



AXM-NET2 Module Modbus Dual Ethernet Meter Module User Manual



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Please read this manual carefully before installation, operation, and maintenance of the AXM-NET2 Module.

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Safety Notice

ELECTRIC SHOCK DANGER SAFETY WARNING

Please read this document carefully before the installation, operation, and maintenance of the AXM-NET2 Module.

If the equipment is used in a manner not specified by Accuenergy, the protection provided by the equipment may be impaired.

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 / current devices.

Accuenergy shall not be responsible or liable for any damages or injuries caused by improper meter installation and/or operation.

NOTE: THERE IS NO REQUIRED PREVENTIVE MAINTENANCE OR INSPECTION NECESSARY FOR SAFETY. HOWEVER, ANY REPAIR OR MAINTENANCE SHOULD BE PERFORMED BY THE FACTORY.

DISCONNECT DEVICE: The following part serves as the designated disconnect device for this equipment.

A SWITCH OR CIRCUIT-BREAKER MUST BE INCLUDED IN THE INSTALLATION.

THE SWITCH MUST BE IN CLOSE PROXIMITY TO THE EQUIPMENT AND WITHIN EASY REACH OF THE OPERATOR. THE SWITCH SHALL BE MARKED AS THE DISCONNECTING DEVICE FOR THE EQUIPMENT.

Important Symbols

The following symbols in this manual are used to provide warnings of danger or risk during the installation and operation of the meter.



ELECTRIC HAZARD SYMBOL: Indicates information about procedures that must be followed to reduce the risk of electric shock and danger to personal safety.



WARNING SYMBOL: Information about a hazardous circumstance, if not considered, may result in injury or death.



INFO SYMBOL: An advanced notice providing additional information before an action is taken by the user.

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Chapter 1: Introduction

The AXM-NET2 module provides an Ethernet communication interface for Acuvim II and Acuvim L Series power meters.

The AXM-NET2 module provides users with an industry leading 100 ms and 20 ms response rates via Modbus TCP that allow users to attain real-time updates of key parameters such as voltage, current, and power from the Acuvim II and Acuvim L Series meter.

1.1 Module Types

The AXM-NET2 has only one model available with dual Ethernet ports.

1.1.1 AXM-NET2

The AXM-NET2 is equipped with two Ethernet ports for wired connections, providing a reliable networking solution for industrial and energy monitoring applications. With support for daisy-chain topology and Rapid Spanning Tree Protocol (RSTP), the AXM-NET2 ensures robust and flexible deployment in complex network environments.

Ethernet Interface: The dual Ethernet ports allow you to establish robust wired connections for stable and secure data transfer. Connect your AXM-NET2 to your network devices using standard RJ45 Ethernet cables. With the built-in switching capability, multiple meters can be daisy-chained together without requiring an external switch.

Daisy Chain & RSTP Connectivity: In addition to basic Ethernet communication, the AXM-NET2 supports Rapid Spanning Tree Protocol to prevent network loops and ensure quick recovery in case of link failures. This combination of daisy-chain wiring and RSTP functionality provides enhanced flexibility and resilience for complex network environments.

1.2 Functional Description of the Ethernet module

The AXM-NET2 series module supports a wide range of communication protocols designed for energy monitoring and industrial networking applications. The most commonly used protocols are briefly explained below.

The AXM-NET2 module supports the Modbus TCP protocol. When connected to the Acuvim II V3 series meter, it acts as a Modbus TCP server that responds to client queries. The default Modbus port is 502, and users can configure a custom port number within the range 2000–5999. Requests are bridged to the meter through the internal UART channel using Modbus RTU.

In addition to Modbus TCP, the AXM-NET2 supports secure communication through the HTTPS. The module runs as an HTTPS server on the default port 443, providing access to the Web Interface configuration and enabling secure data transmission. It also includes built-in functionality for AcuCloud data upload, periodically sending measurement records over HTTPS with buffering and retransmission mechanisms to ensure data integrity.

The following is a list of all the protocols supported by the AXM-NET2 module:

- Modbus TCP
- RSTP
- SNTP/NTP
- HTTP/HTTPS

Chapter 2: Installation



The installation must be performed by qualified, competent, accredited professionals who have received formal training, and have experience with high-voltage and current devices. Appropriate safety wear including gloves, glass, arc flash suit is mandatory to ensure safe installation.

During normal meter operation, caution should be exercised as high voltage may be present at terminal blocks, current and potential transformer connection nodes, and other related circuits.

All primary and secondary circuits may contain lethal current and voltage. Contact with current channels must be avoided.

Acuvim II, Acuvim L, and AXM-NET2 modules cannot be installed on the primary side of transformers or where VA limitations are present. It can only be installed on the secondary side of the circuit. Avoid contact with meter terminals after the installation is complete.

Do not apply voltage above the rated maximum limit of the meter and devices connected to it. Before energizing the meter, please refer to the meter's label and specifications.

Do not perform high voltage tests or insulation experiments to the output, input, or communication terminals.

The use of shorting blocks and fuses is recommended.

Use a dry cloth to wipe the meter if necessary.



Failure to follow manufacturer guidelines for installation and use may compromise the safety of the meter and the user.

Any repair should only be performed by the manufacturer. A switch or circuit breaker should be utilized in the equipment. The switch should be placed close to the equipment and easily accessible. The switch is regarded as part of the breaking device.

Please read this chapter carefully before beginning installation.

2.1 Appearance and Dimensions

The following figure provides the dimensions of AXM-NET2 Module.

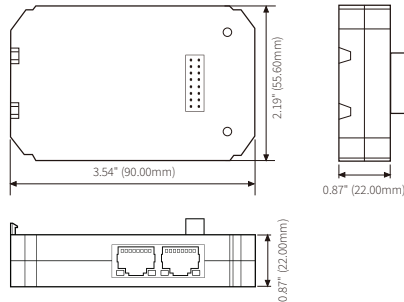


Figure 2-1 AXM-NET2 Appearance and Dimensions

2.2 Installation Method

The AXM-NET2 module is connected to the Acuvim II or Acuvim L meter by a communication plug. Additional expansion modules, such as the I/O modules, can be connected to the Acuvim II/ L meter after installing the AXM-NET2 module. Refer to the following steps for installation of the AXM-NET2 module.

1. Remove the cover from the back of the Acuvim II/L series meter to expose the socket.
2. Insert the installation clips into grooves of the Acuvim II/L meter and then lightly press the AXM-NET2 module to establish a connection between meter and module.
3. Tighten the installation screws.



WARNING

Do not install the meter while the power is on. The module must be installed or uninstalled while the meter is powered off to prevent injury or damage to the devices.

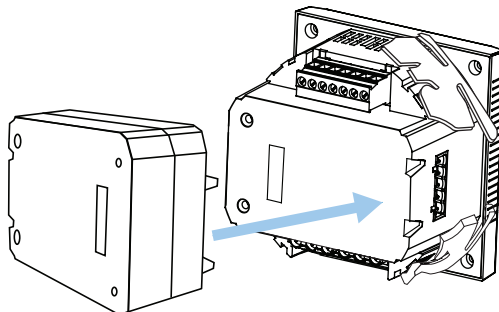


Figure 2-2 Installing the AXM-NET2 Module

2.3 Cable Connection

The AXM-NET2 uses two standard RJ45 connectors to connect to the Ethernet network. The mechanical and electrical characteristics of the connector are consistent with the requirements of IEC 60603-7.

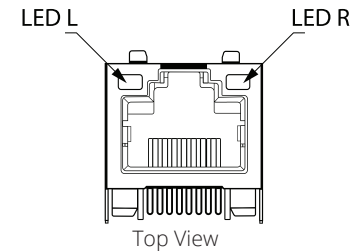


Figure 2-3 RJ45 Connector Overview

Table 2-1 RJ45 Pin Assignment

Pin Number	Name	Description
1	TX+	Transmit Data (+)
2	TX-	Transmit 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 Ethernet speed status. When the LED is on, it indicates 100 Mbps, an off LED indicates a speed of 10 Mbps.

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

2.4 Default Settings

The default settings of the Acuvim II/L meter are:

Table 2-2 Default Network and Modbus Settings

Parameter	Default Values
IP Address	192.168.1.254 (Static)
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

By default, the AXM-NET2 is configured with a static IP address of 192.168.1.254. Both Ethernet ports share this single IP address since they are internally bridged through an integrated switch. This design allows users to connect devices in a daisy-chain topology without requiring an external switch.

2.5 Initializing

1. Press the **H** and **V/A** buttons simultaneously on the Acuvim II or Acuvim L meter. Release the buttons and the meter will enter the meter selecting mode, as indicated by the flashing 'Meter' cursor.

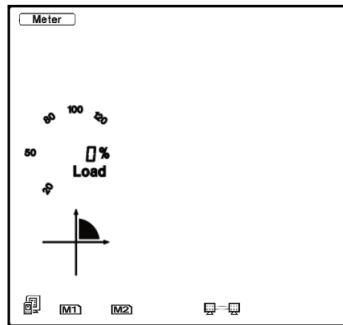


Figure 2-4 Selection Mode Interface

2. Press the **P** or **E** button to move the cursor to 'Setting'. Press **V/A** button to enter the parameter setting mode. The device address page is the first page of the 'Setting' mode. It will show the Modbus address of the meter for a second before prompting for the password of the device.
3. Enter the password in the 'PASSWORD' screen. The default password is 0000 and press **V/A** to enter the parameter selection Mode.

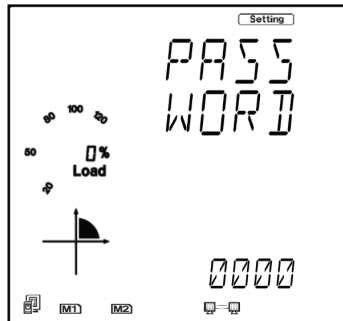


Figure 2-5 Password Screen

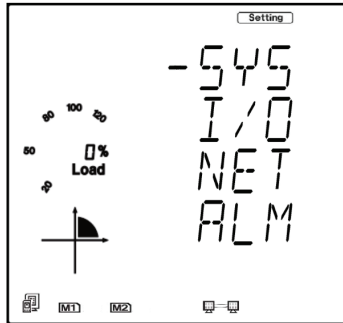


Figure 2-6 Parameter Selection Mode Screen

4. The cursor will be on 'SYS'. Press **V/A** on this screen to enter the system settings. The 'S01 ADDR' screen will be displayed.
5. Press the **E** button until 'S37 PROTOCOL 2' is seen on the screen. Select the 'WEB2' protocol.
 - Press **V/A** to modify the setting; the cursor should now flash.
 - Press **P** or **E** to select 'WEB2'.
 - Press **V/A** to confirm the change.

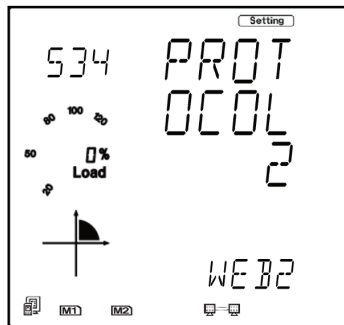


Figure 2-7 S37 Protocol 2 Screen

Once the Protocol 2 setting of the AccuVim II/L meter is configured for WEB2, users can view all necessary settings in the meter's NET settings.

6. Press the **H** button to exit the system setting and enter the parameter selection screen.
7. Press the **P** or **E** button to move the cursor to '**NET**' and press the **V/A** button to enter the Ethernet module settings.

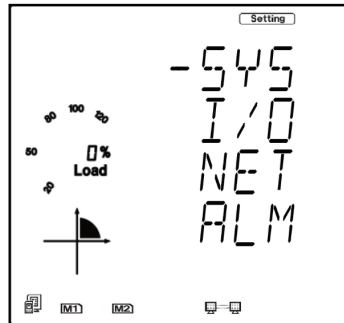


Figure 2-8 NET Screen

8. The first page of the NET Settings will be the N01 DHCP setting. By default, this is configured to Manual. Setting this configuration to Auto will allow the router to assign the meter with an IP address, while Manual will allow the user to configure the IP address. Press the **V/A** button to enter edit mode. Press **P** or **E** to change the settings and press **V/A** to confirm.



INFO

If the DHCP is selected as Auto, the Ethernet module needs to be rebooted before it can be assigned with a new IP address.

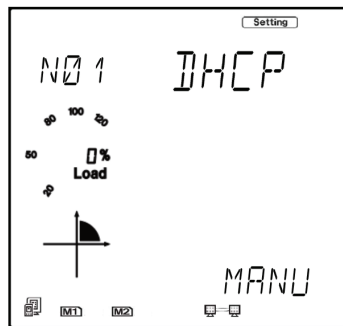


Figure 2-9 DHCP Settings

9. Press **P** and navigate to 'N02 IP address'. This is the IP address used for Ethernet connection and can be used to access the Web Interface of the module. Users can configure the IP address if the DHCP is configured to Manual. Press **V/A** to configure the IP address. The cursor of the first digit will begin to flash. Press the **H** button to scroll through the digits, press the **P** or **E** to change the value of the flashing cursor and press **V/A** to confirm.

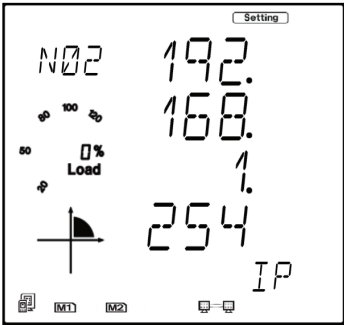


Figure 2-10 N02 IP Address Configuration

10. Press **P** and navigate to 'N03 Subnet Mask'. Press **V/A** to configure the subnet address. The cursor of the first digit will begin to flash. Press the **H** button to scroll through the digits, press the **P** or **E** to change the value of the flashing cursor and press **V/A** to confirm.

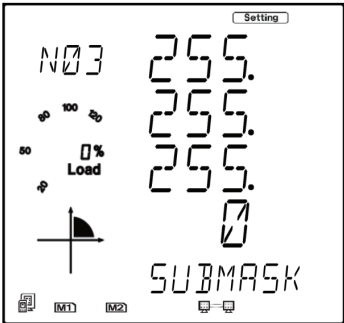


Figure 2-11 N03 Subnet Mask Configuration

11. Press **P** and navigate to 'N04 Gateway'. Press **V/A** to configure the gateway IP address. The cursor of the first digit will begin to flash. Press the **H** button to scroll through the digits, press the **P** or **E** to change the value of the flashing cursor and press **V/A** to confirm.

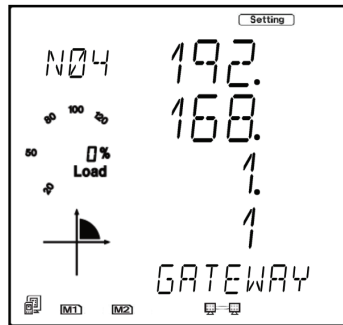


Figure 2-12 N04 Gateway Configuration

12. Press **P** to navigate to 'N05 DNS Primary Server'. Press **V/A** to configure the DNS address. The cursor of the first digit will begin to flash. Press the **H** button to scroll through the digits, press the **P** or **E** to change the value of the flashing cursor and press **V/A** to confirm.



INFO

The DNS parameters must be set correctly to use the SMTP, FTP/HTTP Post, and AcuCloud functions.

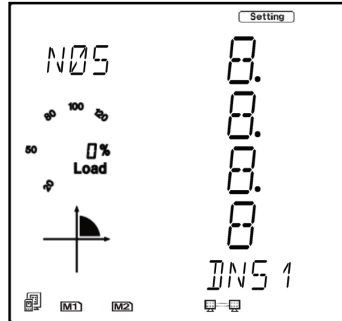


Figure 2-13 N05 DNS Primary Server Configuration

13. Press **P** to navigate to 'N06 DNS Secondary Server'. Press **V/A** to configure the DNS address. The cursor of the first digit will begin to flash. Press the **H** button to scroll through the digits, press the **P** or **E** to change the value of the flashing cursor and press **V/A** to confirm.

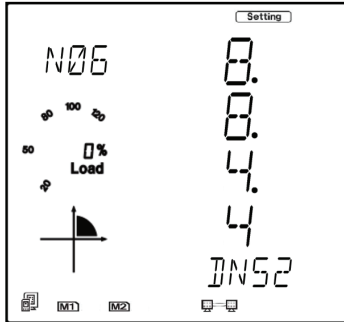


Figure 2-14 N06 DNS Secondary Server Configuration

14. Press **P** to navigate to 'N07 Modbus Port'. Press **V/A** to configure the Modbus Port. The cursor of the first digit will begin to flash. Press the **H** button to scroll through the digits, press the **P** or **E** to change the value of the flashing cursor and press **V/A** to confirm.

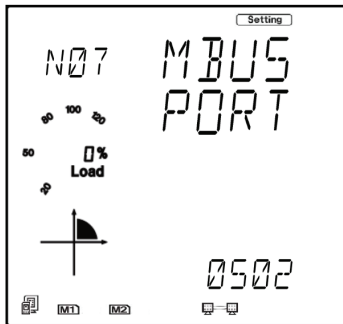


Figure 2-15 N07 Modbus Port Configuration

15. Press **P** to navigate to 'N08 HTTP Port'. Press **V/A** to configure the HTTP Port. The cursor of the first digit will begin to flash. Press the **H** button to scroll through the digits, press the **P** or **E** to change the value of the flashing cursor and press **V/A** to confirm.



Figure 2-16 N08 HTTP Port Configuration

16. Press **P** to navigate to 'N09 NET REST'. After making any changes to the NET settings, users must reboot the Ethernet module from this page for the settings to take effect. Press **V/A** to reboot the module, the cursor will begin to flash. Press the **P** or **E** button to change the setting to 'Reset' and press **V/A** to confirm. The cursor will return to 'No' once the module has successfully reset.



Figure 2-17 NET Reset Configuration

Chapter 3: Connection Method

3.1 Direct Connect to a Computer

The AXM-NET2 module can be connected to a computer using a crossover standard T568A cable. The AXM-NET2 module supports Modbus TCP and HTTPS for this method of connection.

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

1. Connect the meter to the computer using a RJ45 Ethernet cable.
2. From the Windows screen, right-click on the Network Connections icon.
3. Select "Open Network Sharing Center".

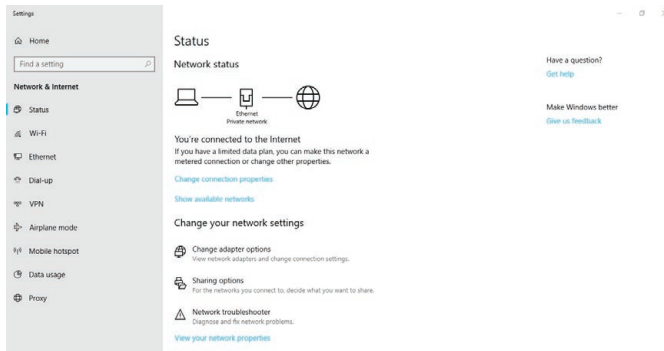


Figure 3-1 Network Setting Interface

4. Click "Change adapter options".

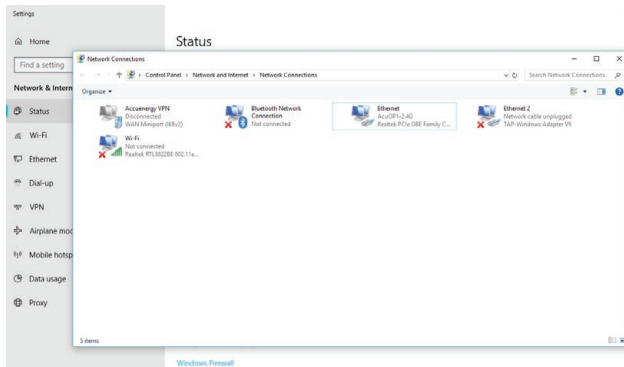


Figure 3-2 Network Connections Window

5. From the Network Connections window, right click on the "Local Area Connection" icon and select "Properties".

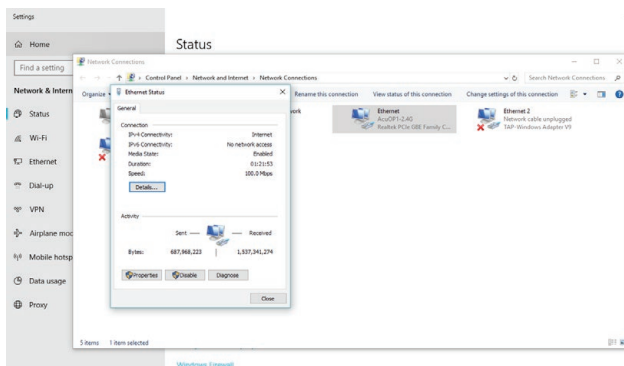


Figure 3-3 Ethernet Status Window

6. Select the "Internet Protocol Version 4 (TCP/IPv4)".

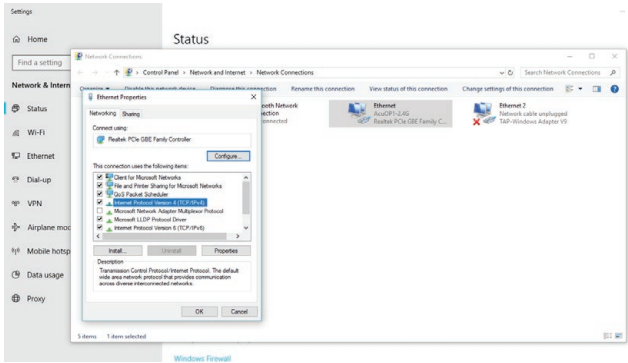


Figure 3-4 Ethernet Properties Window

7. The Internet Protocol Version 4 (TCP/IPv4) Properties box will appear.

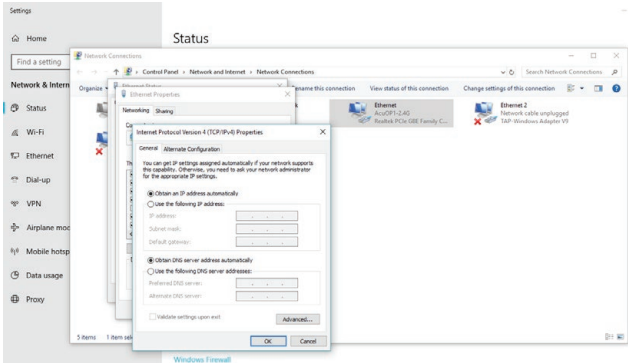


Figure 3-5 Configuring IP Address Settings

8. Click "Use the following IP address" and enter an IP number so that the Acuvim II/L meter and computer are in the same local network range.
For example, if the meter has 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 from 1 to 253 but cannot be the same as the meter.

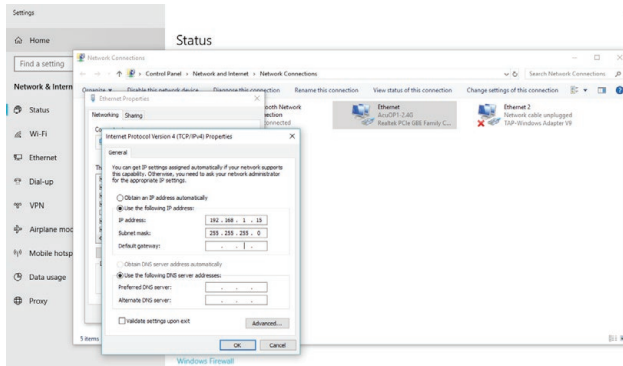


Figure 3-6 IPv4 Configuration

9. Once the IP address is entered, press the Tab key on keyboard to scroll through the fields and click OK.
10. Before selecting the OK button make note of the IP address you have assigned to the Acuvim II/L meter and then press OK.



The Acuvim II/L meter and computer cannot have the same IP address; they must be different.

3.2 Direct Connect to a Router/Switch

The AXM-NET2 can be connected to a router or switch using a standard Ethernet cable. The module is equipped with two RJ45 ports, which are internally bridged and share a single IP address. Users can configure the IP settings as either Static IP or DHCP (Dynamic Host Configuration Protocol) through the Web Interface.

Since both Ethernet ports belong to the same logical interface, they provide identical functionality. This design enables daisy-chain wiring between multiple devices without the need for an external switch, while maintaining consistent network settings across both ports.

3.3 Description of Modbus TCP Protocol

The Modbus TCP protocol is used as one of the communication protocols in the AXM-NET2 module. The protocol establishes a master and slave communication over Ethernet. The master device first sets up a TCP connection with slave device. The master device then sends a request

to the slave device, and the slave device sends a response to the master device. The figure in the next section shows how the Modbus TCP protocol works.

3.3.1 Protocol

Data Frame Format

Table 3-1 Modbus Application Protocol Frame Structure

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

Modbus Application Protocol Header (MBAP Header) Field

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

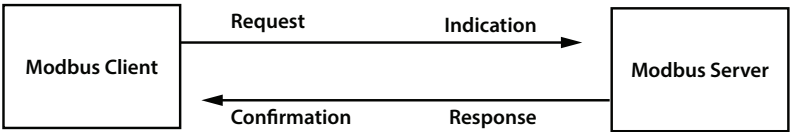


Figure 3-7 Block Diagram of Modbus TCP

Table 3-2 MBAP Field Description

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 byte	Slave Address, In the Range Of 0-247 Decimal

Function Field

The function code field of a message frame contains 8 bits. Valid function 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 which action to perform.

Table 3-3 Modbus Function Codes

Code	Meaning	Data
01	Read relay output status	Obtain current status of relay output.
02	Read digital input status	Obtain current status of digital input.
03	Read data	Obtain current binary value in one or more registers.
05	Control single relay output	Force replay to ON or OFF state.
16	Write multiple registers	Place specific value into a series of consecutive multiple registers.

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 slave contains additional information which the slave must use to take the action defined by the function code. This can include information such as the register addresses, the quantity of registers to query and the count of the actual number of data bytes.

For example, if the master requests the 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, the number of registers to write, the count of data bytes to follow in the data field, and the data to be written into the registers.

3.3.2 Format of Communication

Table 3-4 Example of Modbus 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 Register hi	Data # of Register lo
03H	40H	00H	00H	48H

Explanation of frame

The meaning of each abbreviated field above is:

- Transaction Identifier hi: High byte of transaction identifier
- Transaction Identifier lo: Low byte of transaction identifier
- Protocol Identifier hi: High byte of protocol identifier
- Protocol Identifier lo: Low byte of 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

Read Status of Relay (Function code 01)

Function Code 01

This function code is used to read the relay output status in the Acuvim II or Acuvim L series meter.

1=On 0=Off

There are 8 relay outputs in the Acuvim II/L series meter, starting at address 0000H.

The following query is reads the two relay output status at address 1 of meters.

Query

Table 3-5 Modbus Request Frame for Relay Status

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 Register hi	Data # of Register lo
01H	00H	00H	00H	02H

Response

The Acuvim II/L meters respond with the MBAP header, function code, quantity of data bytes, and data.

An example response to read the status of the first two relay outputs starting at 0000H is shown below. The status of relay outputs one and two is corresponds to the last 2 bits of data.

Table 3-6 Relay Outputs Bit Mapping

Relay	Bit
Relay 1	bit 0
Relay 2	bit 1

The content of the data is relay 1 is OFF and relay 2 is ON.

Table 3-7 8-Bit Data Byte Register of Relay

7	6	5	4	3	2	1	0
0	0	0	0	0	0	1	0

MSBLSB

Read Status of DI (Function Code 02)

Function Code 02

1=On 0=Off

There are 28 Digital Inputs (DIs) in the Acuvim II/L meter, starting at address 0000H. The following query reads status of the four DI on the AXM-IO1 module with a logic address of 1 in the meter.

Query

Table 3-8 Modbus Request Frame for DI Status

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 Register hi	Data # of Register lo
02H	00H	00H	00H	04H

The content of the data is,

Table 3-9 8-Bit Data Byte Register of DI

7	6	5	4	3	2	1	0
0	0	0	0	1	1	1	0

MSB

LSB

Read Data (Function Code 03)

Function Code 03

Query

This function allows the user to obtain the measurement data of the Acuvim II/L meters.

Below is an example of a request to read 6 registers corresponding to the device clock of the meter, starting at 1040H.

Table 3-10 Modbus Request Frame for Device Clock

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 Register hi	Data # of Register lo
03H	10H	40H	00H	06H

An example response for the meter time (2006-12-18 14:15:20) is provided below

Table 3-11 Modbus Meter Time Response Frame

Transaction Identifier hi	Transaction Identifier lo	Protocol Identifier hi	Protocol Identifier lo	Length hi	Length lo	Unit Identifier
00H	00H	00H	00H	00H	0FH	01H

Function Code	Byte count	Data1 hi	Data1 lo	Data2 hi	Data2 lo	Data3 hi	Data3 lo	Data4 hi	Data4 lo	Data5 hi	Data5 lo	Data6 hi	Data6 lo
03H	0CH	07H	D6H	00H	0CH	00H	12H	00H	0EH	00H	0FH	00H	14H

Control Relay (Function Code 05)

Function Code 05

Query

This function code enables the control of a single relay output in the Acuvim II/L meters. Any relay output in the Acuvim II/L meters can be controlled ON or OFF, starting at 0000H.

Sending FF00H will set the relay output to ON, while sending 0000H will turn it OFF. All other values are invalid and will not affect the relay output status.

The example below is a request to an Acuvim II/L meter to turn ON relay output 1.

Table 3-12 Modbus Request Frame for Relay 1

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 Register hi	Data # of Register lo
05H	00H	00H	FFH	00H

Response

The normal response to the command request is to retransmit the message as received after the relay output status has been altered.

Table 3-13 Modbus Relay 1 Response 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 reg hi	Data start reg lo	Value hi	Value lo
05H	00H	00H	FFH	00H

Preset/Reset Multi-Register (Function Code 16)

Function Code 16

Query

This function code allows the user to modify the contents of multiple registers. The example below is a request to an AcuVim series meter with device address 1 to preset the CT1(500) and CT2(5) registers. The CT1 data address is 1008H, and CT2 is at 1009H.

Table 3-14 Modbus Request Frame to Preset CT1 and CT2

Transaction Identifier hi	Transaction Identifier lo	Protocol Identifier hi	Protocol Identifier lo	Length hi	Length lo	Unit Identifier
00H	00H	00H	00H	00H	0BH	01H

Function Code	Data start reg hi	Data start reg lo	Data #of reg hi	Data #of reg lo	Byte count	Value1 hi	Value1 lo	Value2 hi	Value2 lo
10H	10H	08H	00H	02H	04H	01H	F4H	00H	05H

Response

The normal response to a multi-register preset request, including the MBAP Header, function code, data start register and the number of registers is shown below.

Table 3-15 Modbus Response Frame to Preset CT1 and CT2

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 reg hi	Data start reg lo	Data #of reg hi	Data #of reg lo
10H	10H	08H	00H	02H

Chapter 4: User Management

The AXM-NET2 module supports the HTTPS protocol, providing access to the Web Interface. The user can access the AXM-NET2 module Web Interface to configure the module and use its functions. The Web Interface also allows for remote initial setup of the Acuvim II meters.

The AXM-NET2 Web Interface provides a single-user access session for configuration and monitoring.

To access the Web Interface, the IP address of the AXM-NET2 module must be known. Both Ethernet ports share the same logical IP address, and Wi-Fi connectivity is not available.

4.1 User Access Login

Enter the IP address of the AXM-NET2 module in the address bar of a Web browser to access the Web Interface. The module has a single logical IP address shared by both Ethernet ports, which can be viewed in the meter's Network Settings menu.

Once the IP address is entered, the browser displays the login page of the module, prompting the user to enter the default username and password. The AXM-NET2 supports only one active web session at a time. If another user attempts to log in while a session is already active, the previous session will be terminated automatically.

Table 4-1 Default Login Credentials for AXM-NET2 Module

Parameter	Default Credentials
Username	admin
Password	admin



Sign in to continue

Username

Password

Login

Figure 4-1 Accuenergy Web Interface Login Portal

4.2 User Configuration

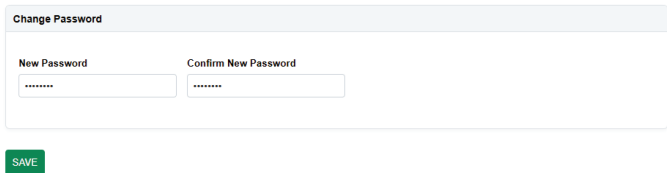
The AXM-NET2 Web Interface does not support multiple user accounts or role-based access management. Only a single active user session is allowed at any given time. User management functions, such as creating accounts, assigning roles, or tracking login history, are not available.

4.3 Role Configuration

The AXM-NET2 supports only a single default user with full access to all functions, including viewing meter readings, configuring settings, and performing maintenance operations through the Web Interface.

4.4 Password Management

The Password Management page allows to change the user password.



The screenshot shows a web form titled "Change Password". It contains two input fields: "New Password" and "Confirm New Password", both with masked characters (dots). Below the fields is a green "SAVE" button.

Figure 4-2 Password Change Page

Chapter 5: Web Interface Readings and Parameter Settings

5.1 Basic Metering

The dashboard is the first page users see after successfully logging into the meter's Web Interface.

The Basic Metering webpage displays real-time measuring parameters for the Acuvim II or Acuvim L series meter. This includes the line voltages, phase voltages, Current, Neutral Current, Active, Reactive and Apparent Power, Power Factor, Frequency and Load type.

The parameters on this page are updated every 1-second.

The values displayed in this webpage will depend on the wiring configuration mode of the meter. For example, if the meter is configured as '2LL' or '3LL' then the metering webpage will not display the phase readings, only the total values will be shown.

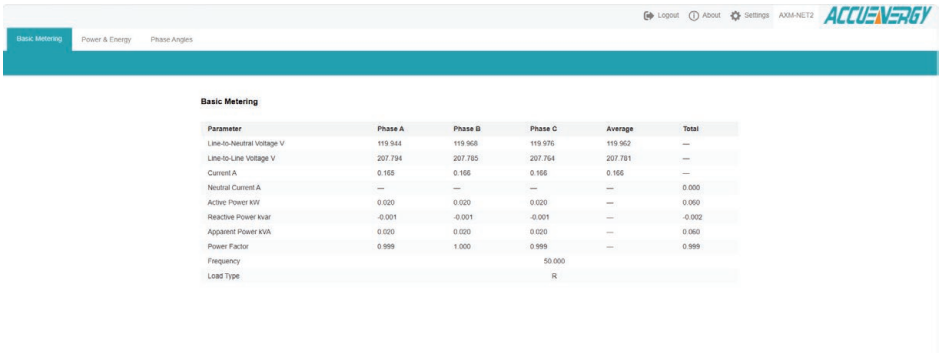


Figure 5-1 Basic Metering Webpage

5.2 Power & Energy

The Power & Energy webpage will show the energy data for the Acuvim II/L meter such as the Active and Reactive Energy that is consumed and delivered as well as the total and per phase Apparent Energy. The page also shows different demand types measured by the Acuvim II/L meter such as the Active, Reactive, Apparent Power as well as the three- phase Current demands.

The parameters in this webpage are updated every 5-seconds.

Basic Metering				
Power & Energy				
Phase Angles				
Energy by Consumption/Generation				
Parameter	Import	Export	Total	Net
Active Energy kWh	301.300	0.000	304.300	302.790
Reactive Energy kWh	0.000	0.000	0.000	-0.000
Apparent Energy kWh	0.000	0.000	304.300	0.000
Energy by Phase				
Parameter	Phase A	Phase B	Phase C	
Import Active Energy kWh	100.100	100.000	100.100	
Export Active Energy kWh	0.100	0.100	0.100	
Import Reactive Energy kVarh	0.000	0.000	0.000	
Export Reactive Energy kVarh	3.500	2.800	3.300	
Apparent Energy kWh	100.800	101.300	102.500	
Demand				
Parameter	Phase A	Phase B	Phase C	Total
Active Power Demand kW	—	—	—	0.000
Reactive Power Demand kVar	—	—	—	-0.001
Apparent Power Demand kVA	—	—	—	0.000
Current Demand A	0.055	0.055	0.055	—

Figure 5-2 Power & Energy Webpage

5.3 Phase Angles

The Phase Angle section of the AXM-NET2 web interface displays the numerical phase angle values of the voltage and current measurements. Unlike graphical visualization, only data values are shown, which can still be used for remote troubleshooting.

Basic Metering			
Power & Energy			
Phase Angles			
Phase Angles			
Parameter	Phase A	Phase B	Phase C
Voltage Phase Angle	-	239.900	119.900
Current Phase Angle	2.000	241.600	121.900

Figure 5-3 Phase Angle Webpage

5.4 Settings

5.4.1 Meter Settings

5.4.1.1 General Settings

The basic metering settings needed for installation and commissioning can be done from the Web Interface. To access these settings users can click on Settings and select the 'Meter' menu tab. On the metering tab users will see the 'General' tab from the submenu selected and the following page presented.

GeneralNetworkTime & DateAutoCloudManagement

LogoutAboutSettingsAXM-NET2

ACCUENERGY

Device Description

Enter description...

Service Configuration

3 element 2 wire Y

PT & CT ratios

PT1

220.0

Default 400, Range 50-1,000,000

PT2

220.0

Default 400, Range 50-400

CT1

20000

Default 5, Range 1-50,000

CT2

333mV

W Method

Calculated

Realtime Reading and Current Direction

Primary

Secondary

IA Direction

Negative

IB Direction

Negative

IC Direction

Negative

IN Direction (Measured)

Positive

Disabled when W Method is Calculated

Phase Selection

IA Phase

Not Selected

IB Phase

Not Selected

IC Phase

Not Selected

IN Phase

Not Selected

Demand

Sliding Window

Sliding Window Demand

Sub-Interval

15

min

Range 1-30

Averaging Interval Window

1

min

Range 1-30

On-board RS485

Protocol

Modbus

Address

1

Baud Rate

19200

Parity

None 1

Change Password

New Password

Enter password

Confirm New Password

Confirm password

SAVE

Figure 5-4 General Settings Webpage

General Settings

Device Description: A description for the meter can be provided in this field.

Service Configuration: Select the type of wiring that the meter will be monitoring from the modes in the drop-down list.

PT1: Enter the rated input of the potential transformer that is connected to the meter. Range is from 50 to 1,000,000V. By default, PT1 is 400.

PT2: Enter the rated output of the potential transformer. Range is from 50 to 400V. The default PT2 setting is 400.



If the voltage input is connected directly to the meter and there are no potential transformer (PT) stepping down the voltage to the meter's voltage input then the PT1 and PT2 settings can be left as the default value of 400.

CT1: Enter the rated input of the current transformer (CT) that is used with the meter. Ranges for the CT1 are from 1 to 50000A.

The default settings for CT1 are dependent on the current input type of the Acuvim II/L meter. The following table displays the default CT1 values for the different current input options.

Table 5-1 Default Values for Current Options

Acuvim II/L Current Input	Default CT1 Value
1A	1
5A	5
80mA/100mA/200mA	1
333mV	1
RCT	1000

CT2: Select the rated output of the current transformer from the drop-down list. By default, this setting is already configured.



CT2 is configurable only for 5A and mA current inputs, 5A can be either 5A or 1A and mA can be either 80mA, 100mA or 200mA.

I4 Method: Represents the Neutral Current Value (I N Value) calculating method - The neutral current value can be configured as either Calculated or Measured.

- Calculated: If Calculated is selected, the I4 readings will be calculated based on IA, IB, IC.
- Measured: If Measured is selected, the I4 readings will be measured independently based on the independent CT2 value.

PT & CT ratios

PT1

220.0

Default: 400, Range: 50-1,000,000

PT2

220.0

Default: 400, Range: 50-400

CT1

30000

Default: 5, Range: 1-50,000

CT2

333mV

I4 Method

Calculated

Figure 5-5 PT & CT Ratios Webpage

Current Phase Angle Settings

Real Time Reading: Select the mode of the readings for the meter when it is polled through Modbus. Default setting for the meter is Secondary mode, which will require some parameters to be scaled by a relationship. Configuring the meter in Primary mode does not require any scaling.

I A Direction: Represents the flow of direction for the Phase A current being measured, configure this setting to troubleshoot issues related to incorrect polarity of readings such as real power, power factor and other parameters.

I B Direction: Represents the flow of direction for the Phase B current being measured, configure this setting to troubleshoot issues related to incorrect polarity of readings such as real power, power factor and other parameters.

I C Direction: Represents the flow of direction for the Phase C current being measured, configure this setting to troubleshoot issues related to incorrect polarity of readings such as real power, power factor and other parameters.

Realtime Reading and Current Direction

☐ Primary

☒ Secondary

I A Direction

Negative

Positive

Negative

I B Direction

Negative

I C Direction

Negative

I N Direction (Measured)

Positive

*Disabled when I4 Method is Calculated

Figure 5-6 Current Direction Settings

Phase Selection: The "Phase Selection" feature allows users to determine the physical phase connection (A, B, C, or Neutral - N) for each current reading and modify the current readings at the application layer without changing the physical wiring.

The screenshot displays the 'Phase Selection' configuration page. At the top, there are four dropdown menus labeled 'I A Phase', 'I B Phase', 'I C Phase', and 'I N Phase'. Each dropdown currently shows 'Not Selected'. The 'I A Phase' dropdown is expanded, revealing a list of options: 'Not Selected', 'Physical wiring Ia', 'Physical wiring Ib', 'Physical wiring Ic', and 'Physical wiring In'. Below these dropdowns, there are two input fields: 'Sub-Interval' and 'Averaging Interval Window', both of which are currently empty.

Figure 5-7 Phase Selection Settings

Demand Settings

This setting refers to the demand type. There are four demand types that are supported by the Acuvim II or Acuvim L series meter, users can choose one of the following:

Fixed Window: The demand is calculated based on selecting the calculation period between 1-30 minutes. The meter will calculate and update the demand values at the end of each calculation period.

Sliding Window: The demand is calculated by selecting the calculation period between 1-30 minutes. The meter will average the energy accumulated within this period of time and the demand value is updated every one minute.

Thermal: The demand is calculated based on thermal response, used in thermal demand meters. This method uses a sliding window to update the demand value at the end of each calculation period.

Rolling Window: The demand is based on selecting a calculation period between 1 to 30 minutes, a subinterval demand calculation slip time and the demand value is updated at each subinterval. The subinterval must be a factor of the calculation period. For example, with a calculation period of 15-minutes, the subinterval can be configured as 5-minutes.

Sub Interval: The sub interval setting is only relevant if the Rolling Window Method is selected, this method requires a sub-interval time that must be a factor of the demand calculation period. the range for this setting is from 1 to 30 minutes.

Average Interval: The average interval window is the calculation period of the demand and can be set from 1 to 30 minutes.

Demand

Sliding Window

Sliding Window Demand

Sub-Interval

15

mins

Averaging Interval Window

1

mins

Range 1-30

Range 1-30

Figure 5-8 Demand Settings

On-board RS485

Protocol: Select the protocol for the Acuvim II or Acuvim L RS485 port, the protocol can be set to Modbus.

Address: Select the RS485 address for the meter, the range for this setting is from 1-247.

Baud Rate: The baud rate is the communication speed of the RS485 data transfer, this ranges from 1200-115200.

Parity: Select the parity bit setting for communication.

On-board RS485

Protocol

Modbus

Address

1

Baud Rate

19200

Parity

None 1

Figure 5-9 On-Board RS485 Settings

Chapter 6: Communications

6.1 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 applicable parameters for the AXM-NET2 module, including the single IP address shared by both Ethernet ports. Wi-Fi configuration is not available on this module.

6.1.1 RSTP Protocol

The AXM-NET2 module provides two Ethernet ports that can be connected in a daisy-chain topology or directly to a network switch. The module has Rapid Spanning Tree Protocol (RSTP) option , ensuring loop prevention and fast recovery in redundant network topologies. The ping function is also always enabled for connectivity diagnostics.

Users can configure the meters IP manually or by setting the DHCP set as Auto.

General

Network

Time & Date

AcuCloud

Management

Network Mode

☒ Static
 ☐ DHCP

RSTP Enable

☐ Disable
 ☒ Enable

IP Address

20.20.20.200

Subnet Mask

255.255.255.0

Gateway

20.20.20.1

Default: 0.0.0.0

DNS Server

208.67.222.222

Default: 8.8.8.8

Meter Channel Address (Modbus TCP)

3

Range 1-247

Modbus TCP Port

2000

Default: 502, Range 2000-5999

SAVE

Figure 6-1 Network Configuration Page

User can pin the IPv4 address of the meter, which allows them to determine communication latency.

```
C:\Users\TimZou>ping 192.168.61.114

Pinging 192.168.61.114 with 32 bytes of data:
Reply from 192.168.61.114: bytes=32 time=1ms TTL=64
Reply from 192.168.61.114: bytes=32 time=1ms TTL=64
Reply from 192.168.61.114: bytes=32 time=1ms TTL=64
Reply from 192.168.61.114: bytes=32 time=2ms TTL=64

Ping statistics for 192.168.61.114:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms
```

Figure 6-2 Command Prompt IPv4 Ping

Network Topology

Users can daisy chain up to 32 devices using the RSTP protocol. This can cut down the amount of network switches required in different applications and allows the use of one network switch/router to be used with up to 32 devices. Each device can be accessed by configuring a unique IP address or having the IP addresses assigned automatically by the network.

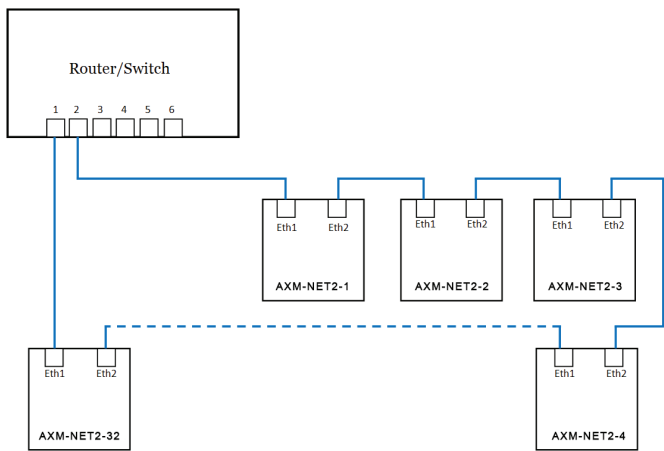


Figure 6-3 AXM-NET2 Module Daisy Chain Topology

6.1.2 Network Settings

The AXM-NET2 module uses a single logical IP address shared across both Ethernet ports.

Network Mode: Select 'Static' to manually configure the IP address to access the meter. If set to 'Static', the Subnet Mask and Gateway will also need to be set. By default, the IP address for ETH1&2 will be 192.168.1.254.

Select 'DHCP' to have the meter assigned an IP address automatically. With this selection the Subnet Mask, and Gateway will also be automatically assigned.



After changing Network Mode to DHCP, 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 Network Mode is configured to DHCP, the IP address can be configured from this page. Default IP address is 192.168.1.254.

Subnet Mask: If the Network Mode is configured to DHCP, the Subnet Mask can be configured from this page. Default IP address is 255.255.255.0.

Gateway: If the Network Mode is configured to DHCP, the Gateway can be configured from this web page. Default IP address is 192.168.1.1.

DNS Server: Enter the address of the DNS server in this field. The default value is 8.8.8.8.

The web interface will display whether each Ethernet port is physically connected or disconnected. Both ports share the same logical network settings and IP address.

Figure 6-4 DNS Configuration

After making any changes on the network settings page, click the 'Save' button. Users will be prompted to reboot the AXM-NET2 series module immediately or later. If later is chosen the AXM-NET2 series module will need to be rebooted from the 'Management' webpage for the settings to take effect.

6.2 Time/Date

The device clock of the AccuVim II/L meter can be configured through the AXM-NET2 web interface. The AXM-NET2 supports the SNTP (Simple Network Time Protocol) function, allowing the module to synchronize its device clock with an external time server.

AXM-NET2 Modbus Dual Ethernet Meter Module

The settings for the time and date can be found by clicking on the 'Settings'. Users can select 'Time/Date' to configure the time settings.

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

SNTP Enabled: Enabling the option for the device will automatically update the time with the external time server and device time will not be manually configurable.

Device Clock: Configure the date and time on the meter when SNTP is disabled.

- Click on the calendar icon  to configure the date and time.

Time Zone: Select the meter's current time zone or configure a different time zone offset for synchronization. The AXM-NET2 allows users to manually set the time zone within a range of UTC-14:00 to UTC+14:00, in increments of 15-minutes. Map-based selection is not supported.

Daylight Saving Time (DST): If required, enable DST and specify the start and end dates.

Click the 'Save' button after configuring the time settings. Users will be prompted to reboot the AXM-NET2 module immediately or later. If later is chosen the AXM-NET2 series module must be rebooted from the 'Management' webpage for the settings to take effect.

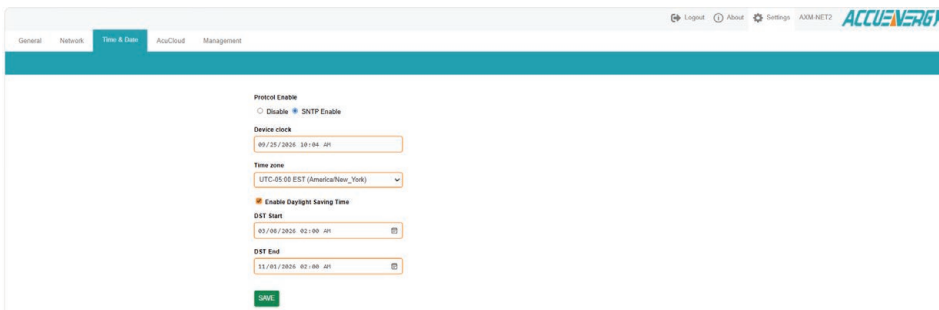
The screenshot shows the 'Time & Date' configuration page of the AXM-NET2 web interface. The page has a top navigation bar with 'General', 'Network', 'Time & Date', 'AcuCloud', and 'Management' tabs. The 'Time & Date' tab is active. The main content area contains the following settings: 'Protocol Enable' with radio buttons for 'Disable' and 'SNTP Enable' (selected); 'Device clock' with a date and time input field showing '09/25/2020 10:04:40'; 'Time zone' with a dropdown menu showing 'UTC-05:00 EST (America/New_York)'; 'Enable Daylight Saving Time' with a checked checkbox; 'DST Start' with a date and time input field showing '03/08/2020 02:00:00'; 'DST End' with a date and time input field showing '11/01/2020 02:00:00'; and a green 'Save' button at the bottom.

Figure 6-5 Daylight Saving Time Page

6.3 AcuCloud

The AXM-NET2 series module can directly interface with the Accuenergy cloud-based Energy Management software AcuCloud. The AXM-NET2 series will post data to AcuCloud every 5- minutes.

AcuCloud will require the serial number of the AXM-NET2 module which will then provide a token that will be used to configure the AXM-NET2 so it can send its data to AcuCloud.

The settings for the AcuCloud post function can be found by clicking on the 'Settings' menu tab and selecting 'Communications'. Select 'AcuCloud' to access the settings to configure the AXM-NET2 series 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 the token provided by the AcuCloud software and paste into this field.

General Network Time & Date **AcuCloud** Management

Note: Please allow host "acucloud.accuenergy.com" to pass through firewall if you are connecting the meter to a high security network.

AcuCloud Enable

☐ Disable ☒ Enable

Module Serial Number: AN54030552 [Copy](#)

[Link to AcuCloud](#)

AcuCloud Token

b59b2b56-6320-4b6f-b833-21b0adc53a1d

[SAVE](#)

Figure 6-6 AcuCloud Configuration Page



Allow host "acucloud.accuenergy.com" to pass through firewall if you are connecting the meter to a high security network.

Users can use the 'Link to AcuCloud' to access AcuCloud software and configure the required settings on that platform. Users must have sufficient access to add devices on their account to correctly configure the meter on the software. For inquiries on creating your AcuCloud account please contact Accuenergy Technical Support.

Click the 'Save' button after changing any settings. Users will be prompted to reboot the AXM-NET2 series immediately or later. If later is chosen the AXM-NET2 series must be rebooted from the 'Management' webpage for the settings to take effect.

The AXM-NET2 series will post the data continuously every 5- minutes to AcuCloud after the reboot.

Chapter 7: Management

7.1 Parameter Reset

The Management webpage allows the user to clear and reset certain parameters in the meter.

The following parameters can be reset from the Management webpage:

- Demand
- Energy
- Device Run Time

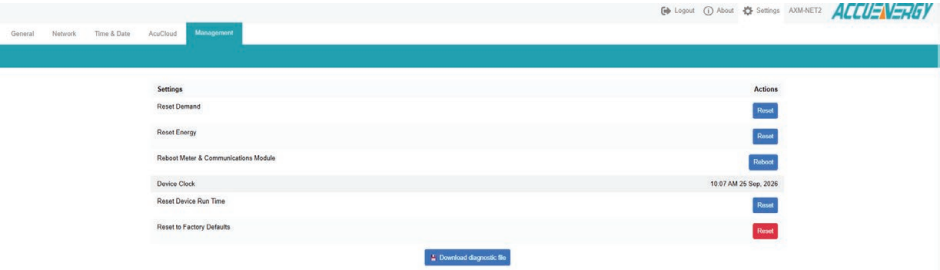


Figure 7-1 Management Webpage

7.2 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 revert back to its default settings. It not only resets the communication module, but also performs a soft reboot on the Acuvim II/L meter.



Figure 7-2 Reboot Meter Setting

7.3 Reset to Factory

The AXM-NET2 module supports a factory reset function where all module settings will revert back to its default factory settings. It will impact all configurations and logs stored on the module.



Factory reset action is permanent and cannot be undone.



Figure 7-3 Factory Reset Setting

Chapter 8: Firmware Update

8.1 Module Firmware Update

The AXM-NET2 module does not support firmware updates through the Web Interface. The only supported method is by using the Acuvim 2 software. Acuvim 2 allows users to upload and install the latest module firmware released by Accuenergy.

8.2 Meter Firmware Update

Firmware updates for the Acuvim II/L meter must be performed through the **Acuvim 2 software**. Users can connect Acuvim 2 to the module with a Modbus TCP Ethernet or via the Modbus RTU. Use the built-in update feature to load and apply the correct firmware file.



Updating through the AXM-NET2 Web Interface is not supported.

1. Under the **Operations** menu, select **Firmware Update**.

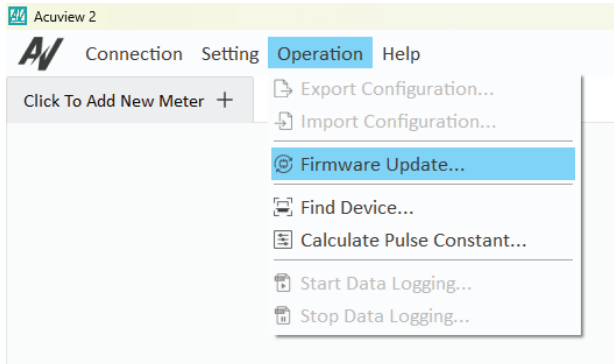


Figure 8-1 Firmware Update Screen

2. Choose the firmware file for update.

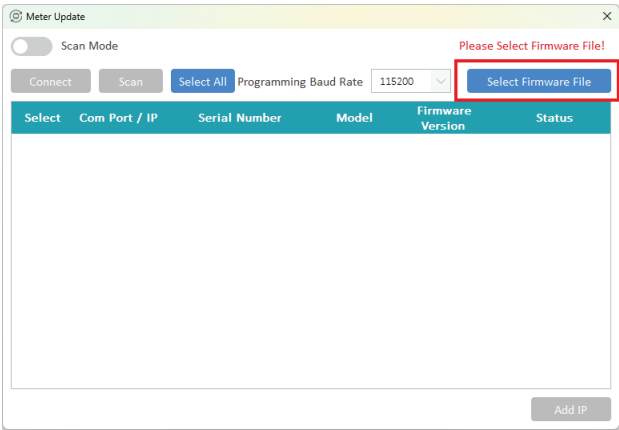


Figure 8-2 File Update Interface

3. There are two ways to use Acuvier 2 to communicate with AXM-NET2 module:

Modbus RTU

Enable **Scan Mode** and click **Scan** to find the port number connected to the meter. Select the COM port and click **Connect**.

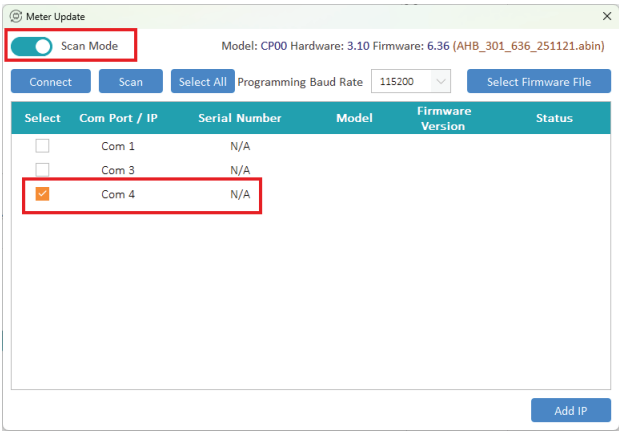


Figure 8-3 Update the Firmware via Modbus RTU

Modbus TCP

To update the firmware using Modbus TCP, choose **Add IP**.

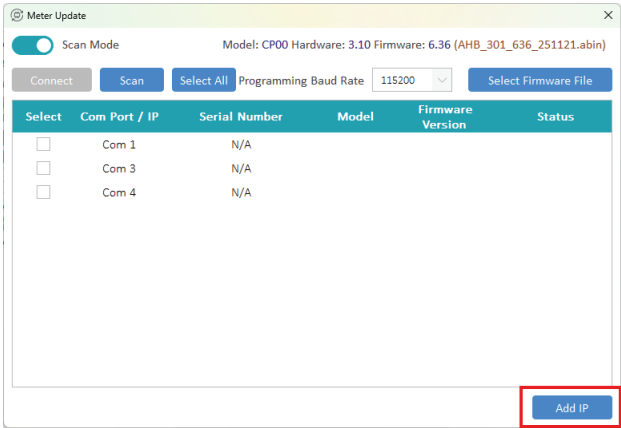


Figure 8-4 Update the Firmware via Modbus TCP

Enter the meter's IP address, port number, and slave ID.

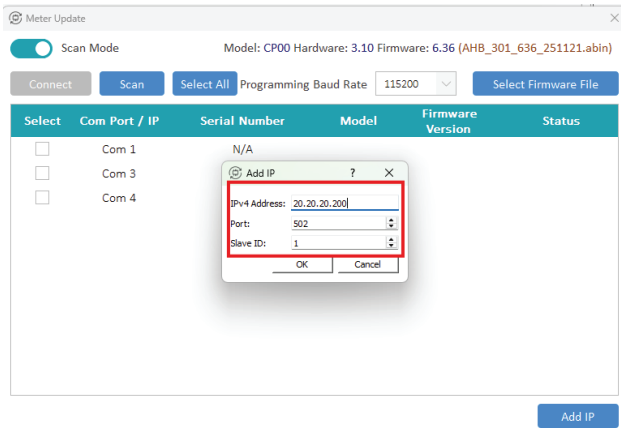
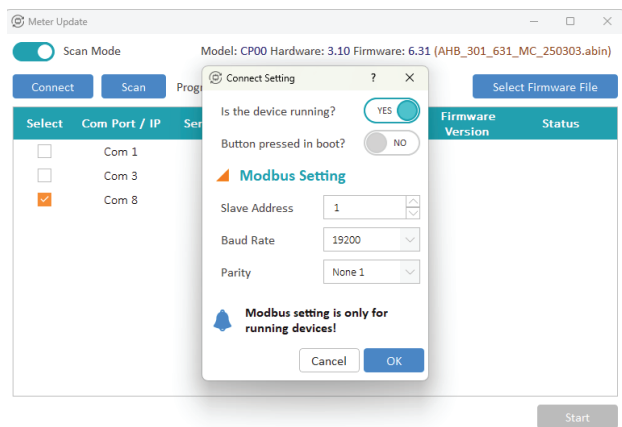
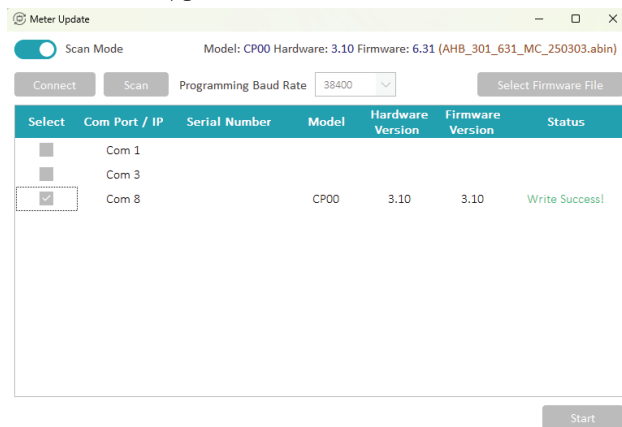


Figure 8-5 Device Information

4. Unselect the **Is the device running?**, and select the **Button pressed in boot?**
Press **OK**



5. Click **Start** and wait until the upgrade is done and shows **Write Success**.





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