Acuvim 3

Advanced Power Quality Meter Datasheet

Acuvim 3

Power Quality Meter

+ IEC 61000-4-30 Class-A Compliant Metering of Split-Second Power Malfunctions
+ IEC 61557-12 Class 0.1 Accuracy Compliant for Voltage/Current RMS
+ IEC 62053-22 Class 0.1s and ANSI C12.20 Class 0.1 Accuracy for Active Energy
+ IEC 62053-24 Class 0.5s Accuracy for Reactive Energy
+ Multi-protocol support: Modbus-RTU, Modbus-TCP/IP, BACnet-IP, DNP3 TCP, IEC 61850, & SNMP
+ PMU (IEEE C37.118) for fast and reliable synchrophasor measurement
+ Waveform Capture detection up to 512 sample/cycle and stored in COMTRADE format
+ Time of Use (TOU) with 8 tariff and up to 12 billing periods
+ Fast Log capture with 1 cycle RMS
+ Up to 100 dataloggers with user-selectable logging interval and parameters
+ Data post: HTTP/HTTPs, SFTP, and email

DESCRIPTION

The Acuvim 3 advanced power quality meters are engineered to provide high-precision power quality metering plus revenue grade, IEC Class 0.1S/ANSI C12.20 Class 0.1 (active energy) four quadrant power monitoring. With support for synchrophasor applications, it can record real-time power quality disturbances, like dips, swells interruptions, unbalance, flicker, and transients as well as capture critical waveforms triggered by sub-second power quality events. Its enhanced Fast Log capture feature can generate and send reports, providing critical information to mitigate the impact of damaging power quality issues. Compact and robust, the Acuvim 3 features a wide range of flexible communication protocols plus and easy-to-use interface with advanced user management and security.

BENEFITS

The Acuvim 3 is an advanced power quality meter designed for high-precision submetering and power quality event capture and analysis.

+ Advanced single-point metering with revenue grade accuracy
+ Fast Log feature captures instantaneous power quality events and saves a report for future assessment
+ Reduce downtime and prevent unexpected equipment errors with sophisticated power quality metering with event notification via email, digital output, or relay output
+ Two, powerful HMI options: Easy-to-use 7" touchscreen interface or advanced, built-in web interface for real-time analysis on the go
+ Compact design for flexible installation and straightforward system or panel integration
+ Recieve instant email notifications to stay informed of system or equipment failures from anywhere

APPLICATIONS

+ Power Quality
+ Data Centers
+ Industrial Automation
+ Manufacturing Facilities
+ Transportation
+ Utilities
+ Healthcare
+ Telecommunications
+ University Laboratories

Key Features

POWER QUALITY METERING

+ IEC 61000-4-30 Class-A compliant measurement for
  - Voltage/Current RMS, updated at 1 cycle with IEC 61557-12 Class 0.1 accuracy
  - Frequency, 1 mHz accuracy, 40 to 70 Hz
  - Voltage/Current harmonics magnitude and angle, up to 127th
  - Voltage/Current unbalance
  - Flicker

POWER QUALITY REPORTING AND ANALYSIS

+ Power quality event detection for
  - Voltage dip/swell/interruption based on 1 cycle RMS
  - Current dip/swell based on 1 cycle RMS
  - Transient overvoltage based on 32 ksps
+ Power quality event to trigger email notification, or DO/RO
+ Up to 65535 power quality event logs in circular buffer
+ Waveform capture
  - Triggered by power quality or manually
  - User configurable sample rate up to 512 sample/cycle
  - User configurable duration (pre-trigger + post-trigger) from 2 cycles to 2 seconds @ 512 sample/cycle
  - COMTRADE format, download from webpage/SFTP, or post via HTTP(s), FTP, SFTP

ADVANCED POWER AND ENERGY METERING

+ IEC 62053-22 Class 0.1S active energy measurements
+ IEC 62053-24 Class 0.5S reactive energy measurements
+ Import/export/net/total and Four-Quadrant energy measurements
+ Time of Use (TOU) support
  - Up to 8 tariff rates
  - Flexible calendar and billing date configuration
  - Record current and up to 12 historic billing periods

+ Fast Log capture
  - Triggered by power quality or manually
  - Capture with 1 cycle RMS
  - User configurable duration, same as waveform capture
  - Fast log report, download from webpage/SFTP, or post via HTTP(s), FTP, SFTP
+ Reporting
  - EN50160 compliance report
  - IEEE 519 compliance report
  - ITIC (CBEMA) Curve
  - SEMI-F47 Curve

Communication Protocols

+ Modbus-RTU via RS485
+ Dual Ethernet
+ WiFi
+ Modbus-TCP/IP
+ HTTPs Webserver
+ HTTP/HTTPs Post
+ BACnet-IP
+ FTP Post
+ SMTP
+ SNMP
+ SNTP
+ DNP3 over IP
+ IEC 61850
+ PMU

Technical Specifications

General	
Voltage Accuracy	0.1% reading, 10-400 VLN, 690 VLL
Current Accuracy	0.1% reading:
	• 1A nominal: 10mA to 2A
	• 5A nominal: 50mA to 10A
Frequency Accuracy	1 mHz, 40 to 70 Hz
Active Energy Accuracy	IEC 62053-22 Class 0.1S
	ANSI C12.20 Class 0.1
Power Quality	IEC 61000-4-30 Class A, Testing according to IEC 62586-2 (2017)
Measurements	
Voltage RMS	IEC 61557-12 Class 0.1, 10-400 VLN, 690 VLL
Current RMS	IEC 61557-12 Class 0.1
	1A nominal: 10mA to 2A
	5A nominal: 50mA to 10A
Frequency	1 mHz accuracy, 40 to 70 Hz, exceeds requirement of IEC 61557-12 Class 0.02
Power and Power Factor *(For each phase and system)*	Active power: IEC 61557-12 Class 0.1
	Reactive power: exceeds requirement of IEC 61557-12 Class 1
	Apparent power: IEC 61557-12 Class 0.2
	Power factor: exceeds requirement of IEC 61557-12 Class 0.5
Fundamental Measurements	Line to Neutral Voltage RMS
	Line to Line Voltage RMS
	Line Current RMS
	Active power
	Reactive power
	Apparent power
	Power factor
Max/Min	Max/min of RMS, Power and Power Factors, Fundamental Measurements records with timestamp
Demand	Algorithms: block and rolling window
	Log peak demand and peak demand time
	Current demand for each phase and system
	Per phase and system Active power demand:
	• Import/export/net/total
	• Four-Quadrant
	Per phase and system Reactive power demand:
	• Import/export/net/total
	• Four-Quadrant
	Per phase and system Apparent power demand:
	• Total
	• Four-Quadrant
Energy, per Phase and System	Active Energy, IEC 62053-22 Class 0.1S:
	• Import/export/net/total
	• Four-Quadrant
	Reactive Energy, IEC 62053-24 Class 0.5S:
	• Import/export/net/total
	• Four-Quadrant
	• Per phase and system
	Apparent energy, IEC 61557-12 Class 0.2:
	• Total
	• Four-Quadrant

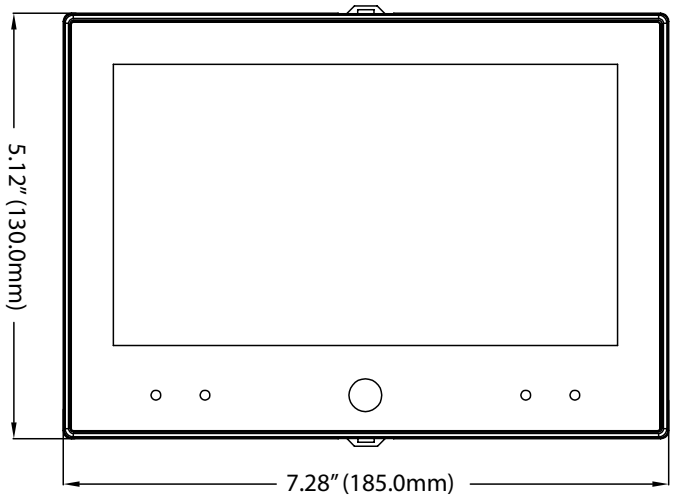
TOU Energy and Demand	For system import active energy, import reactive energy, and apparent energy:
	• Up to 8 tariff rates
	• Record max power demand of billing period
	• Record current and up to 12 historic billing periods
Power Quality Measurements	Positive/Negative/Zero Sequence for current and voltage
	Phase angle for current and voltage
	Harmonics magnitude and angle for current and voltage, up to 127th
	Flicker
Communications	
Communication Interfaces	2 Ethernet ports (100BASE-TX) with IEEE1588 support: RJ45 connector, CAT5/5e/6/6a cable.
	1 WiFi (802.11 b/g/n 2.4 GHz)
	1 RS485 port: Baud rates of 2400 to 115200, pluggable screw terminal connector.
	1 USB-C Port
	1 IRIG-B port
Time Synchronization	NTP
	PTP
	IRIG-B
Serial Port Protocols	Modbus RTU
Web Server	HTTP/HTTPS
Ethernet Port Protocols	IPv4, IPv6, DHCP, DNS
	Modbus TCP, DNP3 TCP, IEC 61850, SNMP, BACnet/IP, PMU (IEEE C37.118)
	Data Post with HTTP(s)/FTP/SFTP/SMTP Email
	File download with HTTP(s)/SFTP
Electrical Characteristics	
Power Supply	Ordering Option
	P1: 50/60Hz 100-415Vac; 100-300Vdc
	P2: 20 to 60 V DC
AC Voltage Inputs	Accuracy range: 10-400 VLN, 690 VLL
	Pickup: 5V
	Overload: 1500 Vac Continuously; 2500 Vac, 50/60 Hz 1 minute
	Measurement category: III
	Frequency range: 40 to 70 Hz (50/60Hz nominal)
AC Current Inputs	Nominal current: 1A or 5A.
	Accuracy Range:
	• 1A nominal: 10mA to 2A
	• 5A nominal: 50mA to 10A
	Pickup:
	• 1A nominal: 0.5mA
	• 5A nominal: 2.5mA
	Surge: 20 A continuous, 50 A @ 10 sec/hr, 500 A @ 1 sec/hr

Input and Output *(Meter Base)*	4 Digital Inputs:
	• Input Voltage Range 20~150Vac/dc
	• Input Current (Max): 2.5 mA
	• Start Voltage: 15V
	• Stop Voltage: 5V
	• Pulse Frequency (Max): 100Hz, 50% Duty Ratio (5ms ON and 5ms OFF)
	• SOE Resolution: 2ms
	1 Digital Output:
	• Dry contact
	• Voltage Range: 30 Vdc
	• Load Current: 60mA (Max)
	• Output Frequency: 50Hz, 50% Duty Ratio (20ms ON, 20ms OFF)
	• Isolation Voltage: 5000Vac
Optional I/O Modules *(Up to 3)*	Digital Input:
	• Input Voltage Range 20~160Vac/dc
	• Input Current (Max) 2mA
	• Start Voltage 15V
	• Stop Voltage 5V
	• Pulse Frequency (Max) 100Hz, 50% Duty Ratio
	• SOE Resolution 2ms
	Digital Output (DO) (Photo-MOS):
	• Voltage Range 0~250Vac/dc
	• Load Current 100mA(Max)
	• Output Frequency 25Hz, 50% Duty Ratio
	• Isolation Voltage 2500Vac
	Relay Output (RO):
	• Switching Voltage (Max) 250Vac,30Vdc
	• Load Current 5A(R), 2A(L)
	• Set Time 10ms (Max)
	• Contact Resistance 30mΩ(Max)
	• Isolation Voltage 2500Vac
	Analog Output (AO):
	• Output Range 0~5V/1~5V, 0-20mA/4~20mA(Optional)
	• Accuracy 0.5%
	• Temperature Drift 50ppm/°C typical
	• Isolation Voltage 500Vdc
	• Open Circuit Voltage 15V
	Analog Input (AI):
	• Input Range 0~5V/1~5V, 0~20mA/4-20mA (Optional)
	• Accuracy 0.2%
	• Temperature Drift 50ppm/°C typical
	• Isolation Voltage 500Vdc
Mechanical Characteristics	
Outlines Standard	DIN 43700, ANSI C39.1 Round or Square, 92mm x 92mm
IP Degree of Protection	IP 54, Panel mount and touchscreen display, front.
	IP 30: Panel mount rear, DIN rail mount, I/O modules.

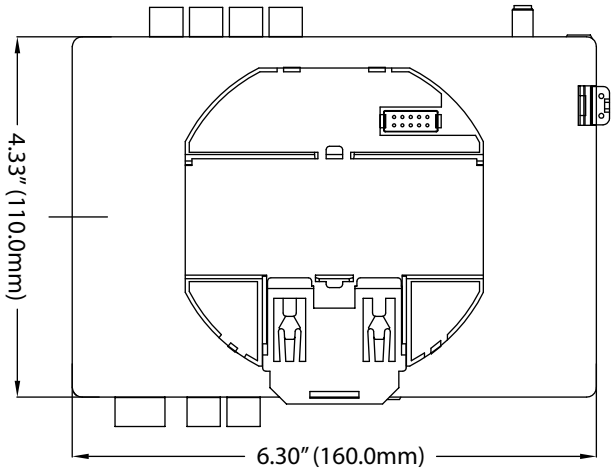
Environmental Conditions	
Operating Temperature	-25°C to 70°C
Storage Temperature	-40°C to 70°C
Pressure	Normal
Humidity	5% – 95% RH Non-Condensing
Altitude	3000m
Pollution Degree	2
Location/Mounting	Indoor Use Only
Electromagnetic Compatibility	
Immunity to Fast Transients	IEC 61000-4-4:
	• Power, Input/Output, Voltage/Current Circuits: ±4 kV @ 5 kHz
	• Communication: ±4 kV @ 5 kHz
Immunity to Ring Waves	IEC 61000-4-12:
	• Power, Input/Output, Voltage/Current Circuits: 2.5kV
	• Communication: 2.5kV
Immunity to Electrostatic Discharge	IEC 61000-4-2:
	• Contact Discharge: ±4 kV
	• Air Discharge: ±8 kV
Immunity to Voltage Dips & Interruptions	IEC 61000-4-11:
	• 70%, 20ms
	• 0%, 100ms
Immunity to Power Frequency Magnetic Fields	IEC 61000-4-8:
	• 100A/m, 1min
	• 1000A/m, 3s
Immunity to Surges	IEC 61000-4-5:
	• Power, Voltage/Current Circuits: 4kV
	• Input/Output: 2kV
	• Communication: 2kV
Immunity to Radiated Fields	IEC 61000-4-3:
	• 80MHz~1000MHz: 10V/m
	• 1.0GHz~2.7GHz: 3V/m
	• 2.7GHz~6.0GHz: 1V/m
Immunity to Conducted Disturbances	IEC 61000-4-6:
	• 150 kHz to 80 MHz: 10V
Immunity to Power Frequency Disturbances	IEC 61000-4-16:
	• 30V: 1min
	• 300V: 1s
Immunity to Damped Oscillatory Wave	IEC 61000-4-18
	AC:
	• 2,5 kV (common mode, 1 MHz)
	• 1 kV (differential mode, 1 MHz)
	• 1 kV (differential mode, 10 MHz)
	DC:
	• 2,5 kV (common mode, 1 MHz)
	• 1 kV (differential mode, 1 MHz)
	• 1 kV (differential mode, 10 MHz)
	IO:
	• 2,5 kV (common mode, 1 MHz)
	• 1 kV (differential mode, 1 MHz)
Radiated Emissions	CISPR 32 Class B
Safety	
IEC/UL 61010-1:2010, IEC/UL 61010-2-030:2010, Overvoltage Category III, Measurement Category III	

Dimensions

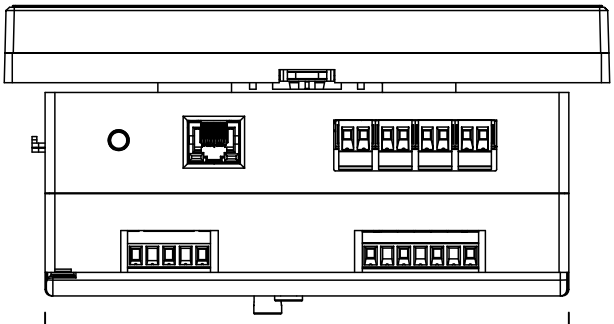
Front



Back



Top



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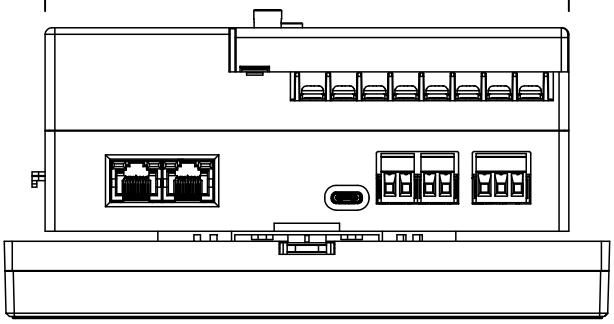
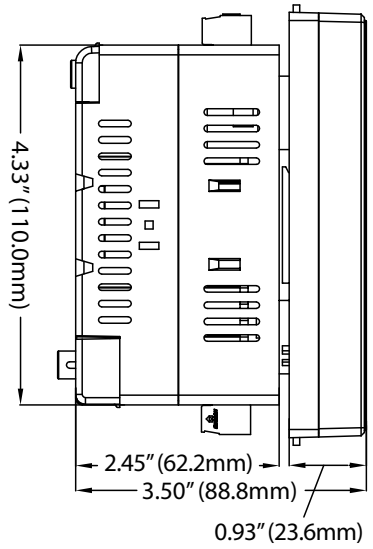


Side



ORDERING INFORMATION

	Model		Form Factor		Current Input		Power Supply
Ordering Example	Acuvim 3	-	D	-	mV	-	P1
			D: Base + Display		5A: 5A/1A current input		P1: 100-415Vac, 100-300Vdc
			M: Base		mV: 333mV/Rogowski Coil Input		P2: 20-60Vdc

Note: ***Form Factor:***
- *D: Base + Display*
- *M: Base*

Current Input:
- *5A: support CT with current output*
- *mV: support CT with voltage output; e.g., RCT or 333mV CT.*

Power Supply:
- *P1: power supply of 50/60Hz 100-600Vac; or 100-300Vdc*
- *P2: power supply of 20 to 60 V DC*

I/O MODULE OPTIONS