AcuPanel 9108X

Power Quality Submetering Panel Installation Guide



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UL 508A

ACCUENERGY

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Please read this installation guide carefully before installation, operation, and maintenance of the AcuPanel 9108X.

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

The following symbols appear throughout this documentation and on the AcuPanel 9108X, in addition to the electrical warning of danger or safety risk during the installation, commissioning and operation.



Electrical Shock Hazard: Contains information about procedures which must be followed to prevent the risk of electric shock and danger that can result in personal injury or death.



Safety Warning: Contains information about circumstances which if not considered may result in personal injury or death.



Info: An advance notice to provide additional information before an action is taken by the user.

Installation and maintenance of the AcuPanel 9108X shall only be performed by qualified, competent professionals who have received training and have experience with high voltage and current devices.

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

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Introduction

Overview

The AcuPanel 9108X is a power quality submetering panel supplied in a NEMA 4X enclosure with a pre-installed Acuvim 3 advanced power quality meter. It delivers IEC 61000-4-30 Class A compliant power quality monitoring and revenue-grade energy metering compliant with ANSI C12.20 Class 0.1 and IEC 62053-22 Class 0.1S standards. Its self-powered design draws operating power directly from the voltage measurement inputs, eliminating the need for a separate control power supply or control transformer.



Figure 1 AcuPanel 9108X Power Quality Submetering Panel

Typical Applications

- Power distribution systems
- SCADA and building automation systems
- Critical infrastructure
- Manufacturing facilities
- Telecommunications
- Transportation monitoring
- OEM projects and retrofit installations

Package Contents

Info

Carefully open the packaging of the panel and do not use excessive force.

Inspect all the contents of the package are not damaged before installing the panel.

A	AcuPanel 9108X Power Quality Submetering Panel
B	Pre-installed Acuvim 3 Advanced Power Quality Meter
C	Four wall-mount Lugs and Screws
D	Wi-Fi Antenna
E	CT Shorting Blocks
F	Quick Setup Guide (Not Pictured)

A



B



C



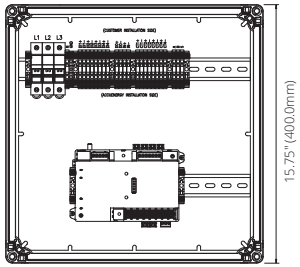
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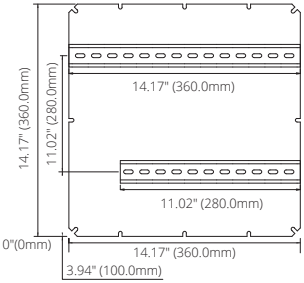


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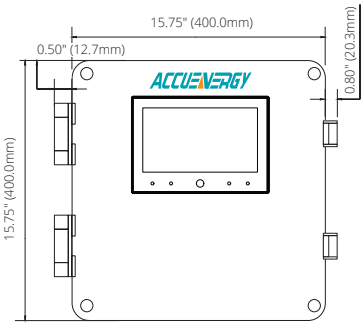


Appearance and Dimensions

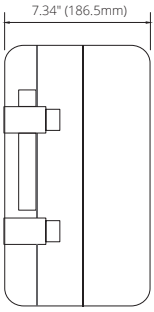




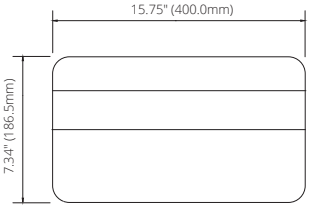
FRONT VIEW WITHOUT COVER



FRONT VIEW



SIDE VIEW



BOTTOM VIEW

Figure 2 AcuPanel 9108X Dimensions

Safety & Installation Considerations



Electrical Hazard

Installation of AcuPanel 9108X must only be performed by qualified electrical personnel following proper electrical safety procedures.

AcuPanel 9108X Installation Safety

- Before commencing the wiring or service of the panel, ensure to de-energize and lock out all circuits.
- Short the secondary of the CT before disconnecting. Do not install or disconnect CTs or leave the secondary of the CT open on an energized conductor.
- Ensure polarity of the CT aligns with the connected phase correctly.
- To reduce the risk of electric shock, always open or disconnect the circuit from the building power distribution system before installing or servicing current transformers.
- Verify the service is fully disconnected before making any voltage connections. Connect the common ground point of the AcuPanel 9108X to the facility grounding system.
- Ensure proper protective earthing and compliance with electrical safety standards.

Panel Mounting Procedure

Mounting Tools

1.	Electric Drill
2.	Level
3.	Wire Cutters
4.	Side Cutters
5.	Conduit Knockout Punch Tools
6.	Grommets and Cable Retention

Typical Mounting Surfaces

Select a structurally suitable mounting surface that can support the weight of the enclosure and wiring including electrical distribution panels, electrical backboard, concrete or masonry walls, or other suitable surfaces, provided that the mounting surface complies with applicable electrical codes.

Mounting the Panel

Step 1: Select the Mounting Location

Choose a mounting location that is easily accessible, dry, and free from excessive vibration or heat. The NEMA 4X panel is rated for indoor or outdoor use.

Step 2: Mount the Enclosure

Mount the enclosure vertically on a wall using the four corner mounting lugs supplied.

Step 3: Ensure Adequate Clearance

Ensure sufficient clearance around the enclosure for conduit entry and door swing.

Step 4: Install Conduit Connections

Drill conduit entry holes at appropriate locations on the enclosure as per application requirement. Openings include reference voltage and current inputs, RS485, Ethernet cable, digital input, digital output, and time synchronization connections. Seal all unused openings to maintain NEMA 4X rating.

Info

The AcuPanel 9108X is **NOT** pre-drilled for conduit.

All conduit holes must be drilled on-site by the installer to ensure connections are properly sized and located for the application.

9108X Panel Wiring

Factory Wired Connections

Control power, voltage reference, current input, digital input, digital output, time synchronization, and RS485 wiring from the meter to the panel terminals are pre-wired and tested at the factory level.

Field-Wired Connections by Installer

The installer needs to carry out the external load voltage, current transformer, communication, digital input, digital output, time synchronization, and I/O module wiring to the panel terminals as described in the following sections.

Voltage Wiring



Electrical Hazard

De-energize the source panel before making any wiring connections.

Verify with a meter that all conductors are de-energized.

Step 1: Connect the Load Voltage Reference

Connect the A, B, C voltage leads and N to the terminal blocks labelled L1, L2, L3, and N in the AcuPanel 9108X.

Depending on the control power of the panel, a transformer is included in the panel. No additional power supply or control transformer is required. The voltage reference will supply control power to the entire enclosure.

Step 2: Install the Inline Fuses

It is recommended to install inline fuses with the voltage reference A, B, and C voltage lead connections for overcurrent protection.

Step 3: Verify the Wiring Configuration

Select the correct wiring configuration for your circuit type.

Refer to the corresponding wiring diagram on the inside of the enclosure door.

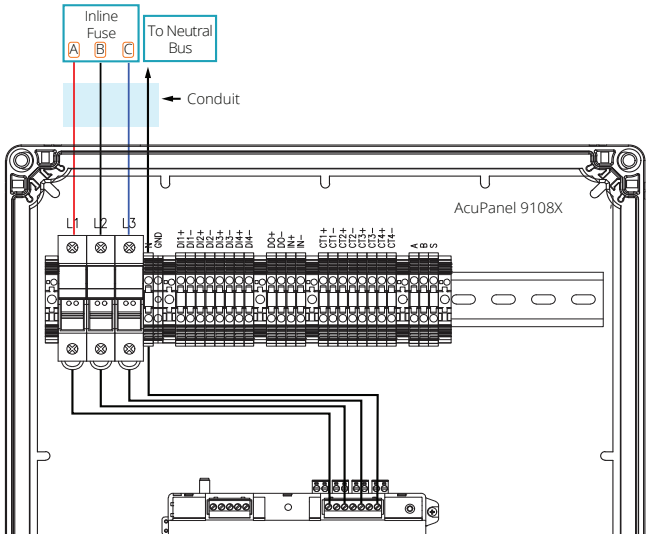


Figure 3 Voltage Connections

Current Transformers Wiring

Electrical Hazard

Never leave CT secondaries open-circuited on energized conductors. Short the secondary terminals before removing any CT.

Current transformers (CTs) are ordered separately. Verify the CT model, ratio, and cable length before installation.

Step 1: Installing the Current Transformers

Clamp or install CTs around each monitored conductor. Ensure to orient the CT polarity arrow points towards the load and away from the source. Follow the wiring diagram and instructions provided by the CT manufacturer.

Step 2: Routing the Secondary Cables

Route CT secondary cables through the conduit to the AcuPanel 9108X. Keep CT leads away from high-voltage conductors to avoid interference.

Step 3: Connecting to the CT Terminals

Connect the CT secondary leads to the terminal blocks labelled CT1+, CT1−, CT2+, CT2−, CT3+, CT3− inside the panel. If needed, connected the neutral CT to the CT4+ and CT4- terminals of the AcuPanel 9108X.

For Rogowski coil CTs, connect the integrator output to the corresponding input terminal.

Ensure the coil overlap joint is properly closed around the conductor.

Compatible current transformers include field selectable 5A or 1A split-core or solid-core CTs, 333 mV split-core or Rogowski coil CTs.

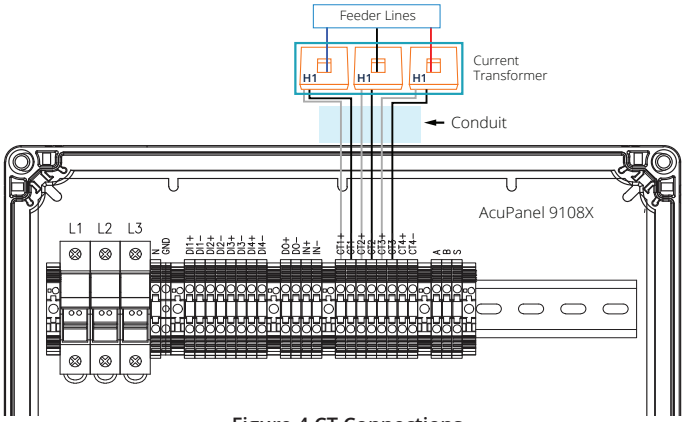


Figure 4 CT Connections

Info

Refer Current Transformers for further information.

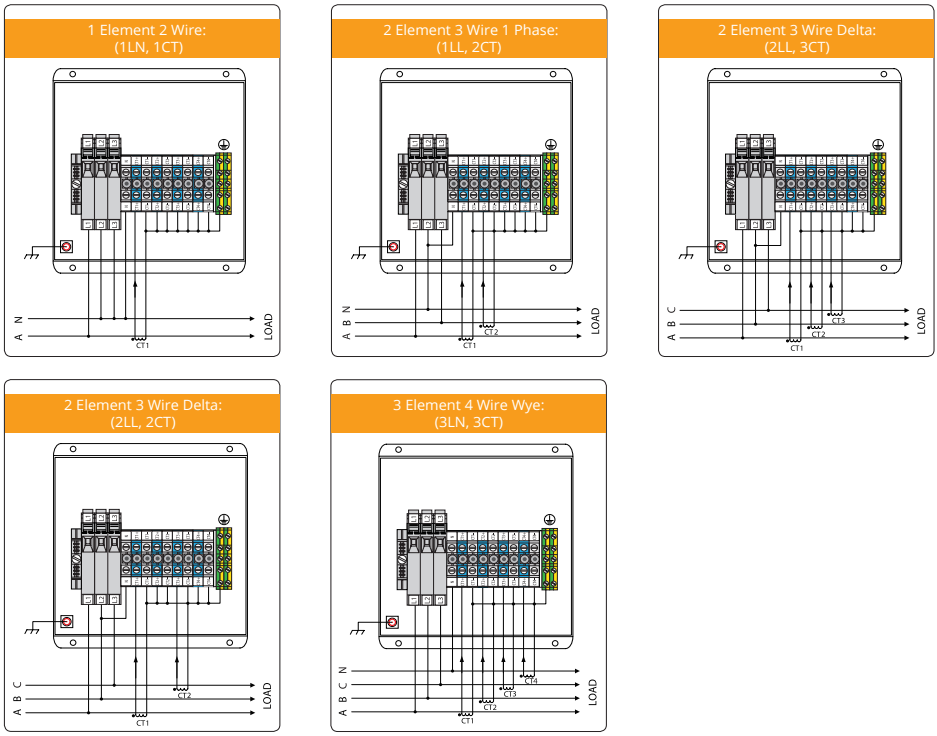


Figure 5 AcuPanel 9108X Wiring Diagrams

Communications Wiring

RS485 Wiring

Step 1: Connect the RS485 Wires

Connect the RS485 A+, B−, and S terminals to the respective panel terminals on the AcuPanel 9108X. Ensure to check for correct polarity.

Step 2: Terminate the RS485 Bus

Terminate the RS485 bus with a 120Ω resistor at each physical end of the cable run if multiple devices are daisy-chained, as required by network configuration.

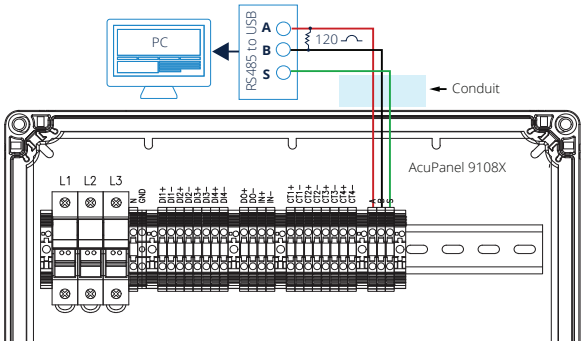


Figure 6 RS485 Wiring

Ethernet and Wireless Communication

Step 1: Connect Ethernet

Connect an Ethernet cable to either of the dual Ethernet ports on the Acuvim 3 for network communication. Configure the meter's network settings and the host system as required.

Step 2: Connect Wi-Fi Antenna

Connect the antenna at the designated connector. Do not connect the antenna to an unspecified meter port.

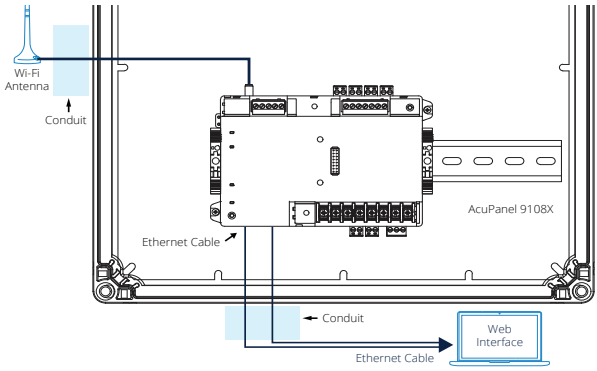


Figure 7 Ethernet and Wi-Fi Connection

Digital I/O and IRIG-B Connections

Step 1: Connect Digital Inputs

Connect the external digital input wires to the designated DI1+, DI1- through DI4+, DI4- terminals in the AcuPanel 9108X.

Step 2: Connect Digital Output

Connect the external digital output wires to the designated DO+ and DO- terminals in the panel.

Step 3: Connect IRIG-B Time Synchronization

Connect the IRIG-B time-synchronization signal wires to the designated IN+ and IN- terminals in the panel.

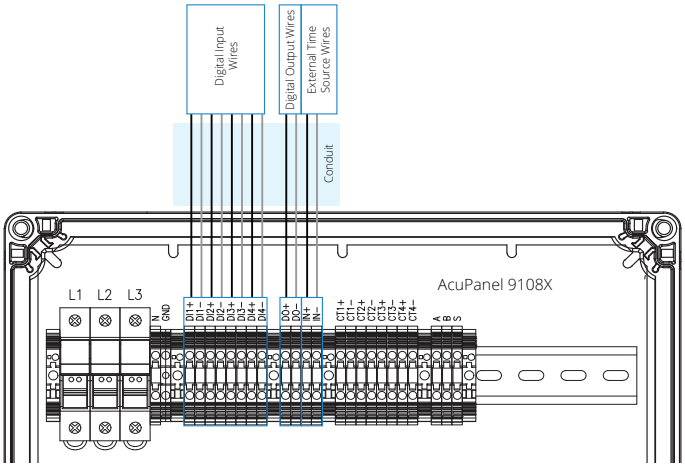


Figure 8 I/O and Time Synchronization Connection

Optional I/O Module Connections

Optional IO1 to IO3 modules are separate additional modules installed on top of the Acuvim 3 meter. The optional I/O module connections are distinct from the digital I/O connections mentioned previously.

Step 1: Verify Module Compatibility

Confirm that the optional I/O module is the same as the module which was selected at the time of placing the order.

Step 2: Install the I/O Module

Insert the I/O module on top of the Acuvim 3 meter. Align the pins and attach the module to the meter.

Step 3: Connect Field Devices

Connect field devices to the designated terminals of the module. Verify the signal type, ratings, and terminal polarity before connecting field wiring.

Info

A maximum of three external I/O modules can be connected to the Acuvim 3 power quality meter simultaneously.

No more than two of the exact same I/O models can be attached to a single meter. If two of the same module types are used, the modules must be configured with different logic numbers within the meter settings to avoid communication conflicts.

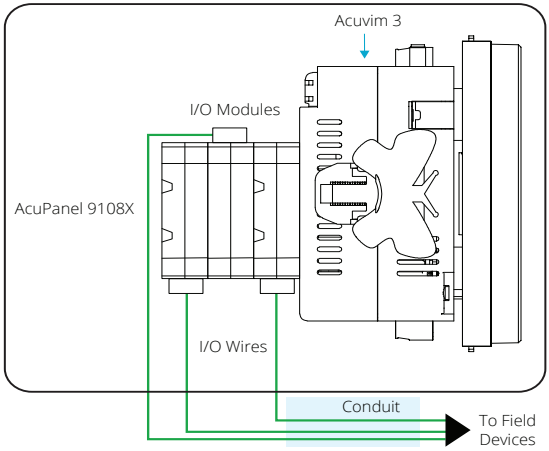


Figure 9 I/O Module Wiring

Ground Connection

Step 1: Locate the Ground Terminal

Locate the factory-installed common ground terminal inside the AcuPanel 9108X enclosure. All internal components are pre-wired to this ground point at the factory.

Step 2: Connect to Facility Ground

Connect the panel's common ground terminal to the facility ground system in accordance with applicable local electrical codes to complete the ground path.

Step 3: Verify the Ground Connection

Verify that the ground connection is secure and provides a continuous grounding path before energizing the panel.

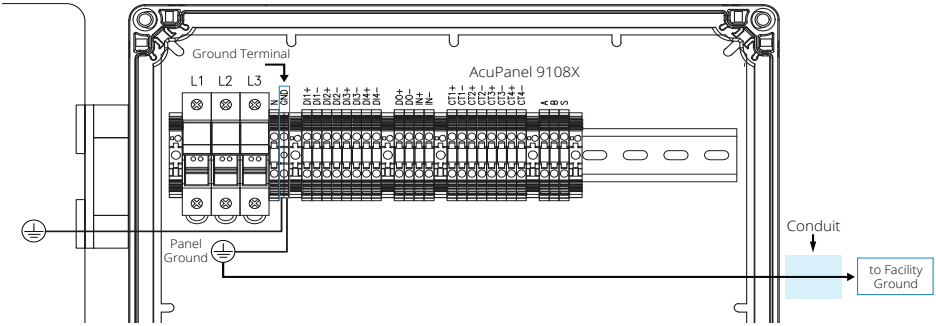


Figure 10 Ground Connection

Network Integration

The AcuPanel 9108X can be integrated into Building Management Systems (BMS), Energy Management Systems (EMS), SCADA systems, or an AcuLink 810 gateway for centralized monitoring. Select an integration path based on the communication interface mentioned.

Communication Interface	Integration Path	Connection Requirements
RS485	Modbus RTU	Set the address and baud rate to match the master device.
Ethernet	Modbus TCP	Ethernet Connection.
Ethernet	BACnet/IP	Ethernet Connection. Configuration on Web Interface.
RS485	BACnet MS/TP	Change Mode to BACnet.
Ethernet	DNP 3.0 / IEC 61850	Ethernet Connection. Configuration on Web Interface.
RS485	AcuLink 810 Gateway	Used for Local Data Storage and Access Web Interface.
Ethernet	AcuCloud	Connect via Ethernet or use AcuLink 810 as an Upstream Data Path to Cloud Based Energy Management.

Commissioning Checklist

Check	Acceptance Criteria	Result
Pre-Energization Checklist	• CT connections secure and correctly phased. • Voltage wiring connections verified. • Panel clean of tools and debris. • All enclosure covers installed and latched.	Pass / Fail
Grounding	• Panel common ground terminal connected to facility ground.	Pass / Fail
Power-Up Verification	• Acuvim 3 illuminates upon power-up. • Real-time electrical parameters are visible. • Voltage and current readings match expected values.	Pass / Fail

Post Power-Up Troubleshooting

Observed Error	Possible Cause	Recommended Action
No Display	No Control Power	Check Voltage Wiring and Source Breaker.
Display Visible, but Readings are Zero	CT leads Not Connected	Verify CT Secondary Leads are Connected to CT1 - CT3 Terminals.
Negative Power Reading	CT Installed Backwards or on Wrong Phase	Swap CT Polarity or Make Correction in Software. Reassign Phases in Meter Configuration.
Zero Current Reading	Open CT Circuit or CT Ratio Not Programmed	Check CT Connections. Ensure CT Secondary Is Not Open-Circuited or Program CT Ratio in Settings.
Voltage Mismatch	Wrong Phase Connection or Wiring Mode	Verify Wiring Configuration Matches the Actual Circuit Type.
Incorrect Energy Readings	Wrong CT Ratio or Phase Mismatch	Reconfigure CT Ratio. Verify CT Phases Match Voltage Reference Phases.
Erratic or Fluctuating Readings	CT Leads Near High-Voltage Conductors	Reroute CT Cables Away from Power Conductors.
No RS485 Communication	Incorrect Wiring Polarity, Wrong Address or Baud Rate	Check RS485 A+ and B− Polarity. Verify Modbus Address and Baud Rate Match the Master Device.

Accessing Energy Data

On-Device Touchscreen

The Acuvim 3 provides real-time readings without any additional software. Available parameters include:

- Line and phase voltage
- Phase and total current
- Active, reactive, and apparent power
- Power factor
- Frequency
- Cumulative energy, kWh import and export
- Phasor diagram
- Harmonic spectrum
- Waveform captures and transients
- ITIC and SEMI curves
- Voltage sag, swell, and interruption recording

Phase & CT Verification

The Acuvim 3 supports CT polarity correction through software configuration. No physical rewiring is required in most cases.

Step 1: Verify Phase Readings

Check the per-phase voltage, current, power, and power factor readings against the expected values for the connected load. Confirm that the voltage and current measurements correspond to the correct phases.

Step 2: Check CT Polarity

If a phase shows negative power or energy flowing in the wrong direction, use the CT polarity correction feature in the meter configuration to flip the CT orientation in software.

Verify that per-phase voltage, current, and power factor readings align with expected values for the connected load before accepting final commissioning.

Meter Configuration

If manual configuration is required, the following settings must be programmed on the Acuvim 3 meter.

- **Wiring Mode:** Set to match wiring configuration of the monitored circuit.
- **CT Ratio:** Set to match the primary and secondary ratings of the installed CTs.
  Example: For a 200A:5A CT, set the primary rating to 200 A, and 5 A as secondary.
- **Communication Address:** Assign a unique Modbus device address.
  The default address is 1.

Product Specifications

AcuPanel 9108X Specification	Description
Enclosure	NEMA 4X Polycarbonate
Dimensions	400.0 mm × 400.0 mm × 186.5 mm 15.75" (W) × 15.75" (H) × 7.34" (D)
Meter	Acuvim 3 Advanced Power Quality Analyzer
Current Inputs	Single or Three-Phase Circuits
CT Input Types	5A or 1A 333 mV or Rogowski Coil
Nominal Voltage	Up to 400 V L-N / 690 V L-L
Wiring Configuration	1E2W 2E3W Single Phase 2E3W Delta 2E3W Delta 3E4W Wye
Control Power	P1: 100 - 415 VAC, 50/60 Hz, 100 - 300 VDC P2: 20 - 60 VDC P3: 480 VAC P4: 600 VAC
Accuracy	ANSI C12.20 Class 0.1 IEC 62053-22 Class 0.1S
PQ Standard	IEC 61000-4-30 Class A
RS485 Port	1 Modbus RTU
Protocols	RS485 includes Modbus RTU, BACnet MS/TP Ethernet and Wi-Fi include Modbus TCP, BACnet/IP, DNP 3.0, IEC 61850
Display	Colour Touchscreen
Operating Temperature	-25°C to +70°C -13°F to +158°F
Certifications	UL 508A, UL 61010-1

Support & Resources

Resource	Details
Product Datasheet	https://www.accuenergy.com/acupanel-9108x-datasheet
User Manuals	https://www.accuenergy.com/acuvim-3-manual
Firmware Updates	accuenergy.com/support/firmware
AcuCloud Login	acucloud.accuenergy.com
Commissioning	Remote or on-site programming available.

Accuenergy Commissioning Service

Accuenergy provides on-site or remote commissioning for all AcuPanel systems.

Contact fieldservices@accuenergy.com to request services.

ACCUENERGY

MAKE ENERGY USAGE SMARTER

For additional help please reach out to:

Accuenergy Sales

Email: marketing@accuenergy.com

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Accuenergy Technical Support

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Specs Subject To Change Without Notice.