

# Acuvim II Series

## Intelligent Power Meter (Web Accessible)



Revenue Grade with DATA-LOGGING  
and WAVEFORM CAPTURE



ISO9001 Certified

**ACCUENERGY**

## DESCRIPTION

The Acuvim II series are high-end multifunction power and energy meters manufactured by Accuenergy. They are the ideal choice for the monitoring and controlling of power distribution systems. Some of the features and electrical power parameters available on the Acuvim II series are:

- True-RMS Measuring Parameter
- ANSI C12.20(0.2 Class) and IEC 62053-22(0.2S Class)
- Power Quality Analysis
- Over/Under Limit Alarm
- Multi Communication Ports (Eg: Ethernet, RS485)
- Web Server and Email Sending
- Switch Status Monitoring
- Waveform Capture

- Measure Individual Harmonics from 2<sup>nd</sup> to 63<sup>rd</sup>(Acuvim IIR/IIE/IW)
- Module Design
- Data-Logging
- TOU, 4 Tariffs, 12 Seasons, 14 Schedules
- Class Leading Warranty

The Acuvim II series may be used as data gathering devices for intelligent power distribution systems or plant automation systems. All monitored data is available via a digital RS485 communication port running Modbus RTU protocol. Ethernet and Profibus DP communication are also options.

With its flexible, modular I/O and communication options, the Acuvim II series is the most versatile and cost-effective metering solution on the market.

● Function; ○ Option; Blank NA

## Acuvim II Series Meters

CATEGORY		ITEM	PARAMETERS	Acuvim II	Acuvim IIR	Acuvim IIE	Acuvim IW
METERING	REAL TIME METERING	Phase Voltage	V1, V2, V3, Vlavg	●	●	●	●
		Line Voltage	V12, V23, V31, Vllavg	●	●	●	●
		Current	I1, I2, I3, In, lavg	●	●	●	●
		Power	P1, P2, P3, Psum	●	●	●	●
		Reactive Power	Q1, Q2, Q3, Qsum	●	●	●	●
		Apparent Power	S1, S2, S3, Ssum	●	●	●	●
		Power Factor	PF1, PF2, PF3, PF	●	●	●	●
		Frequency	F	●	●	●	●
		Load Features	Load Features	●	●	●	●
	ENERGY & DEMAND	Four Quadrant Powers	Four Quadrant Powers	●	●	●	●
		Energy	Ep_imp, Ep_exp, Ep_total, Ep_net	●	●	●	●
		Reactive Energy	Eq_imp, Eq_exp, Eq_total, Eq_net	●	●	●	●
		Apparent Energy	Es	●	●	●	●
		Demand	Dmd_P, Dmd_Q, Dmd_S, Dmd_I1, Dmd_I2, Dmd_I3	●	●	●	●
TOU	TIME OF USE	Energy/max demand	TOU, 4 Tariffs, 12 Seasons, 14 Schedules			●	
	DAYLIGHT SAVING TIME	Two formats adjust	Month/Day/Hour/Minute Month/Week/First few weeks/Hour/Minute			●	
MONITORING	POWER QUALITY	Waveform Capture	voltage and current Waveform	Trigger, Manual, DI change, Sag/Dips, Swell, Over Current			●
		Voltage Unbalance Factor	U_unbl	●	●	●	●
		Current Unbalance Factor	I_unbl	●	●	●	●
		Voltage THD	THD_V1, THD_V2, THD_V3, THD_lavg	●	●	●	●
		Current THD	THD_I1, THD_I2, THD_I, THD_lavg	●	●	●	●
		Individual Harmonics	Harmonics 2 <sup>nd</sup> to 63 <sup>rd</sup> (31 <sup>st</sup> for Acuvim II)	●	●	●	●
		Voltage Crest Factor	Crest Factor	●	●	●	●
		TIF	THFF	●	●	●	●
	STATISTICS	MAX with Time Stamp MIN with Time Stamp	Each phase of V & I; Total of P, Q, S, PF & F; Demad of P,Q & S; Each phase THD of V & I; Unbalance factor of V & I	●	●	●	●
OTHERS	ALARM	Over/Under Limit Alarm	V, I, P, Q, S, PF, V_THD & I_THD each phase and total or average; Unbalance factor of V & I; load type; Analog Input of each channel	●	●	●	●
	POWER QUALITY EVENT LOGGING	SAG/DIPS,SWELL	Voltage				●
	DATA LOGGING	Data Logging 1 Data Logging 2 Data Logging 3	F, V1/2/3/lavg, V12/23/13/lavg, I1/2/3/n/avg, P1/2/3/sum, Q1/2/3/sum, S1/2/3/sum, PF1/2/3, PF, U_unbl, I_unbl, Load Type, Ep_imp, Ep_exp, Ep_total, Ep_net, Eq_imp, Eq_exp, Eq_total, Eq_net, Es, THD_V1/2/3/avg, THD_I1/2/3/avg, Harmonics 2nd to 63rd, Crest Factor, THFF, K Factor, sequence and phase angles, DI counter, AI, AO, Dmd P/Q/S, Dmd I1/2/3		●	●	●
	ONBOARD MEMORY SIZE	Memory	Bytes	—	4MB	4MB	8MB
	COMMUNICATION	RS485 Port, Half Duplex, Optical Isolated	Modbus®-RTU Protocol	●	●	●	●
OPTION MODULE	I/O OPTION	TIME	Real Time Clock	Year, Month, Date, Hour, Minute, Second	●	●	●
		Switch Status (DI)	Digital Input (Wet)	○	○	○	○
		Power Supply for DI	24 Vdc	○	○	○	○
		Relay Output (RO)	NO, Form A	○	○	○	○
		Digital Output (DO)	Photo-MOS	○	○	○	○
		Pulse Output (PO)	By using DO	○	○	○	○
		Analog Input (AI)	0(4)~20mA, 0(1)~5V	○	○	○	○
	COMMUNICATION	Analog Output (AO)	0(4)~20mA, 0(1)~5V	○	○	○	○
		Ethernet	10M/100M, Modbus-TCP, HTTP Webpage, Email	○	○	○	○
	PROFIBUS-DP	Profibus-DP/V0	Profibus-DP/V0	○	○	○	○
	RS485 MODULE	RS485 Module	Additional Modbus RTU	○	○	○	○

## I/O Module (Option)

Module Name	Digital Input (DI)	Power Supply For DI (24V)	Digital Output (DO)	Relay Output (RO)	Analog Input (AI)	Analog Output (AO)
AXM-IO1	6	1		2		
AXM-IO2	4		2			
AXM-IO3	4			2	2	2

## Communication Module (Option)

Module Name	Spec		
AXM-NET	10M/100M self-adaptable, RJ45 Jack HTTP Web page browser	Modbus®-TCP/IP Protocol Email sending on time interval or on event	
AXM-PROFI	Profibus-DP/V0 Input Byte (typical): 32 byte Profibus slave mode, baud rate self-adaptable up to 12M	Output Byte (typical): 32 Byte EN50170 vol.2 compliance	
AXM-RS485	Modbus®-RTU Protocol		

## APPLICATIONS

- Metering of distribution feeders, transformers, generators, capacitor banks and motors
- Medium and low voltage systems
- Commercial, industrial, utility
- Power quality analysis
- Data Logging

## FEATURES

### Metering

- Voltage V1, V2, V3, Vlavg, V12, V23, V31, Vllavg
- Current I1, I2, I3, In, lavg
- Power P1, P2, P3, Psum
- Reactive Power Q1, Q2, Q3, Qsum
- Apparent Power S1, S2, S3, Ssum
- Frequency F
- Power Factor PF1, PF2, PF3, PF
- Energy Ep\_imp, Ep\_exp, Ep\_total, Ep\_net
- Reactive Energy Eq\_imp, Eq\_exp, Eq\_total, Eq\_net
- Apparent Energy Es
- Demand Dmd\_P, Dmd\_Q, Dmd\_S, Dmd\_I1, Dmd\_I2, Dmd\_I3
- Load Features
- Four Quadrant Powers

### Monitoring

- Power Quality
- Voltage Harmonics 2<sup>nd</sup> to 63<sup>rd</sup> and THD
- Current Harmonics 2<sup>nd</sup> to 63<sup>rd</sup> and THD
- Voltage Crest Factor
- THFF (TIF)
- Current K Factor
- Voltage Unbalance Factor U\_unbl
- Current Unbalance Factor I\_unbl
- Max/Min Statistics with Time Stamps
- Sampling rate 256 samples per cycle

### Alarms

Limits can be set for up to 16 indicated parameters and can be set with a specified time interval. If any input of the indicated parameters is over or under its setting limit and persists over the specified time interval, the event will be recorded with time stamps and trigger the Alarm DO output. The 16 indicated parameters can be selected from any of the 51 parameters available.

## TYPICAL WEB PAGE FROM Acuvim II SERIES

The figure displays four screenshots of the Acuvim II software interface:

- Max & Min Record:** Shows a table of maximum and minimum values for various parameters over time.
- SOE Record:** Shows a table of Sequence of Events (SOE) records, listing timestamp, event type, and details.
- Alarm Record:** Shows a table of alarm records with columns for timestamp, alarm ID, and status.
- Harmonics:** Shows a table of harmonic data with columns for frequency, amplitude, and phase.

### I/O option module

The E-module® technique was adopted for its flexibility and easy expansion of the I/O function of Acuvim II. A maximum of 3 modules can be used for one meter. Digital input, digital output, pulse output, relay output, analog input and analog output are provided by I/O option module.

### Communication

Modbus RTU protocol via RS485  
Ethernet (Modbus TCP, HTTP, SMTP)  
Profibus DP  
Dual RS485 communication ports

### Display

Clear and large character LCD Screen display with white back light  
Wide environmental temperature endurance  
Display Load percentage, 4 quadrants power and load nature

### Outline

Small Size 96x96 DIN or 4" ANSI Round

### Data Logging

Acuvim IIR/IIE/IIW offers 3 assignable historical logs where the majority of the metering parameters can be recorded. The onboard memory is up to 8 MB and each log size is adjustable. A real time clock allows for any logged events to be accurately time stamped.

### Time of use

User can assign up to 4 different tariffs (sharp, peak, valley and normal) to different time periods within a day according to the billing requirements. The meter will calculate and accumulate energy to different tariffs according to the meter's internal clock timing and TOU settings.

### Waveform Capture

Acuvim IIW can record 8 groups of voltage and current waveforms. It provides the waveform record of 8 cycles before and after the triggering point. It also supports a settable triggering condition.

### Power Quality Event Logging

When a power quality event happens, such as voltage sag and swell, etc., Acuvim IIW will record the timestamp and the triggering condition of the event. It can save up to 50, 000 power quality events.

## DATA LOGGING FROM Acuvim II SERIES

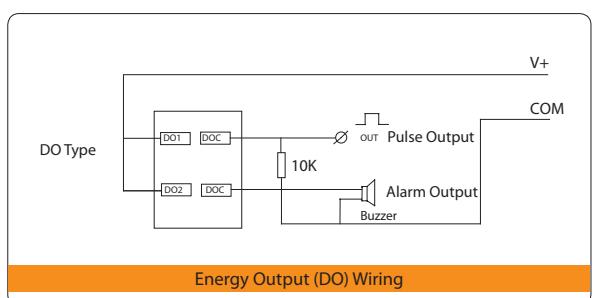
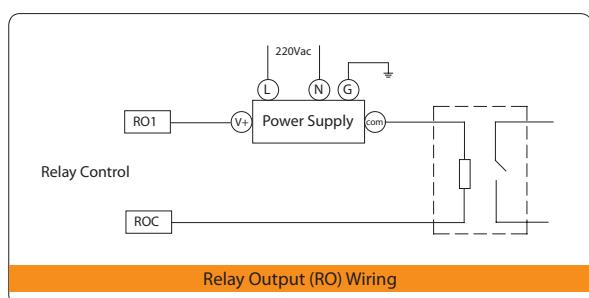
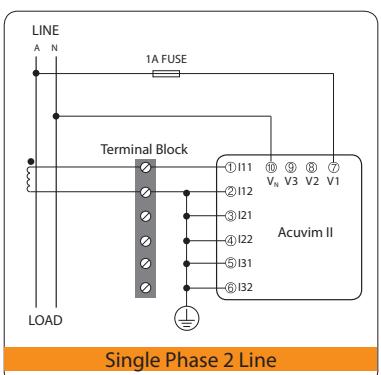
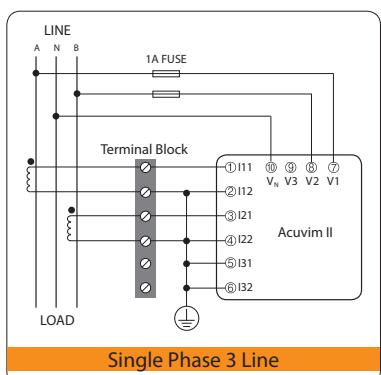
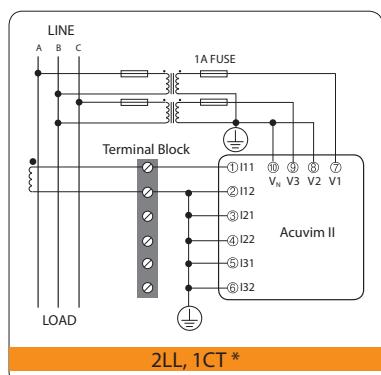
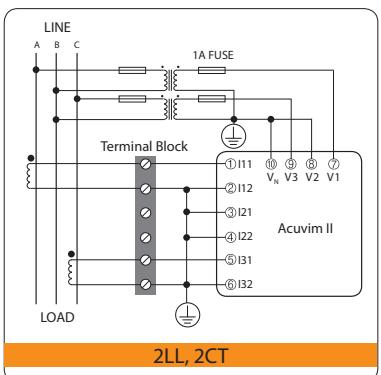
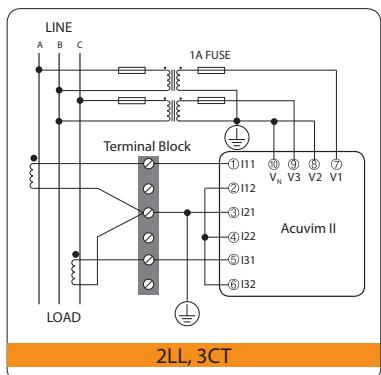
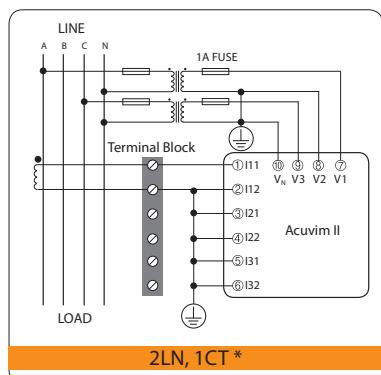
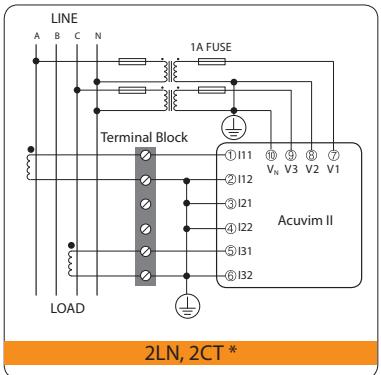
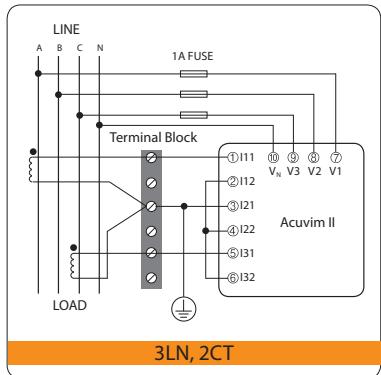
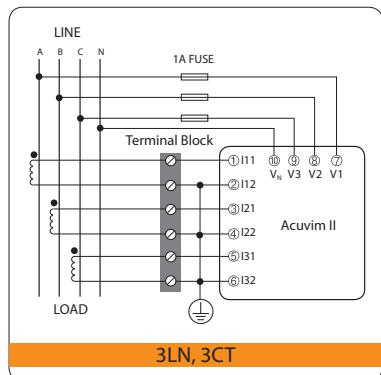
The figure shows the Acuvim II software interface for data logging:

- Data Logging Configuration:** Shows the configuration window with fields for Log Type (0), Window Num (1), and Update Device (Read Log).
- Data Log Table:** Shows a table of recorded data points with columns for Time, Frequency, I\_A, I\_B, I\_C, I\_N, and I\_R. The table includes rows for various timestamp intervals and corresponding current values.

## SPECIFICATIONS

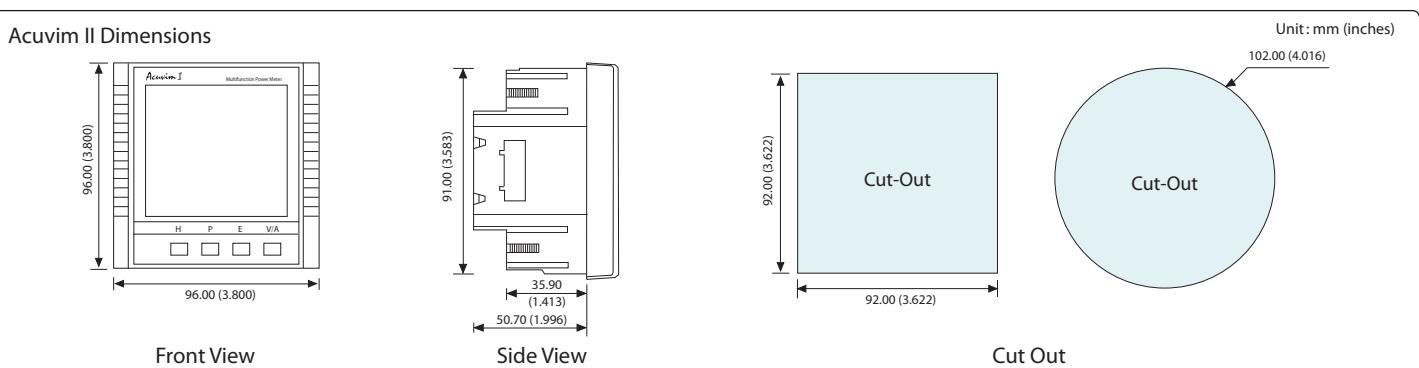
METERING				CONTROL POWER	
Parameters	Accuracy		Resolution	Range	
	Acuvim II	Acuvim IIR/IIE/IIW			
Voltage	0.2%	0.2%	0.1V	20V~1000kV	
Current	0.2%	0.2%	0.1mA	5mA~50000A	
Power	0.5%	0.2%	1W	-9999MW~9999MW	
Reactive Power	0.5%	0.2%	1var	-9999Mvar~9999Mvar	
Apparent Power	0.5%	0.2%	1VA	0~9999MVA	
Power Demand	0.5%	0.2%	1W	-9999MW~9999MW	
Reactive Power Demand	0.5%	0.2%	1var	-9999Mvar~9999Mvar	
Apparent Power Demand	0.5%	0.2%	1VA	0~9999MVA	
Power Factor	0.5%	0.2%	0.001	-1.000~1.000	
Frequency	0.2%	0.2%	0.01Hz	45.00~65.00Hz	
Energy	Primary	0.5%	0.2%	0.1kWh	0~9999999.9kWh
	Secondary	0.5%	0.2%	0.001kWh	0~999999.999kWh
Reactive Energy	Primary	0.5%	0.2%	0.1kvarh	0~9999999.9kvarh
	Secondary	0.5%	0.2%	0.001kvarh	0~999999.999kvarh
Apparent Energy	Primary	0.5%	0.2%	0.1kVAh	0~9999999.9kVAh
	Secondary	0.5%	0.2%	0.001kVAh	0~999999.999kVAh
Harmonics		1.0%	1.0%	0.1%	0.0%~100.0%
					20.0%~100.0% (IIR/IIE/IIW)
Phase Angle		2.0%	2.0%	0.1°	0.0°~359.9°
Unbalance Factor		2.0%	2.0%	0.1%	0.0%~100.0%
Running Time				0.01h	0~9999999.99h
INPUT					
<b>Current Inputs (Each Channel)</b>					
Nominal Current		5A / 1A			
Metering Range		0~10A ac			
Withstand		20Arms continuous, 100Arms for 1 second, non-recurring			
Burden		0.05VA (typical) @ 5Arms			
Pickup Current		0.1% of nominal			
Accuracy		0.2% full scale			
<b>Voltage Inputs (Each Channel)</b>					
Nominal Full Scale		400Vac L-N, 690Vac L-L (+20%)			
Withstand		1500Vac continuous 2500Vac, 50/60Hz for 1 minute			
Input Impedance		2Mohm per phase			
Metering Frequency		45Hz~65Hz			
Pickup Voltage		10Vac (30 Vac for Acuvim IIR/IIE/IIW)			
Accuracy		0.2% full scale			
<b>Energy Accuracy (Acuvim IIR/IIE/IIW)</b>					
Active (according to IEC 62053-22) (according to ANSI C12.20)		Class 0.2s			
Reactive (according to IEC 62053-23)		Class 2			
<b>Harmonic Resolution</b>					
Metered Value		Acuvim II: 31 <sup>st</sup> harmonic Acuvim IIR/IIE/IIW: 63 <sup>rd</sup> harmonic			
COMMUNICATION					
<b>RS-485 (Standard)</b>					
MODBUS® RTU Protocol, 2-wire connection					
1200~38400 baud rate					
<b>The Second RS-485 Port (Optional)</b>					
MODBUS® RTU Protocol, 2-wire connection					
4800~38400 baud rate					
<b>Ethernet (Optional)</b>					
10M/100M BaseT					
MODBUS® TCP/IP Protocol					
Data Browsing through HTTP					
Sending e-mail automatically					
<b>PROFI-BUS (Optional)</b>					
PROFIBUS-DP/V0 Protocol					
Work as PROFIBUS slave, baud rate adaptive, up to 12M					
Typical input bytes: 32, typical output bytes: 32					
PROFIBUS standard according to EN 50170 vol.2					
OPERATING ENVIRONMENT					
Operation Temperature		- 25°C to 70°C			
Storage Temperature		- 40°C to 85°C			
Relative Humidity		5% to 95% non-condensing			
STANDARD COMPLIANCE					
Measurement Standard		IEC 62053-22; ANSI C12.20			
Environmental Standard		IEC 60068-2			
Safety Standard		IEC 61010-1, UL 61010-1			
EMC Standard		IEC 61000-4/-2/-3/-4/-5/-6/-8/-11, CISPR 22			
Outlines Standard		DIN 43700, ANSI C39.1			

## TYPICAL WIRING

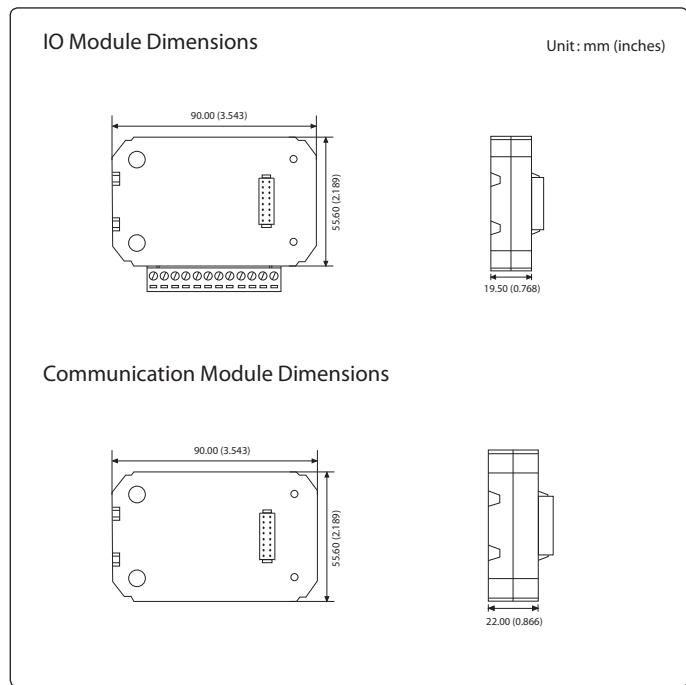
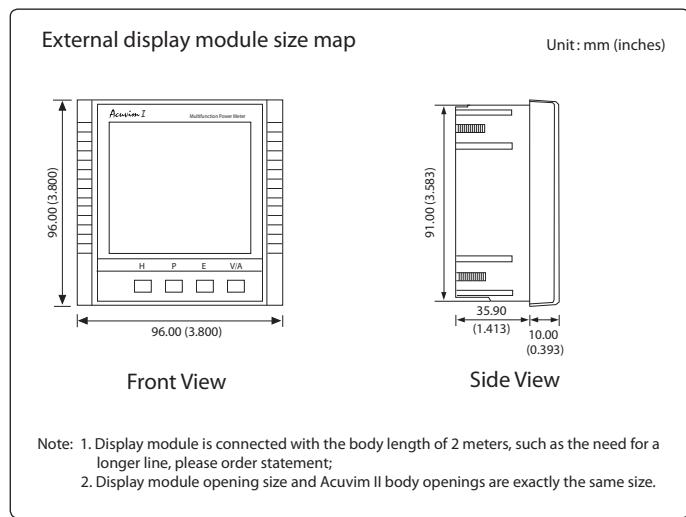
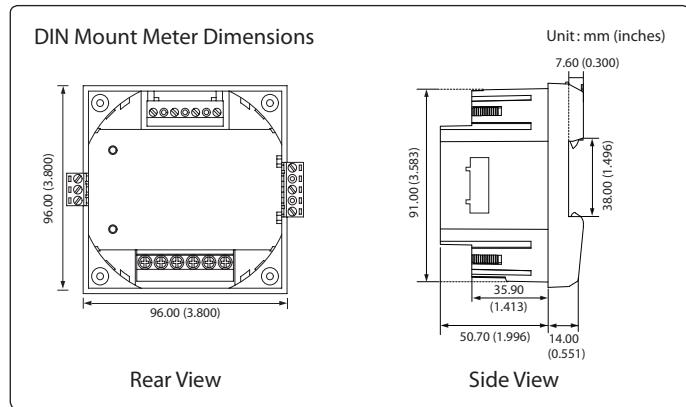


Note: "\*" wiring diagram not applicable to Acuvim IIR/IIE/IIW

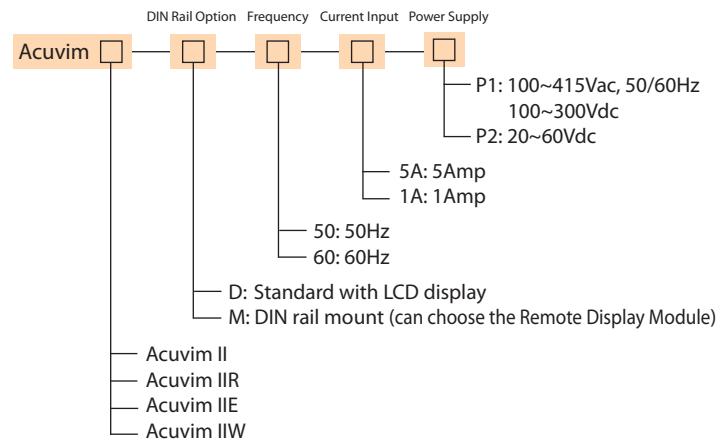
## DIMENSIONS



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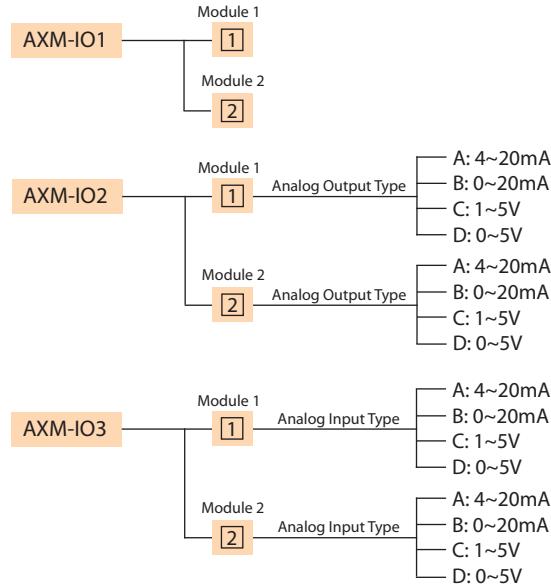


## ORDERING INFORMATION



Acuvim II Base Meter Ordering Example: Acuvim IIR - D - 60 - 5A - P1

### I/O Option module

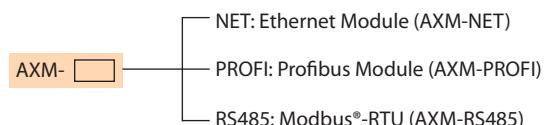


IO Module Ordering Example: AXM-IO2-1A

### Remote Display Option

REM- DS2: Compatible with Acuvim II Series "M" (DIN Mount) models only

### Communication Option Module



- Note: 1. No more than 2 of the same I/O modules may be attached to the meter (example: Two AXM-IO2). The same two IO modules must be a different component number.  
2. A maximum of 3 modules may be attached to the meter. If a communication module is used (example: A XM-NET), it must be installed on the back of the meter FIRST before the other module are attached.