurable from the interface:

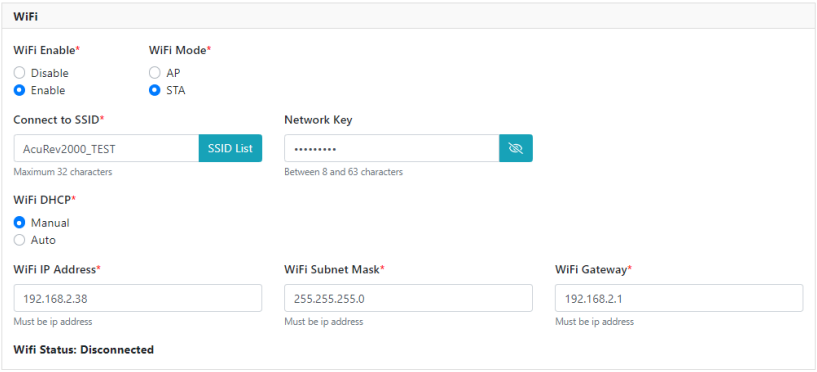
- **WiFi Enabled:** Select the Enable or Disable communication through WiFi.
- **WiFi Mode:** The WiFi can be configured to work in two modes just like any other WIFI device. It can be configured as either Access Point (AP) or Station mode.
    - Access Point: Default configuration for AcuRev 2100. The AcuRev 2100 will act as a wireless access point and will allow other wireless devices to connect and access the AcuRev 2100.

      In Access Point mode, users can configure the SSID, Network Key and IP of the AcuRev 2100 as well as the DHCP DNS servers.
    - Station: The AcuRev 2100 will behave like a wireless client and bridge to another wireless network that is available.

      In Station mode, users can select the Wireless network to connect to under the "Connect to SSID" setting. Click on "Select from Available Networks" and enter the Network Key for the wireless network that the AcuRev 2100 will bridge to.

If users are connecting to an open Wireless network that is not password protected, the password field can be left blank.

AcuRev 2100 also supports Enterprise WiFi, where users can connect using an enterprise-level WiFi network which is common in many colleges/universities, hospitals, etc. When attempting to connect to an enterprise-level WiFi network the interface will show options to connect to the network with a username and password.

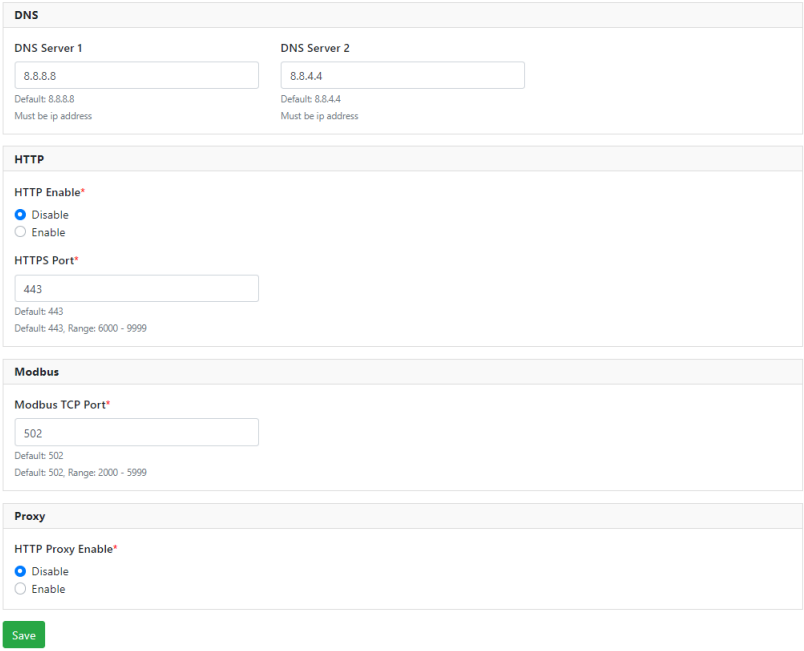


In station mode the DHCP can be configured as either manual or auto.

- If manual, users can configure the IP, Subnet Mask and Gateway and DNS Servers.
- If auto, users can check the meter's display to get the IP address and all other network configurations assigned by the wireless network. The user can also configure the DNS servers if the DHCP is set to Auto.

NOTE: *The WiFi IP address for the AcuRev 2100 will be in parameter N11 of the NET settings.*

- **DNS Server 1:** Enter the address of DNS server 1 in this field. Default DNS1 is 8.8.8.8
- **DNS Server 2:** Enter the address of DNS server 2 in this field. Default DNS2 is 8.8.4.4
- **HTTPS Port:** Enter the HTTPS port number of the meter. By default, this setting is configured to 443. The range can be from 6000 to 9999.
- **HTTP Enable:** Enable HTTP so the AcuRev 2100 can be accessed through the HTTP protocol, by default the HTTP port is 80 but it can be configured from 6000-9999.
- **Modbus TCP Port:** Enter the Modbus port number of the meter. By default, this setting is configured to 502. The range can be from 2000 to 5999.
- **Proxy Server Enable:** Select enable to allow for forwarding of data log files to pass through the Proxy server first and then the data post server. IE. AcuCloud.



After making any changes on the network settings page, click 'Save'. Users will be prompted to reboot the AcuRev 2100 immediately or later. If later is chosen the AcuRev 2100 will need to be rebooted from the 'Management' page in order for the settings to take effect.

7.2 Email

The AcuRev 2100 supports the SMTP protocol where users can configure the meter to send emails based on a specific time interval or whenever there is an alarm, System Event or a combination of both. The Email configuration page can be accessed by clicking on the **Email** tab under **Communications**.

There are three modes available for sending emails that the user can enable.

The first mode is **Real Time Email Reporting** where emails are sent immediately when there is a new alarm, or System event.

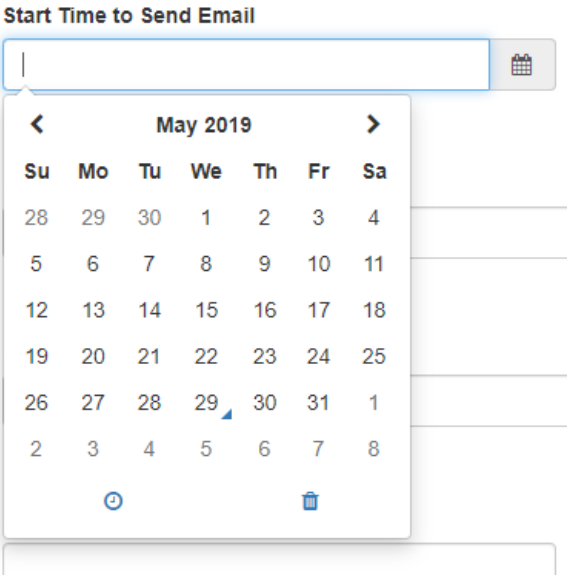
The second mode is **Periodic Email Reporting** where users can receive emails at a certain period of time based on the time interval configured. The email will include the data that is selected to be sent.

The third mode is when both of the above are enabled.

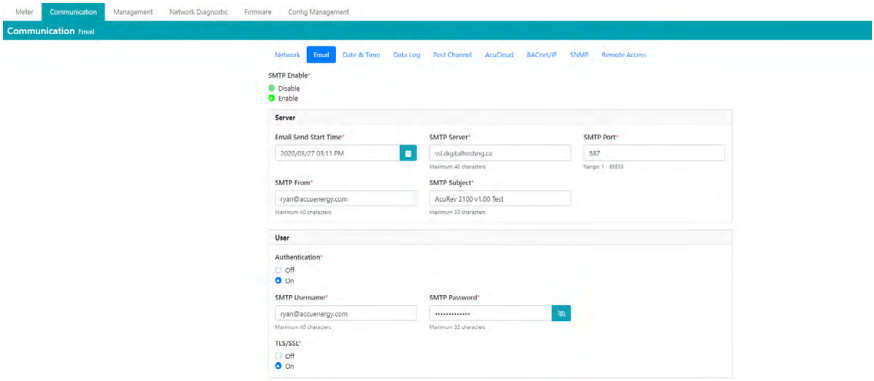
Users must know their SMTP server provider and details regarding their SMTP server, which can be provided by users' IT personnel.

The following settings must be configured for email reporting:

- **SMTP Enabled:** Select 'Enable' to enable and to further configure the settings related to the SMTP function.
- **Start Time to Send Email:** Select the date and time for when the emails should begin to send.
  - Click on the icon to configure the time and date.
  - Click on the icon in the bottom right to clear the time and date.



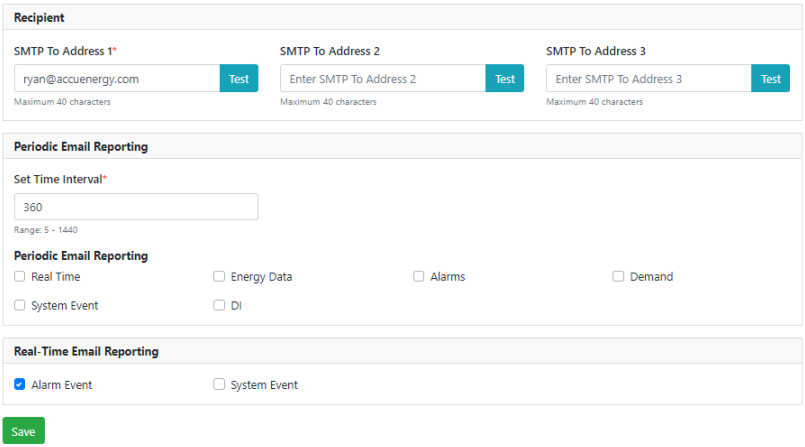
- **SMTP Server:** Enter the URL of a valid SMTP server. I.E. mail.accuenergy.com or smtp.gmail.com
- **SMTP Port:** Enter the port number associated with the SMTP server.
- **SMTP From:** Enter a name or phrase which will appear to let you know who the mail is from. I.E. 'Technical Support'
- **SMTP Subject:** Enter a subject line for the emails
- **Authentication:** Users can have email authentication on or off. If authentication is on users will need to provide the SMTP username and password.
  - **SMTP Username:** Enter the SMTP user name for the SMTP server set above.
  - **SMTP Password:** Enter the SMTP user password for the username set above.
- **TLS/SSL:** Users have the option to send emails using TLS/SSL protocols



- **SMTP To Address 1/2/3:** Enter up to three recipients that you wish to have the email sent to in “SMTP To Address 1/2/3”.
- **Test Address 1/2/3:** Test the if the email can be sent to “SMTP To Address 1/2/3”.

NOTE: *If the test address function fails, users can view the email post-failure by clicking on the 'Details' option from the test post screen.*

After configuring the above settings, the next step is to select the content for the emails.



The content of the emails can either be time-based triggered or event-based triggered.

For receiving emails on a time based under Enable Periodic Email Reporting:

Enter a time between 5-1440 mins in the Set time interval

- Check off the box beside the parameters for the content the user should receive.
  - **Real Time:** Report on Real-time voltage, current, power and etc.
  - **Energy Data:** Report on energy parameters.
  - **Alarm:** Report of the alarm log.
  - **Demand:** Report demand data.
  - **System Event:** Report of the SOE log.
  - **DI:** Report DI status/counters.

The user will receive an email report in a CSV file attachment. The report will include the readings and/or the real time triggered event.

7.3 Time/Date

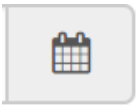
The device clock of the AcuRev 2100 meter series meter can be set through the web interface of the AcuRev 2100. The AcuRev 2100 supports NTP (Network Time Protocol) so that the module can update the meter's device clock by synchronizing with a time server.

The module can sync with up to three time servers. If a time server is down, the module will synchronize with the second or the third time server if they are configured.

The settings for the time and date can be found by clicking on **Settings** and selecting the **Communications** tab. Users can select **Date & Time** to configure the time settings.

The following must be configured to set the time/date and NTP settings:

- **NTP Enabled:** Select enable to further configure the settings related to the NTP (Network Time Protocol) function
- **Device Clock:** Configure the date and time on the meter
  - Click on the icon to configure the date and time.

    
  - Click on the icon in the bottom right to clear the time and date.

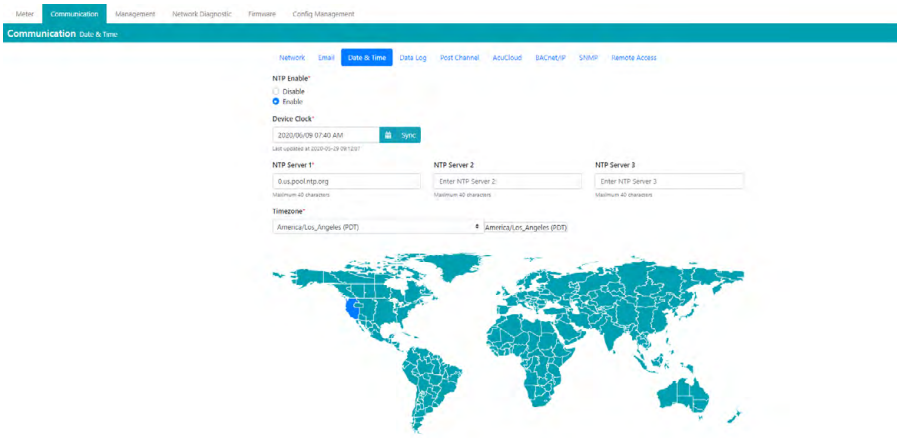
- **Sync Time:** Click on Force Update to have the AcuRev 2100 sync its time with the NTP server
- **NTP Server 1/2/3:** Enter up to 3 NTP servers in the "NTP Server 1", "NTP Server 2" and "NTP Server 3"

  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:** Select the time zone the meter is in or the time zone in which you would like the meter's time to be synchronized to from the drop-down list. Users can also select the time zone by clicking on the region on the map.

Click “Save” after configuring the time settings. Users will be prompted to reboot the AcuRev 2100 immediately or later. If later is chosen the AcuRev 2100 must be rebooted from the “Management” page in order for the settings to take effect.



7.4 Data Log

The AcuRev 2100 supports logging data onto its onboard memory, where the module has 8GB of memory.

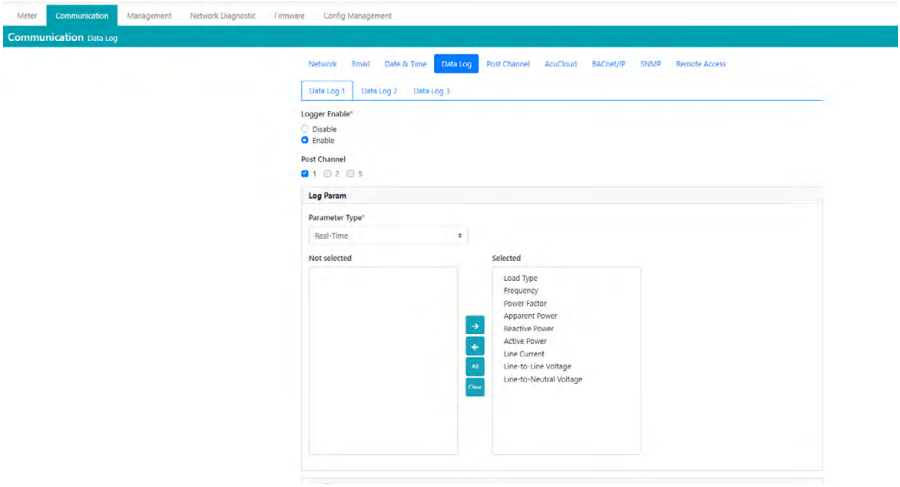
The module supports three loggers for different parameters and requirements.

The data can be downloaded as a .csv file from the “data log” page in the logs section or by using an HTTP/FTP client.

- **Logger Enable**: To use the data log function to log the data onto the module, select 'Enable' to view and configure the settings that are applicable.
- **Post Channel:** Select the channel to push the data log to an external HTTP/FTP server. Only an enabled post channel can be selected here. A post channel can be enabled in the 'Post Channel' tab on the settings page.

- **Log Param Type:** Users can select the type of parameters they wish to log into logger.

Use the '>' button to add selected parameters into the data log and use the '<' button to remove selected parameters from the data log. Users can also use the 'All' or 'Clear' buttons to add all or clear all parameters to and from the data log. The supported parameter types include real-time readings, energy readings, demand readings, power quality readings and I/O readings.



- **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.

- **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 the UTC timestamp or based on Time Interval Format.

- **Log Interval:** Select how frequently the meter will log data to the file that will be uploaded to the server from the drop-down list. The logging interval can be from 1 second to 1 month. The minimum time interval option is according to the selected parameter.

- The Real-time & IO's min Log Interval is 15 seconds

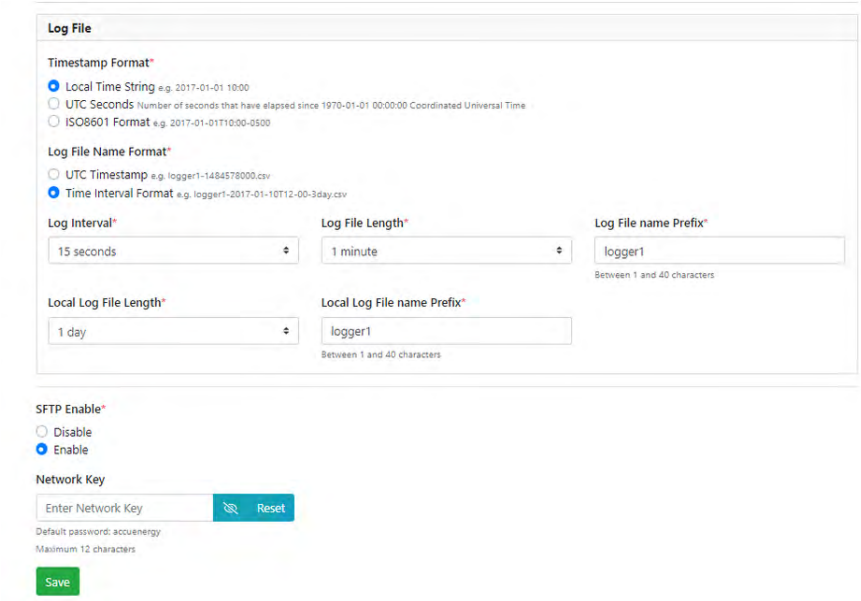
- The Energy's min Log Interval is 1 minute

- The Demand & Power Quality's min Log Interval is 1 min

NOTE: *If the selected parameters are Real-time and I/O, the min log interval is 15 seconds. If the selected parameters are Real-time and Energy, the min log interval is 1 minute.*

- **Post File Length:** Select how frequently the log file will be uploaded to the server from the drop-down list The log file length can be from 1 minute to 1 month.
- **Log File Name Prefix:** Provide a name for the log file posted to the post channel which will be appended to the beginning of the log file. By default "logger1" will be appended to the beginning of the log file.
- **Local Log File Length:** Select the length of the local log file as 1 hour, 1 day, 7 days or 1 month of data from the drop-down list.
- **Local Log File Name Prefix:** Provide a name for the local 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.

NOTE: *The Post File Length and Local Log File Length must be less than or equal to the log interval selected.*



- **SFTP Enable:** To download the logged data from the module using an FTP client, select Enable. The log file will then be available to be downloaded using an FTP client using the following credentials:

  Host: sftp://IPaddressofthemeter
  Username: sftpuser
  SFTP Password: accuenergy
  Port: 22

By default the password for retrieving the backup log files is **accuenergy.** The user can configure any password or can reset to the default of accuenergy by clicking on the "Reset SFTP Password".

NOTE: *After enabling the SFTP function the user must reboot the communication module in order to access the data logs with the default password of 'accuenergy'.*

Click 'Save' after changing any settings. Users will be prompted to reboot the AcuRev 2100 immediately or later. If later is chosen, the AcuRev 2100 must be rebooted from the 'Management' page in order for the changes to take effect.

7.5 Post Channel

The AcuRev 2100 supports the HTTP and FTP Post functions to send data from the meter to an HTTP/FTP server. The AcuRev 2100 can post .csv files to three different HTTP or FTP servers using HTTP Post or FTP Post.

In the case when there is no connection to the server, the AcuRev 2100 will store the posts and send it out after the connection is restored. A maximum of 3000 files will be buffered on the module. The Clear Post Channel Logs button will allow users to clear the buffered files on the meter.

The AcuRev 2100 can post data to a server at intervals of time ranging from 1 minute to 1 month.

The settings for configuring the post channels to post the data can be found by clicking on **Settings** and then selecting the **Communications** tab. Click **Post Channels** to configure any of the three post channels.

- **Post Channel 1/2/3 Enable:** Enable the Post Channel 1 in order to configure the settings needed to post data via the HTTP(S)/FTP post functions
- **Post Method:** Select the method for posting the files, the user can choose HTTP/HTTPS or FTP
- **Post Name Fixed:** This configuration needs to be enabled in order for the user to control the name of the file that will be posted. Otherwise, the file name will be based on the Log File Name Format configuration from the Data Log settings
- **Post File Name:** Users can enter a name for the file that will be posted as if 'Post Name Fixed' is enabled

If the HTTP/HTTPs post method is selected:

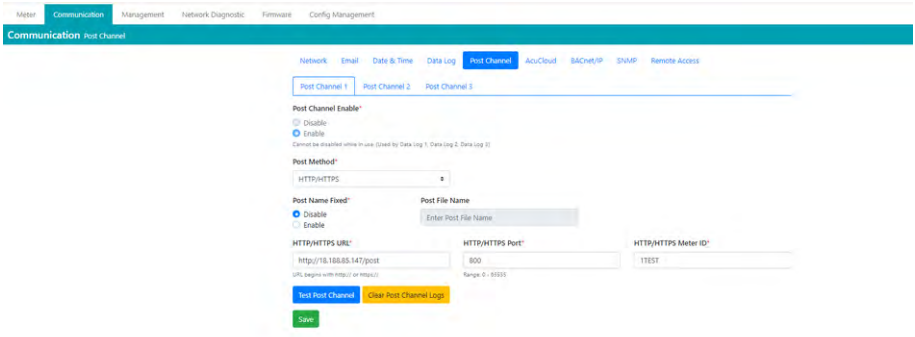
- **HTTP/HTTPS URL:** Enter the URL for the HTTP/HTTPS server. The URL needs to begin with the prefix http:// or https://
- **HTTP/HTTPS Port:** Enter the port number the server will be listening on
- **HTTP/HTTPS Meter ID:** Enter a name or description for the meter to be identified on the server

If the FTP post method is selected:

- **FTP URL:** Enter the URL for the FTP server. The URL needs to begin with the prefix ftp://
- **FTP Port:** Enter the port number the server will be listening on
- **FTP Username:** Enter the username required to log into the FTP server
- **FTP Password:** Enter the password required to log into the FTP server

NOTE: *The 'TEST Post Channel' button should only be utilized after clicking the 'Save' button otherwise a fail response will be observed. If a fail response occurs after clicking 'Save' confirm the network settings or credentials for the server.*

Click 'Save' after changing any settings. Users will be prompted to reboot the AcuRev 2100 immediately or later. If later is chosen the AcuRev 2100 must be rebooted from the 'Management' page in order for the settings to take effect.



7.6 AcuCloud

The AcuRev 2100 can directly interface with the Accuenergy Cloud software AcuCloud, where the meter can post data to the cloud every five minutes.

AcuCloud will require the serial number of the AcuRev 2100 which will then provide a token that will be used to configure the AcuRev 2100 so it can send its data to AcuCloud.

The settings for the AcuCloud post function can be found by clicking on the **Settings** tab and selecting **Communications**. Select **AcuCloud** to access the settings to configure the AcuRev 2100 to send data to the cloud.

- **AcuCloud Enable:** Select 'Enable' to enable the function and to further configure the settings related to AcuCloud.
- **AcuCloud Token:** Copy and paste the token provided by the AcuCloud software into this field.

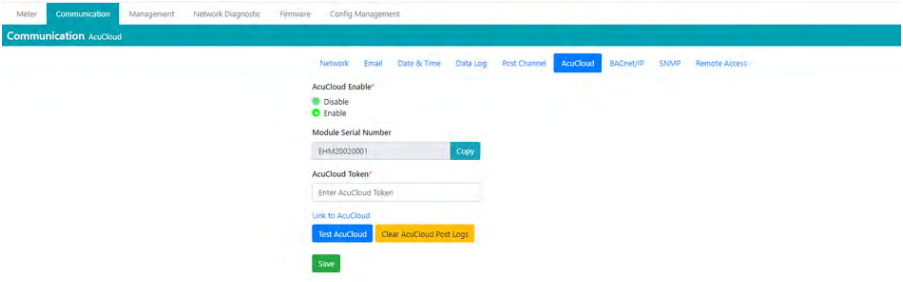
NOTE: *The "TEST AcuCloud" button should only be utilized after clicking the 'Save' button otherwise a fail response will be observed. If a fail response occurs after clicking 'Save', please double-check the serial number entered in AcuCloud, the token pasted in the web page as well viewing the test post details by clicking on the 'Details' option.*

Users can use the 'Link to AcuCloud' to access the cloud software and configure the required settings on that platform. Users must have sufficient access to add devices on their account in order to correctly configure the meter on the software.

NOTE: *For inquiries on creating your AcuCloud account please contact Accuenergy Technical Support.*

Click 'Save' after changing any settings. Users will be prompted to reboot the AcuRev 2100 immediately or later. If later is chosen the AcuRev 2100 must be rebooted from the 'Management' page for the settings to take effect.

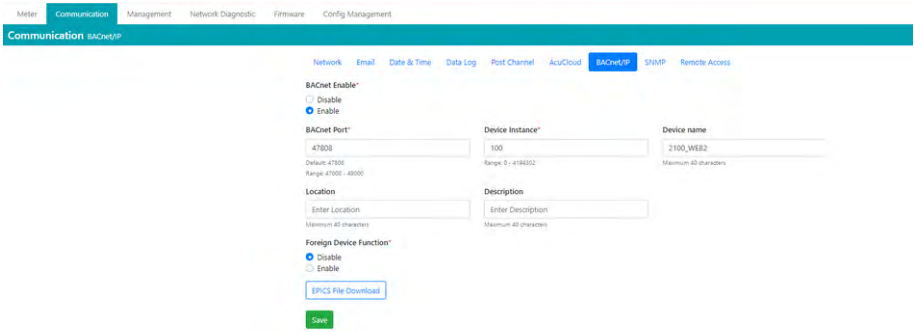
The AcuRev 2100 will post the data continuously every 5 minutes after the reboot.



7.7 BACnet/IP

The AcuRev 2100 supports the BACnet/IP protocol. The settings for the BACnet/IP protocol can be found on the web by clicking on the Settings tab and selecting Communications. Once on the communications page select BACnet/IP to access the settings to configure the AcuRev 2100 to communicate with a BACnet client.

- **BacNet Enabled:** Select Enable to enable the BACnet protocol.
- **BACnet Port:** Enter the BACnet or UDP port number. The default port is 47808.
- **Device Instance:** Enter the instance number for the device in the BACnet system. It must be unique within the system.
- **Device Name:** Enter a name for the device to distinguish it from other devices within the network.



Under the "Enable Foreign Device Function", select 'Enable' to communicate with a BACnet device from another subnet.

- Enter the IP of the BACnet Broadcast Management Device (BBMD) under the 'BBMD IP' field for the device which will receive broadcast messages on one subnet and forward them to another subnet.
- Enter BACnet Port of the BBMD in "*BBMD Port*"
- Enter a value between 5-1440 min in the "Time To Live" for how often the foreign device will register in the BBMD's foreign device table.

Click 'Save' after changing any settings. Users will be prompted to reboot the AcuRev 2100 immediately or later. If later is chosen the AcuRev 2100 must be rebooted from the 'Management' page in order for the settings to take effect.

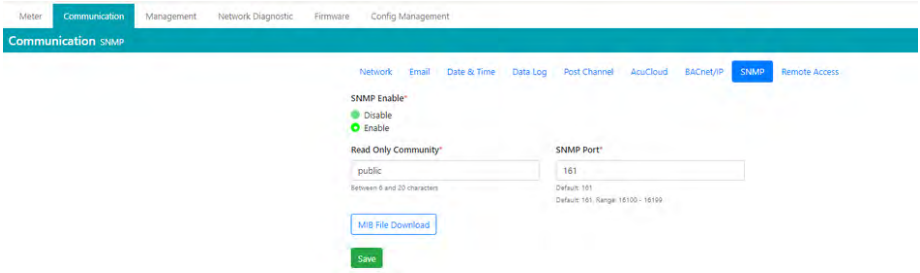
7.8 SNMP

The AcuRev 2100 supports the Simple Network Management Protocol (SNMP) for reporting the metering data to the management station. The AcuRev 2100 uses a public community string for read-only access. By default, the module will communicate using SNMP port 161.

The settings for the SNMP protocol can be found by clicking on the **Settings** tab and selecting **Communications**. From the communications page, select the **SNMP** tab to access the settings to configure the AcuRev 2100 for communication with an SNMP management station.

- **SNMP Enable:** Select 'Enable' to enable the function and to further configure the settings related to the SNMP protocol.
- **SNMP Port:** By default, the SNMP Port is configured to 161. The SNMP Port can be any value from ranging from 16100 to 16199.
- **Read Only Community:** By default the community string is Public, this configuration is similar to a password that allows only authorized users to access the meters data.

Click 'Save' after changing any settings. Users will be prompted to reboot the AcuRev 2100 immediately or later. If later is chosen the AcuRev 2100 must be rebooted from the 'Management' page in order for the settings to take effect.



7.9 MQTT

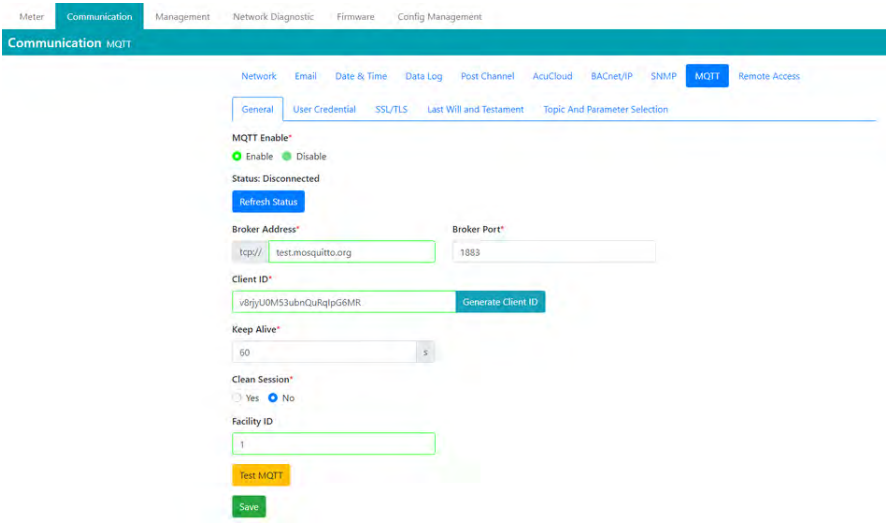
AcuRev 2100 supports the MQTT protocol where the gateway can publish device data to a subscriber using an MQTT broker. The MQTT broker is a central server where all MQTT clients would connect to. The broker/server manages all message topics and updates new messages to all clients that are subscribed to a particular topic. All related MQTT settings can be configured in the MQTT page under the Communication tab.

7.9.1 MQTT General Settings

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

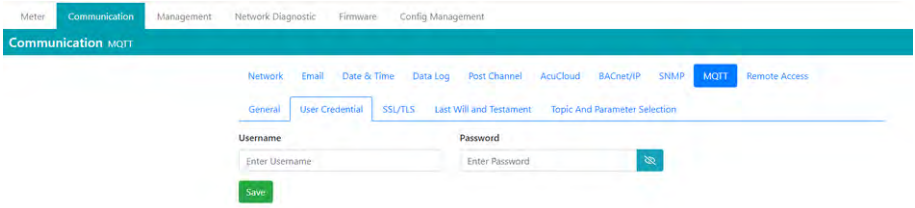
- **Enable MQTT**: Select Enable to enable MQTT protocol
- **Broker Address:** Enter the broker address of the MQTT server
- **Broker Port:** Enter the port number for the MQTT Broker
- **Client ID:** Enter the Client ID for the AcuRev 2100; must be a unique ID number
- **Keep Alive:** The client communicates 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.
- **Facility ID:** Users can specify the facility ID

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



7.9.2 MQTT Authentication

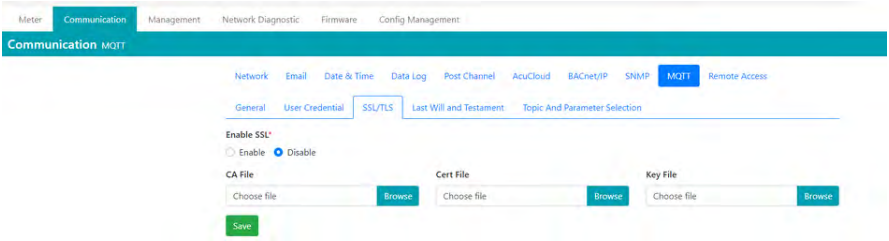
The User Credential tab allows users to configure a “User Name” and “Password” authentication if the broker is able to support it.



7.9.3 MQTT Encryption

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

On this page, users will be able to upload the required certificate and key files.



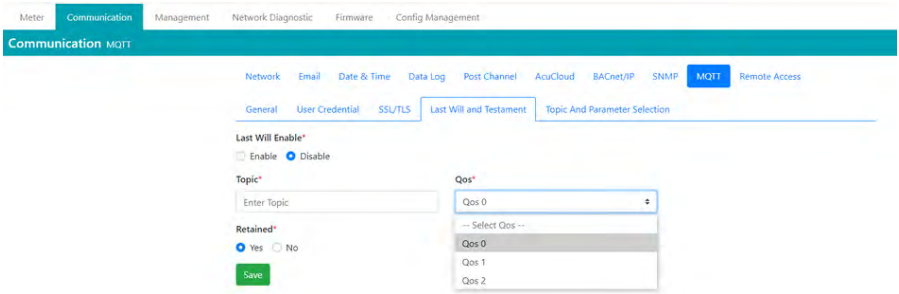
7.9.4 Last Will & Testament

The AcuRev 2100 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 are 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** - is 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 not reliable.
  - **QoS 1** - is 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 sends the most reliable message 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.

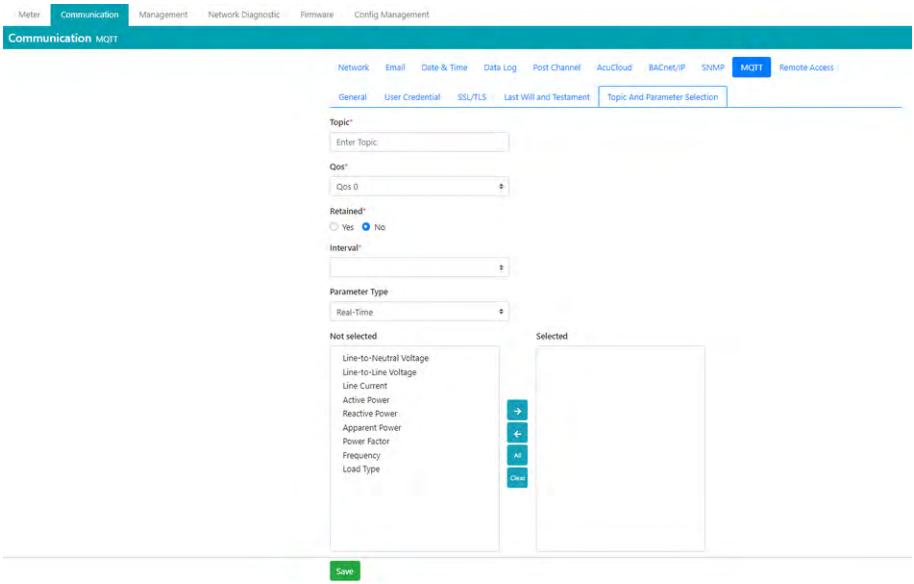


7.9.5 Topic and Parameter Selection

Under the **Topic and Parameter Selection** tab users can configure the sending interval and devices data they want to publish to the broker.

- **Topic:** Users can enter the Topic, which 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 to retain messages or not. If a client retains messages that were published to the topic, a second client that is subscribed to the same topic will be able to see the retained message.

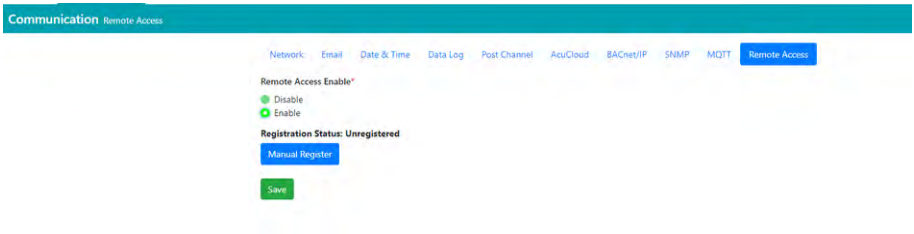
Users will need to specify the data they want to publish under the parameter selection box.



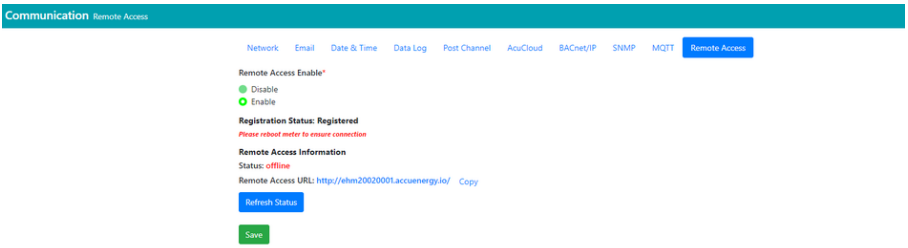
7.10 Remote Access

The AcuRev 2100 supports a remote access function that allows users to access the meters web interface remotely from anywhere using a special url. Users will have full functionality and access to all meter readings and settings with this function.

- **Remote Access Enable:** Select 'Enable' to enable the function and allow for Remote Access.
- **Current Status:** Will provide the user with a status of the Remote Access on whether it is “Registered” or “Unregistered”.

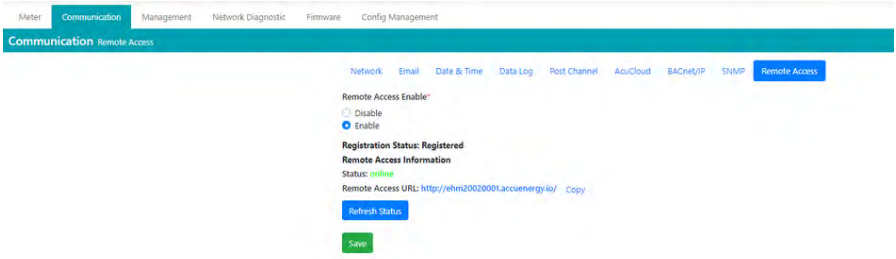


Users can click on the 'Manual Register' button to register the remote access. The following page will be displayed.



NOTE: *The module must be rebooted in order for the remote access connection to work properly.*

- **Registration Status:** Displays the status as 'Registered' or 'Unregistered'
- **Remote Access Information:** Lets users know if the remote access status is online or offline.
- **Remote Access URL:** The URL used to access the meters web server remotely. This URL can be copied and shared with all users that require remote access.



AcuRev 2100 Series Power Meter: Web Manual

Chapter 8: Management

8.1 Parameter Reset

8.2 Reboot Meter & Communications Module

8.3 Change Password

8.4 SSH

8.5 Debug Diagnostic

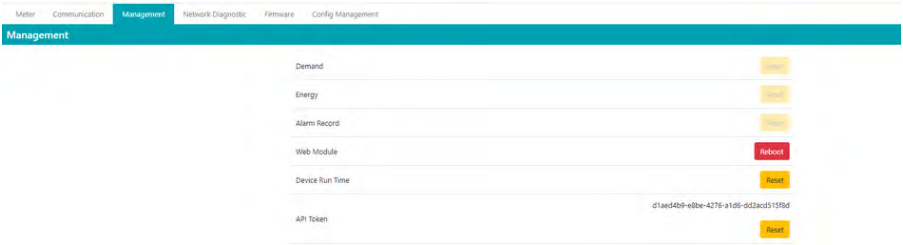
8.6 Diagnostic File

Chapter 8: Management

8.1 Parameter Reset

The Management web page allows the user to clear and reset certain parameters in the meter. The following parameters can be reset from the Management page:

- Demand
- Energy
- Alarm Record
- Device Run Time
- API Token

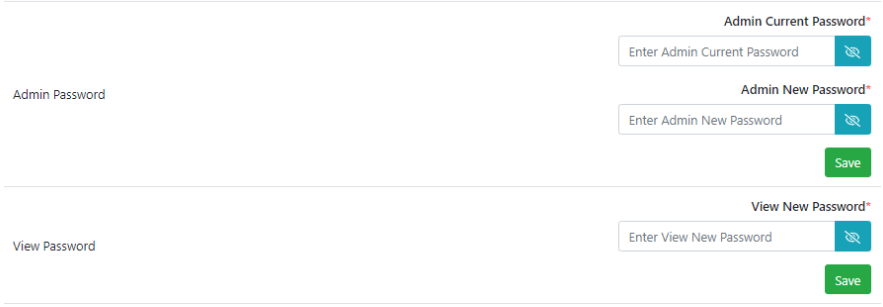


8.2 Reboot Meter & Communications Module

Users can also reboot the web module and meter which is required after any communication or meter setting is changed if a module reboot is not performed the settings will not be saved to the meter and will go back to its default settings. This not only resets the communication module, it also performs a soft reboot on the AcuRev 2100 meter.

8.3 Change Password

The access level passwords can be changed from the Management page as well, all new passwords must be 6 characters or more.

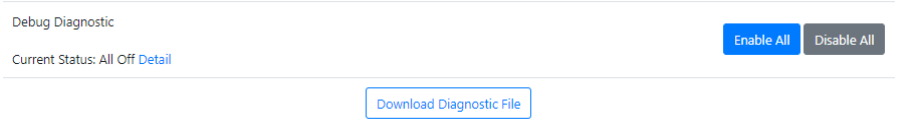


8.4 SSH

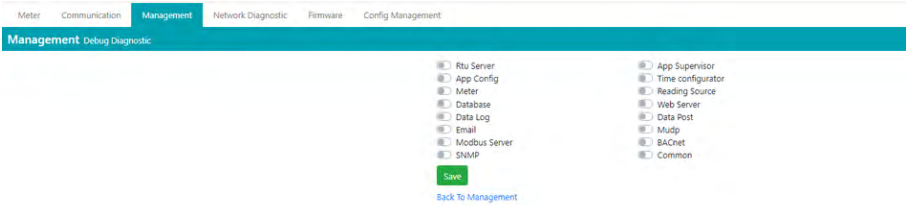
The AcuRev 2100 supports the SSH which can be enabled to allow users to remotely log into the meter using the SSH protocol. When enabled the status will show 'On', when disabled the status will show 'Off'.

8.5 Debug Diagnostic

The debug diagnostic allows the user to enable or disable the debug logs. The current status will say 'All off' if disabled, 'All On' if enabled.



Users can click on the advanced link, to turn on or off specific debug logs. If certain debug logs are enabled the current status will show 'Partial On'.



NOTE: *The system performance may be affected by enabling the debug logs.*

8.6 Diagnostic File

The is a diagnostic file on the AcuRev 2100 that users can download which can be used to analyze the modules diagnostics.

NOTE: *Please send the diagnostic file to Accuenergy Technical Support (support@accuenergy.com) for analysis.*

AcuRev 2100 Series Power Meter: Web Manual

Chapter 9: Network Diagnostic

9.1 Network Status

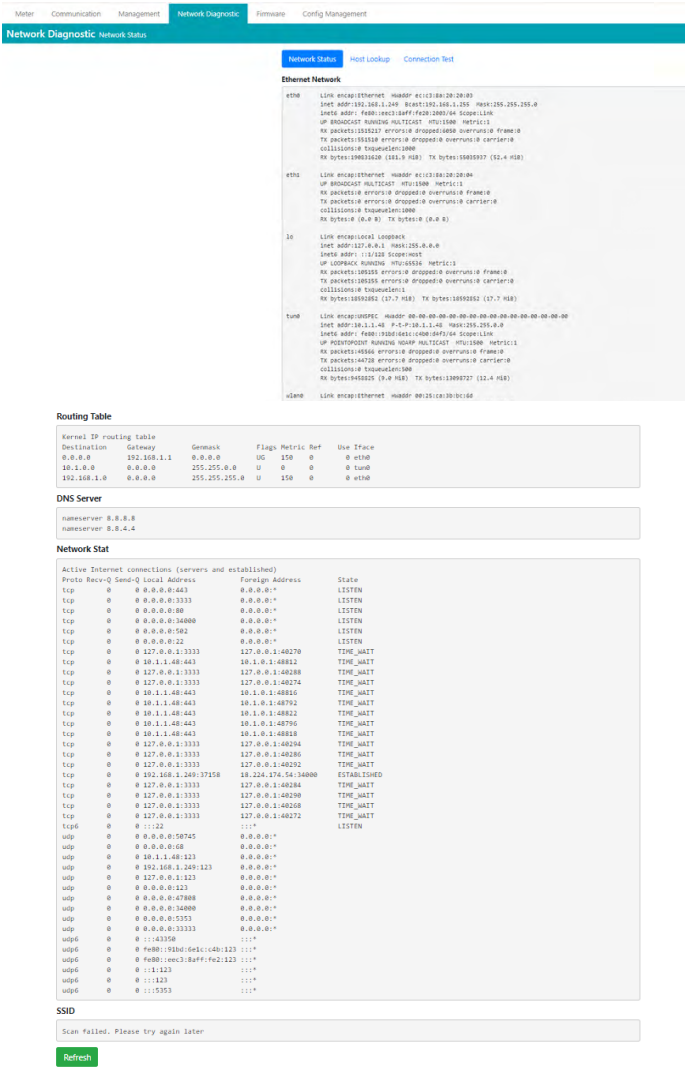
9.2 Host Lookup

9.3 Connection Test

Chapter 9: Network Diagnostic

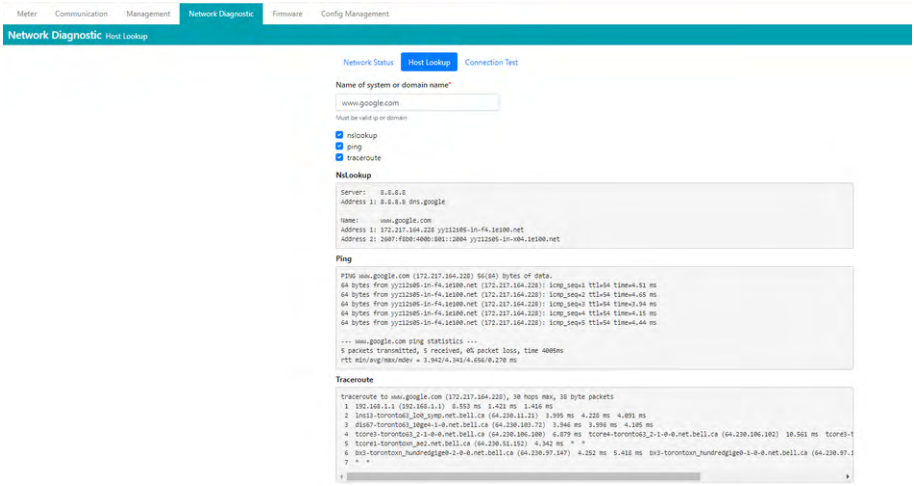
9.1 Network Status

The Network Diagnostic page can be used to monitor the network status of the module.



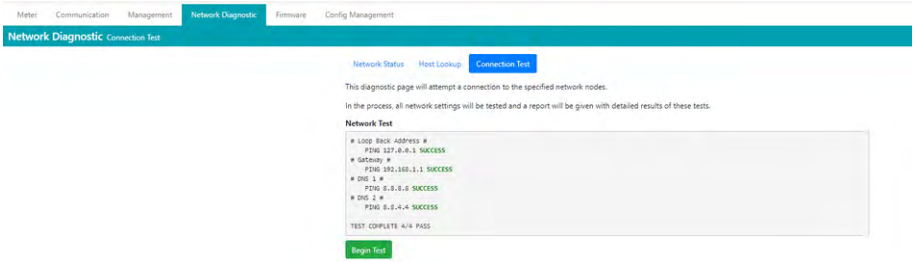
9.2 Host Lookup

In the ***Host Lookup*** tab, users can utilize the 'ping' function to test the reach-ability to other networks. Users can also use the **ping6** function to ping an IPv6 address.



9.3 Connection Test

Users can also use the ***Connection Test*** function to test the local network that the module connected to. The test result will show **SUCCESS** and **PASS** if there are no issues found.



AcuRev 2100 Series Power Meter: Web Manual

Chapter 10: Firmware

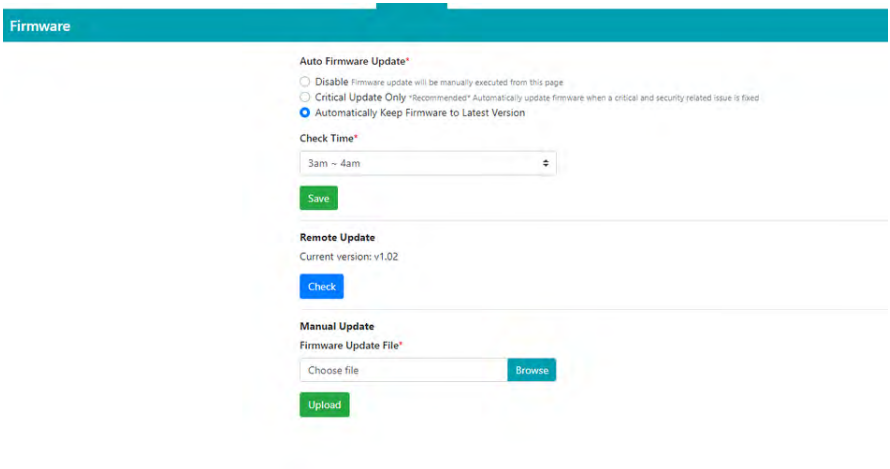
10.1 Module Firmware Update

Chapter 10: Firmware

10.1 Module Firmware Update

The Module Firmware web page is used for updating the firmware version on the AcuRev 2100. The user can check if the module they are using is up to date and update the module if needed using the remoter firmware update. Users can also manually update the firmware by uploading the firmware file. The current version of the firmware will be displayed on the Module firmware update page and can also be viewed on the 'Device Information' page of the web interface.

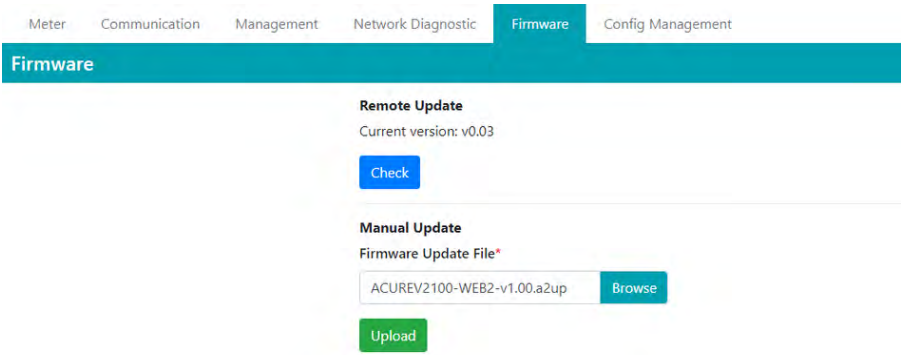
There is an Auto Firmware Update feature available also, this allows users to update the module automatically without manually going into the webserver and performing the update.



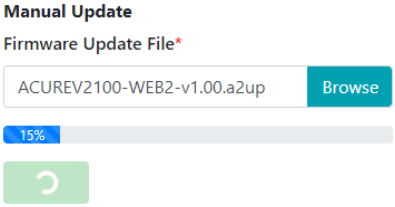
NOTE: *Users can also contact Accuenergy Technical Support for the latest firmware.*

10.1.1 Manual Update

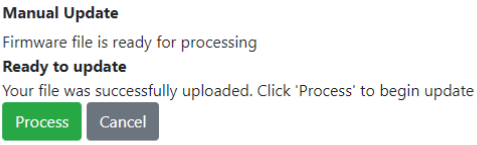
Select and upload the AcuRev 2100 firmware file, it is a .a2up file extension.



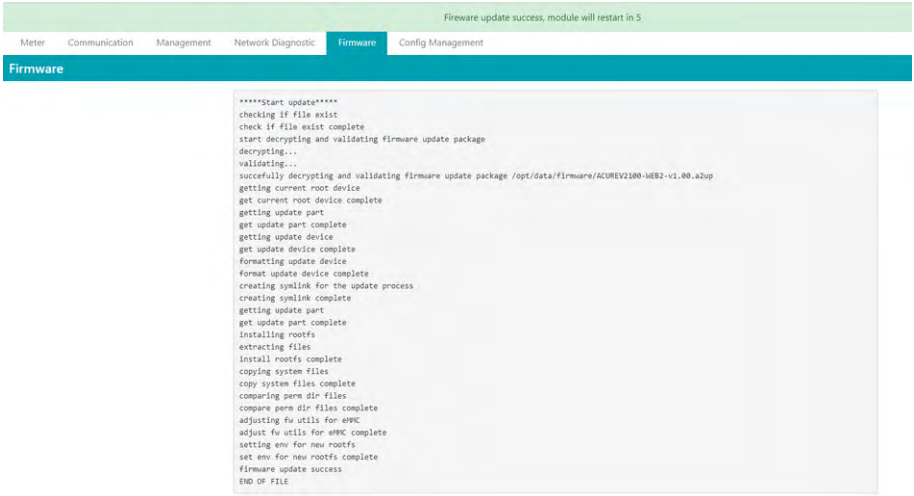
Once the upload was successfully uploaded you will see the following page confirming that the file was uploaded.



Click 'Process' to begin the update.



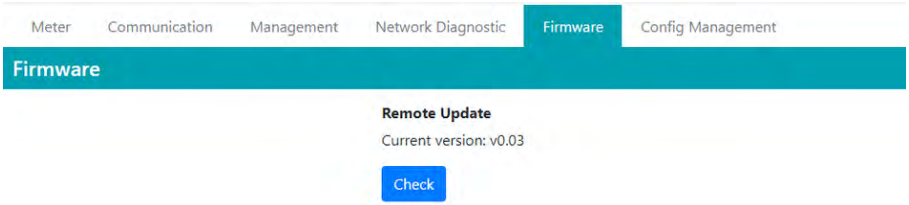
The meter will reboot itself after the update.



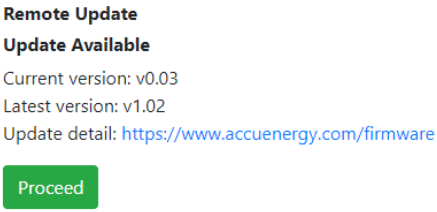
Login to the web interface of AcuRev 2100 after the reboot is complete, and go to the 'About' page to check if the module firmware version is updated.

10.1.2 Remote Update

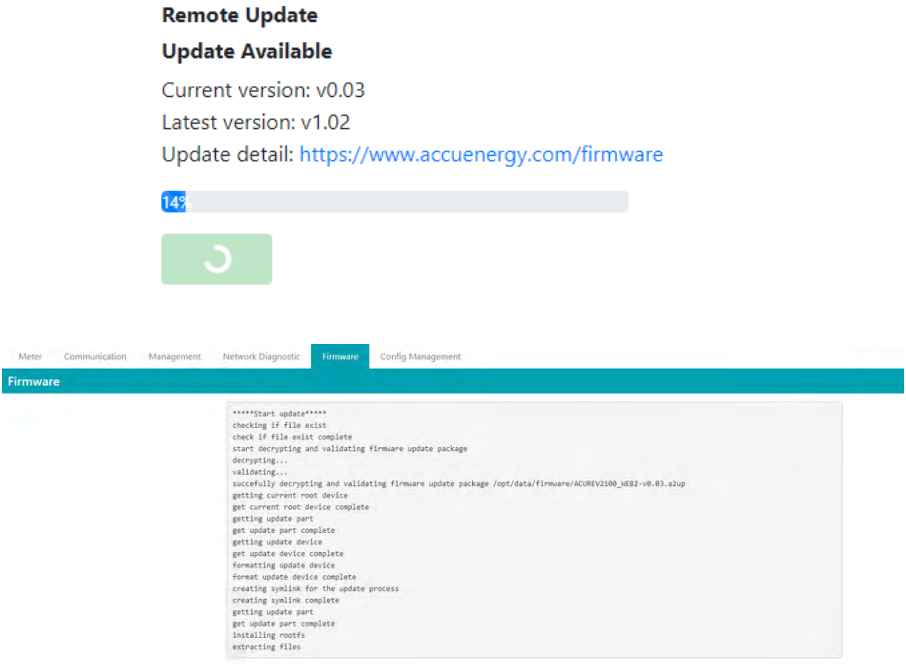
Users can also use the remote firmware server to update the module firmware. Click on 'Check' to verify if there is a firmware update available.



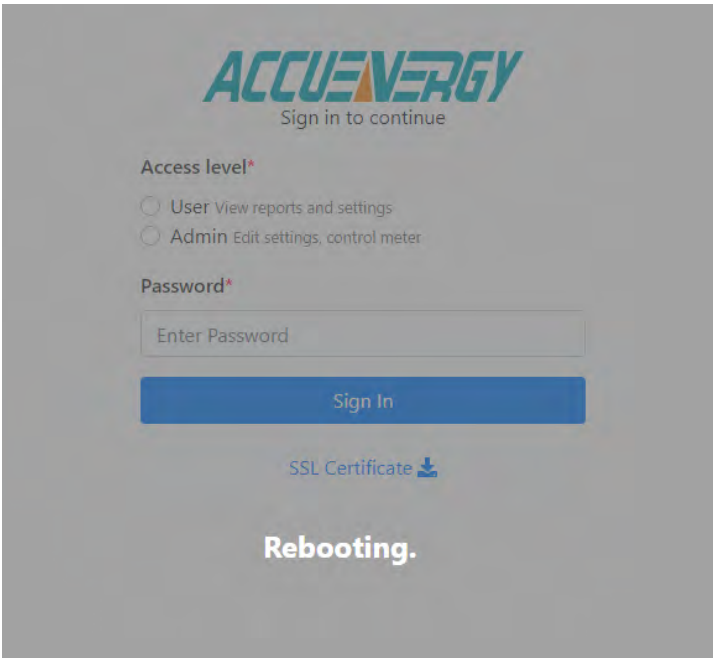
If there is an update available users can proceed to download the firmware.



Once the download is complete the updating process will begin.



When the firmware update is complete, the module will reboot. The rebooting process will take 1-2 minutes to complete.



After the module reboots, users will be able to log back into the web interface. When logged in click on the 'About' tab located on the top right corner of the web page to view the 'Device Information' page. From the Device Information page, users can ensure that the meter was updated correctly to the right firmware version.

AcuRev 2100 Series Power Meter: Web Manual

Chapter 11: Config Management

11.1 Backup Configuration

11.2 Export/Apply Configuration

11.3 Import Configuration

Chapter 11: Config Management

The AcuRev 2100 has a configuration management page that allows users to save all web settings with the exception of certain settings into a configuration file. This is useful if users have more than one meter that needs to be programmed with the same settings, and eliminates any error when trying to configure another AcuRev 2100.

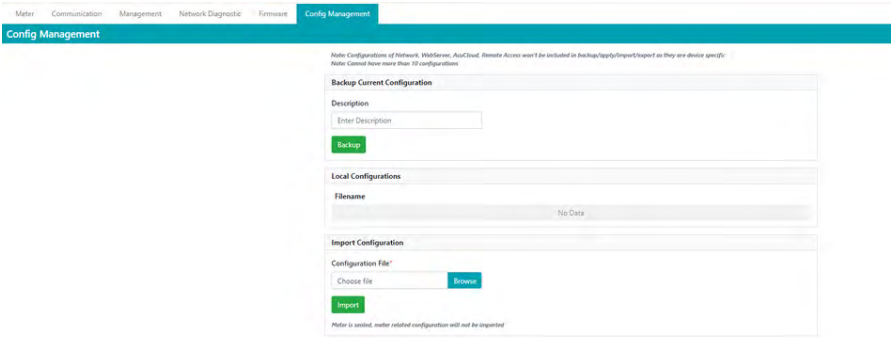
The following settings are saved in the configuration file:

- All Meter settings (Wiring, CT ratio)
- Network settings (Only DNS1, DNS2, Modbus 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
- Management settings (the View and Admin Access Level passwords, SSH, and Debug Configuration)
- MQTT settings (General, User Credentials, Last Will & Testament, Topic & Parameter Selection)

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

- Most Network settings (DHCP, IP, Submask, Gateway, HTTP Port for both Ethernet 1 and 2. All WiFi settings, HTTP enable, and HTTPS port is not changed)
- AcuCloud
- Remote Access
- MQTT client ID and SSL certificates

The Config Management page can be accessed by clicking on the ***Settings*** tab and selecting ***Config Management***.



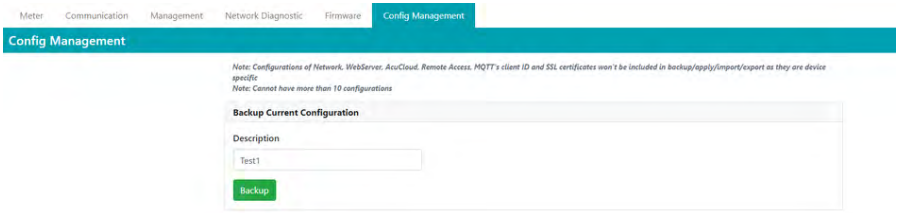
11.1 Backup Configuration

Users can create a backup of the current configurations on the AcuRev 2100 interface.

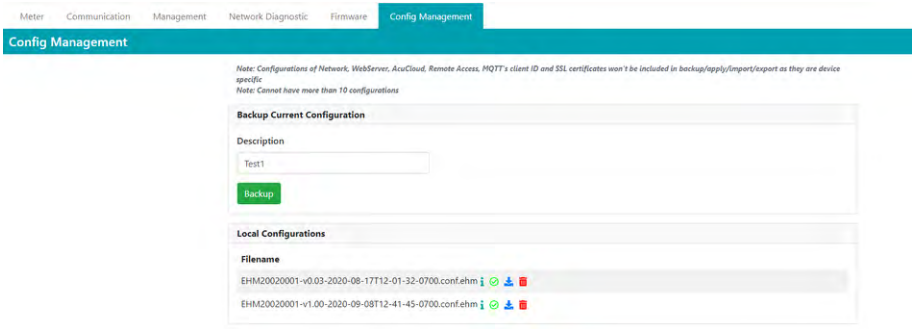
- **Backup Current Configuration Description:** Enter in a description for the backup configuration file.

Once the description is entered in click on the **Backup** button.

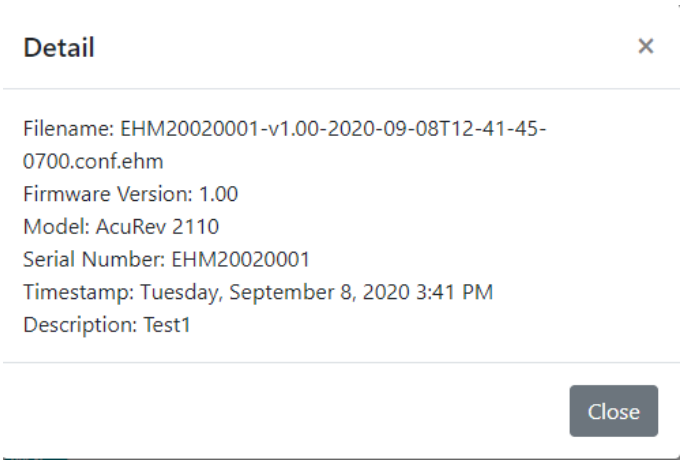
The backup is displayed in the List of Local Configurations. The file has a file format that includes the module serial number, module firmware version, and time stamp that the file was created.



NOTE: *Users cannot have more than 10 configurations in the List of Local Configurations.*



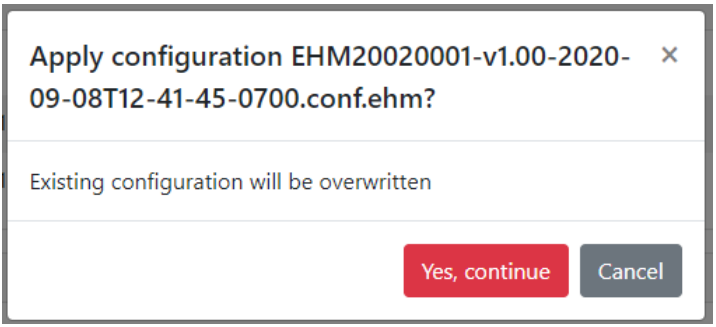
Users can click on **Detail** to view the description of the configuration file. The details include the Model name, serial number, time created. firmware version and the description entered when the backup was created. Users can remove any of the configuration files from the list at any time by selecting ***Delete.***



11.2 Export/Apply Configuration

Users can export the configuration file and use it on other AcuRev 2100 units. The file is downloaded as a .ehm file.

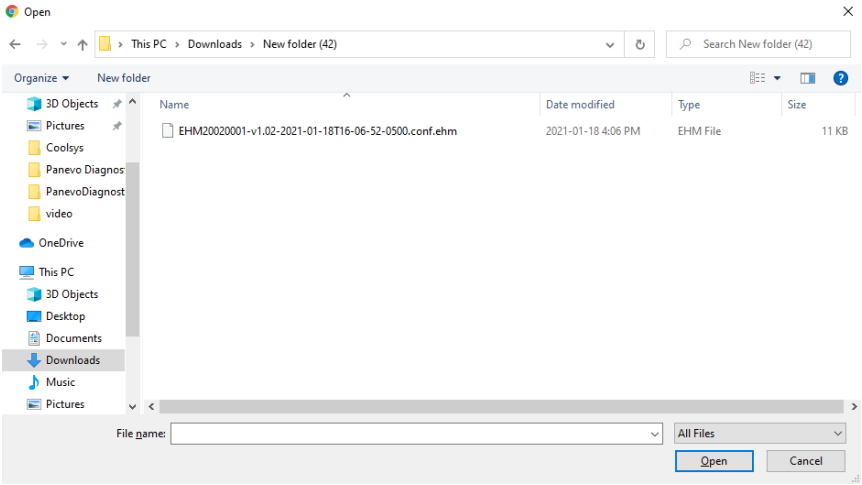
To implement the configuration file click on the green check button to ***Apply***. A prompt warning the user that the existing .conf.ehm file will be overwritten is shown. Click ***Yes*** to continue.



A module reboot is required for the configuration to take effect. if users decided to reboot later the reboot must be performed from the Management page in order for the settings to take effect on the device.

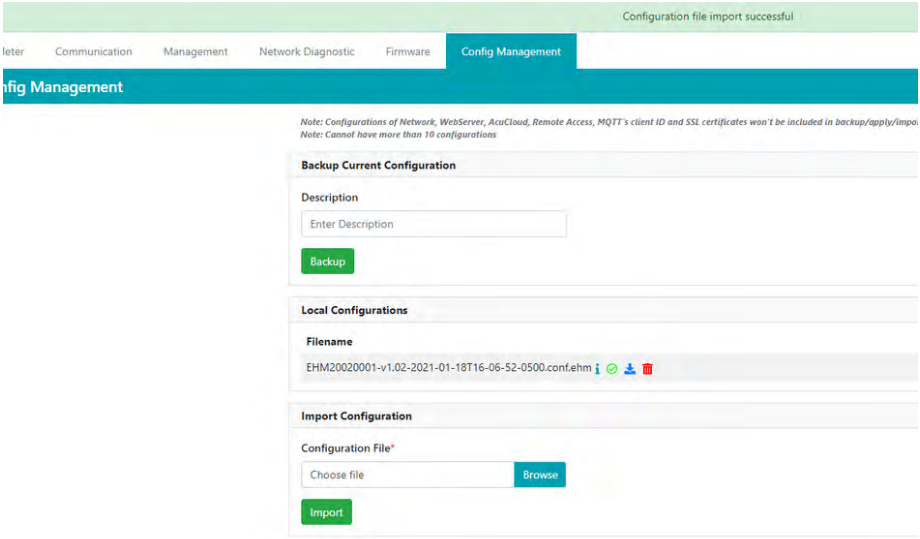
11.3 Import Configuration

Import Configuration: Users can import a configuration file (.conf.ehm file format) to the AcuRev 2100.



Click on ***Import*** to upload the configuration file to the AcuRev 2100.

The newly imported file will now appear in the List of Local Configurations



NOTE: *Users cannot import a file that already exists on the local configurations, when the list already contains 10 config files, and cannot import a config file that has been exported from an AcuRev 2100 with a higher firmware version.*

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