Acuvim-L

Multifunction Power & Energy Meter Datasheet

DESCRIPTION

Designed for a wide range of standard metering projects, the Acuvim L is a cost-effective, multifunction power meter that combines value and high-performance with easy integration into panel or device monitoring applications. With multiple communication options including Modbus-RTU, PROFIBUS, Modbus-TCP/IP, and BACnet-IP through optional expansion modules and revenue grade accuracy, the Acuvim L can be configured as either a panel-mount device, as a DIN rail mount transducer, or installed in a pre-configured, pre-wired AcuPanel for extreme protection in even the toughest application environments.

FEATURES

+ True RMS, revenue grade measurements: ANSI C12.20 class 0.5 & IEC 62053-22 class 0.5s
+ Multiple communication options including Modbus-TCP/IP, BACnet-IP, PROFIBUS, Modbus-RTU, I/O communications, and more
+ NEMA 3 front panel protection for installation in harsh environments
+ Available compatibility with multiple CT output options including 5A, 1A, 333mV, and Rogowski coils
+ Perform power quality analysis, measure individual harmonics up to the 63rd order, and monitor THD
+ Three form factors: Panel mount meter with digital display, DIN rail mount transducer, or in a pre-wired, pre-configured panel

KEY FEATURES

Revenue Grade Accuracy

+ The Acuvim L meets stringent ANSI C12.20 Class 0.5 and IEC 62053 Class 0.5s revenue grade accuracy requirements to support applications that require high-precision measurements. Monitor power and energy parameters across four quadrants and take real-time, true RMS measurements.

Alarm Output

+ Two parameters may be set within a specified time interval. When the indicated parameter is over or under its setting limit and persists over the specified time interval, the event will be recorded with a time stamp and trigger the alarm output. Choose from any of the 51 available parameters.

Flexible Current Input

+ The Acuvim L is directly compatible with a variety of current transformer outputs including 5A, 1A, 333mV, and Rogowski coils. Choose from multiple form factors including split-core, solid-core, or flexible rope CTs to accommodate a range of project requirements.

Wiring Check

+ The Acuvim L can automatically check the integrity of the meter installation by verifying the wiring mode, load features, and power factor values to ensure proper installation before leaving the job site.

Power Quality Monitoring

+ Using harmonic analysis, the Acuvim L can detect energy deviations that are critical to diagnosing power quality issues before they cause system inefficiency. Monitor individual harmonics in voltage and current and quickly view real-time power quality information, like harmonic content and unbalance factor, on the meter's display. In addition, record up to 16 power quality events with a timestamp and triggering condition information for later analysis.

Communications Modules

+ RS485
  - Modbus-RTU
  - Second RS485 port (option for Acuvim-CL, Acuvim-EL)
+ PROFIBUS
  - PROFIBUS-DP/V0 Protocol
+ L-WEB Module
  - Modbus-TCP/IP
  - BACnet-IP
  - HTTP/HTTPs Post
  - FTP Post
  - NTP
  - DNP 3.0 over IP V2
  - SNMP V3
  - HTTPs webserver
  - SMTP
+ I/O Module Options
  - Digital Input
  - Pulse Output
  - Pulse Counter
  - Relay Output

APPLICATIONS

+ Power distribution automation
+ Medium and low voltage systems
+ Industrial automation
+ Energy management systems
+ Power quality analysis
+ Electric switch gear and control panels
+ Building automation
+ Marine applications

SPECIFICATIONS

Metering

PARAMETERS	ACCURACY	RESOLUTION	RANGE
Voltage	0.2%	0.1V	20V~1000kV
Current	0.2%	0.001A	0~50000A
Current Demand	0.2%	0.001A	0~50000A
Power	0.5%	1W	-9999MW~9999MW
Reactive Power	0.5%	1var	-9999Mvar~9999Mvar
Apparent Power	0.5%	1VA	0~9999MVA
Power Demand	0.5%	1W	-9999MW~9999MW
Reactive Power Demand	0.2%	1var	-9999Mvar~9999Mvar
Apparent Power Demand	0.5%	1VA	0~9999MVA
Power Factor	0.5%	0.001	-1.0~1.0
Frequency	0.05%	0.01Hz	45~65Hz
Energy	0.5%	0.1kWh	0~99999999.9kWh
Reactive Power	0.5%	0.1kvarh	0~99999999.9kvarh
Apparent Energy	0.5%	0.1VAh	0~99999999.9kVAh
Harmonics	1.0%	0.01%	
Meter Running Time		0.01hrs	0~9999999.99hrs
Load Running Time		0.01hrs	0~9999999.99hrs
Meter Total Running Time		0.01hrs	0~9999999.99hrs

Input

CURRENT INPUTS *(EACH CHANNEL)*

Nominal Current Options	① 5A, ② 1A, ③ 1A(333mV), ④ 1A (100mV Rope- CT), ⑤ 1A(80mA/100mA/200mA),
Metering Range	① 0~10A, ② 0~2A, ③ 0~1.2A, ④ 0~1.2A, ⑤ 0~1.2A, ⑥ 0~1.2A
Pickup Current	① 5mA, ② 1mA, ③ 5mA, ④ 5mA, ⑤ 5mA
Withstand	20A RMS continuous 100A RMS for 1 second, non-recurring
Burden	0.05VA (Typical) @ 5A RMS
Accuracy	0.2%

VOLTAGE INPUTS *(EACH CHANNEL)*

Nominal Full Scale	400Vac L-N, 690Vac L-L (+20%)
Withstand	1500Vac Continuous 2500Vac, 50/60Hz for 1 Minute
Input Impedance	2MΩ per phase
Metering Frequency	45Hz~65Hz
Pickup Voltage	10Vac
Accuracy	0.2%

ENERGY ACCURACY

Active	Class 0.5s (According to IEC 62053-22) Class 0.5 (According to ANSI C12.20)
Reactive	Class 2 (According to IEC 62053-23)

HARMONIC RESOLUTION

Metered Value	2nd~63rd harmonics

I/O Options

DIGITAL INPUT

Input Type	Dry Contact
Input Resistance	4kΩ
Input Current (Max)	7.5mA
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	2500V

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
Mechanical Life	$1.5x10^7$

SPECIFICATIONS

Control Power

AC/DC CONTROL POWER	
Operating Range	100~415Vac, 50/60Hz; 100~300Vdc
Burden	3W
Frequency	50/60Hz
Withstand	3250Vac, 50/60Hz for 1 minute
Installation Category III (Distribution)	
LOW VOLTAGE DC CONTROL POWER *(OPTIONAL)*	
Operating Range	20~60VDC
Burden	3W

Standard Compliance & Certifications

Measurement Standard	IEC 61036 Class 1, ANSI C12.16 Class 10
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
Outlines Standard	DIN 43700, ANSI C39.1

Communications

RS-485 (Optional)	Modbus-RTU Protocol 2-wire connection, Half-duplex, Isolated 1200 to 38400 baud rate
Second RS-485 Port (Optional Module)	Option for Acuvim-CL, Acuvim-EL
PROFIBUS (Optional Module)	PROFIBUS-DP/V0 Protocol Works 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
L-WEB (Optional Module) (Ethernet RJ45)	Protocol: Modbus-TCP/IP, DNP3.0 over IP V2, BACnet-IP, SNMP V3, HTTP/HTTPs post, FTP post, SMTP, NTP, HTTPs webserver; 4GB Datalogging memory

Operating Environment

Operating Temperature	-25°C to 70°C -13°F to 158°F
Storage Temperature	-40°C to 85°C -40°F to 176°F
Relative Humidity	5% to 95% Non-Condensing

FUNCTION LIST

● Function; ⊙ Option; Blank NA

	Function	Parameters	Acuvim-BL	Acuvim-CL	Acuvim-EL
Real Time Metering	Line to Neutral Voltages Uln	Uln 1, Uln 2, Uln 3, Uln avg	●	●	●
	Line to Line Voltages Ull	Ull 12, Ull 23, Ull 31, Ull avg	●	●	●
	Current	I 1, I 2, I 3, I n, I 4, I avg, I tot	●	●	●
	Active Power	watt 1, watt 2, watt 3, watt tot	●	●	●
	Reactive Power	var 1, var 2, var 3, var tot	●	●	●
	Apparent Power	va 1, va 2, va 3, va tot	●	●	●
	Power Factor	PF 1, PF 2, PF 3, PF	●	●	●
	Load Nature	L/C/R	●	●	●
	Frequency	F	●	●	●
Energy	Active Energy	Watt-hour Imp, Watt-hour Exp, Watt-hour Imp+Exp, Watt-hour Imp-Exp	●	●	●
		Watt-hour Q1, Watt-hour Q2, Watt-hour Q3, Watt-hour Q4		●	●
	Reactive Energy	Var-hour Imp, Var-hour Exp, Var-hour Imp+Exp, Var-hour Imp-Exp	●	●	●
		Var-hour Q1, Var-hour Q2, Var-hour Q3, Var-hour Q4		●	●
	Apparent Energy	VA-hour Imp, VA-hour Exp, VA-hour Imp+Exp, VA-hour Imp-Exp	●	●	●
		VA-hour Q1, VA-hour Q2, VA-hour Q3, VA-hour Q4		●	●
	Single-Phase Active Energy	Watt-hour Imp 1, Watt-hour Exp 1, Watt-hour Imp 2, Watt-hour Exp 2, Watt-hour Imp 3, Watt-hour Exp 3		●	●
	Single-Phase Reactive Energy	Var-hour Imp 1, Var-hour Exp 1, Var-hour Imp 2, Var-hour Exp 2, Var-hour Imp 3, Var-hour Exp 3		●	●
	Single-Phase Apparent Energy	VA-hour Imp 1, VA-hour Exp 1, VA-hour Imp 2, VA-hour Exp 2, VA-hour Imp 3, VA-hour Exp 3		●	●
Demand	Current Demand, Current Predicted Demand	I 1_Dmd, I 2_Dmd, I 3_Dmd, I 4_Dmd, I 1_Pre_Dmd, I 2_Pre_ Dmd, I 3_Pre_Dmd, I 4_Pre_Dmd	●	●	●
	Power Demand, Power Predicted Demand	P_Dmd, Q_Dmd, S_Dmd, P_Pre_Dmd, Q_Pre_Dmd, S_Pre_Dmd	●	●	●
Time	Real Time Clock	Year, Month, Date, Hour, Minute, Second	●	●	●
Hour	Meter Running Time	Hour	●	●	●
	Load Running Time	Hour	●	●	●
Wiring Check	Voltage/Current Wiring	Each phase of V & I loss or error	●	●	●

FUNCTION LIST

● Function; ⊙ Option; Blank NA

	Function	Parameters	Acuvim-BL	Acuvim-CL	Acuvim-EL
Power Quality	Voltage Unbalance	U_unbl	●	●	●
	Current Unbalance	I_unbl	●	●	●
	Voltage THD	THD_U 1, THD_U 2, THD_U 3	●	●	●
	Current THD	THD_I 1, THD_I 2, THD_I 3	●	●	●
	Individual Harmonics	Harmonics 2nd to 31st	●	●	
		Harmonics 2nd to 63rd			●
	Voltage Crest Factor	Crest Factor	●	●	●
	TIF	THFF	●	●	●
	Current K Factor	K Factor	●	●	●
Sequence	Voltage/Current Sequence	Positive Sequence, Negative Sequence, Zero Sequence		●	●
Phase Angles	Voltage/Current Phase Angles	Voltage Phase Angle, Current Phase Angle	●	●	●
Statistics	MAX with Time Stamp, MIN with Time Stamp	Each phase of V & I; Total of P, Q, S, PF & F; Demand of I1, I2, I3, I4, P, Q&S; Each phase THD of V & I; Unbalance factor of V & I	●	●	●
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; Demand of I1, I2, I3, P, Q&S; Reverse phase sequence;	●	●	●
PQ Event Logging	Power Quality Event with Time Stamp	Voltage SAG and fail, Current overflow, Phase Sequence error			●
Time of Use	Energy/Max Demand	TOU, 4 Tariffs, 12 Seasons, 14 Schedules			●
	Daylight Saving Time	Two Adjustable Formats			●
	Holiday	Holiday setting up to 10 years			●
I/O	Energy Pulse Output	2 DO, configured as pulse output for kWh and kvarh, the pulse rate and width can be set	●		
	IO Module	4DI, 2DO/2RO, SOE, Pulse Counter, Pulse output, Alarm Output		⊙	⊙
Comms	RS-485	Modbus-RTU Protocol		●	●
	Ethernet RJ45	Modbus-TCP/IP, DNP 3.0 Over IP V2, BACnet-IP, SNMP V3, HTTP/HTTPs post, FTP post, SMTP, NTP, HTTPs webserver; 4GB Datalogging memory		⊙	⊙
	RS-485 Module	Modbus-RTU Protocol		⊙	⊙
	PROFIBUS	PROFIBUS-DP/V0 Protocol		⊙	⊙

COMMUNICATION MODULE COMPARISON

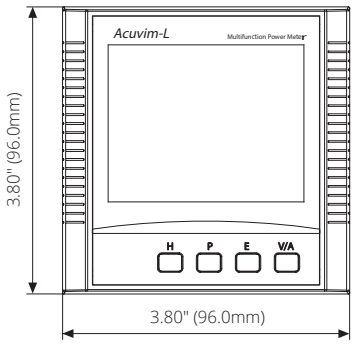
	LX-1	LX-2	LX-3	LX-4	LX-5	LX-6
						
Digital Input (DI)	4	4	-	4	4	4
Digital Output (DO)	2	2	-	2	-	-
RS485 Port	-	1	-	-	-	1
PROFIBUS Port	-	-	1	1	-	-
Relay Output	-	-	-	-	2	2

ETHERNET COMMUNICATION MODULE

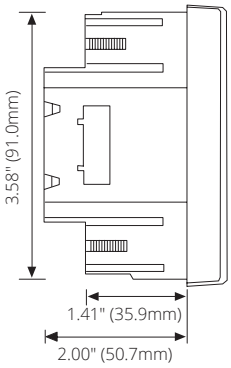
	L-WEB
Protocols	Modbus-TCP/IP, DNP 3.0 Over IP V2, BACnet-IP, SNMP V3, HTTP/HTTPs post, FTP post, SMTP, NTP, HTTPs webserver
Ethernet Port	1
Datalogging	4GB

DIMENSIONS

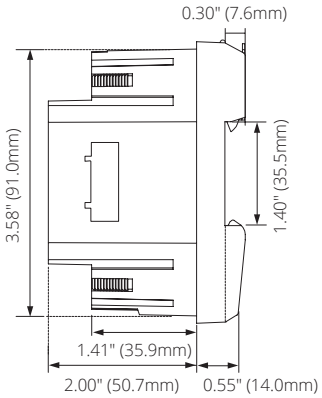
Acuvim-L V3 Dimensions



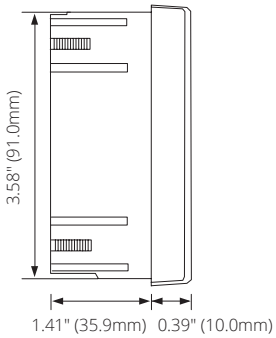
Front View of the Display Meter and Remote Display Unit



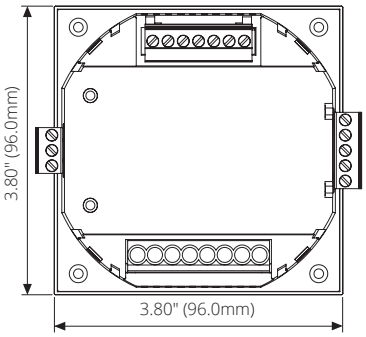
Side View of the Display Meter



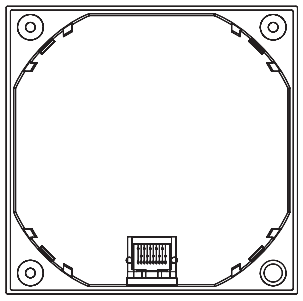
Side View of the DIN rail Meter



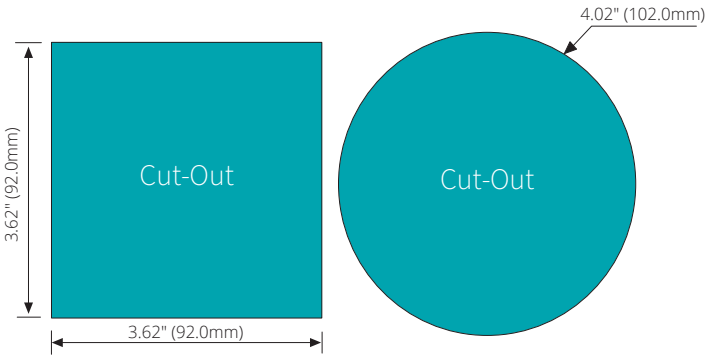
Side View of the Remote Display Unit



Rear View

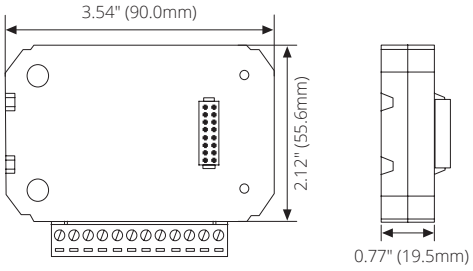


Rear View of the Remote Display Unit

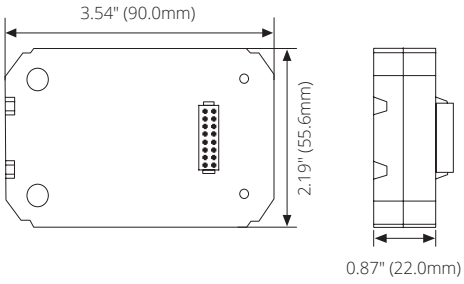


Cut Out

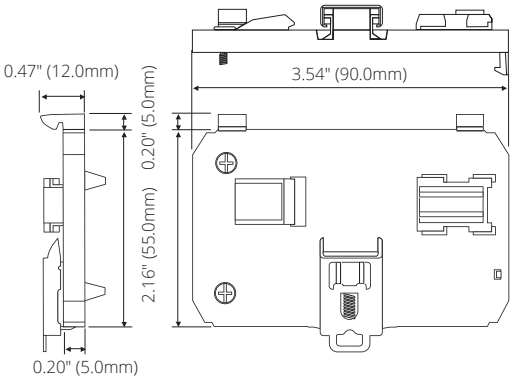
Extension Module Dimensions



PROFIBUS and Ethernet Module Dimensions

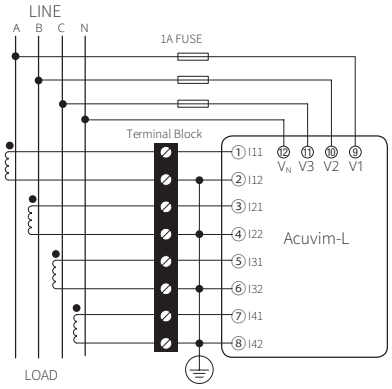


AXM-DIN Rail Mounting Dimensions

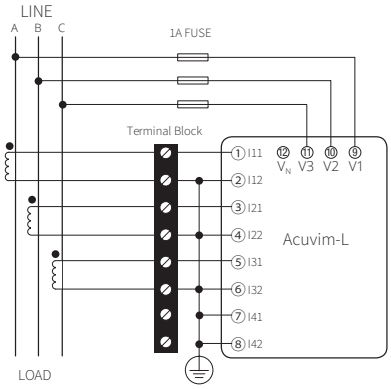


WIRING DIAGRAMS

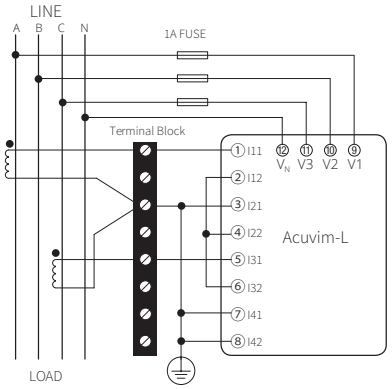
3 Phase 4 Wire (Wiring: 3LN, 3CT; IN: Measured)



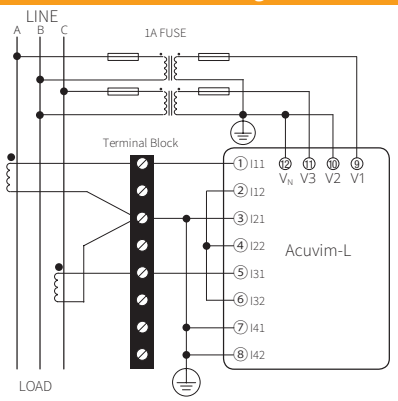
3 Phase 3 Wire (Wiring: 3LL, 3CT)



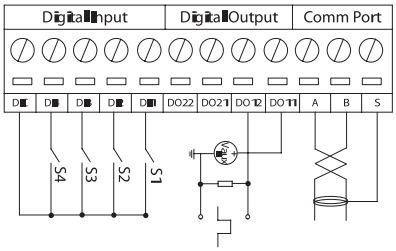
3 Phase 4 Wire (Wiring: 3LN,3CT; IN: Calculated)



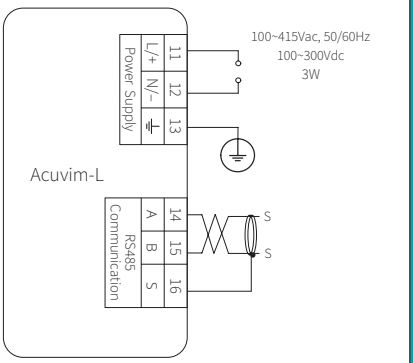
3 Phase 3 Wire (Wiring: 3LL, 3CT)



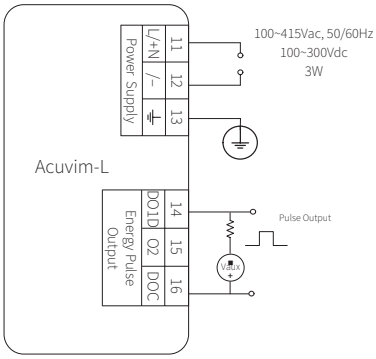
I/O Module, DI, RO/DO Wiring Diagram



Power Supply + Communication



Power Supply + Energy Pulse Output (DO)**

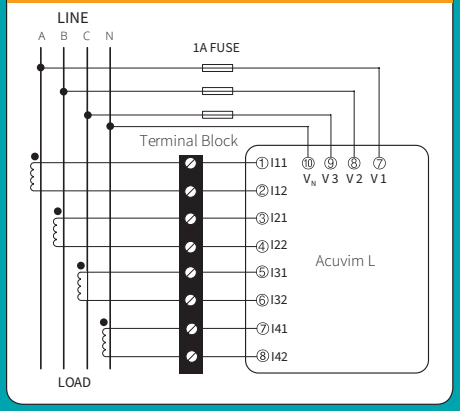


Note: ** Wiring diagram is only applicable to Acuvim BL.

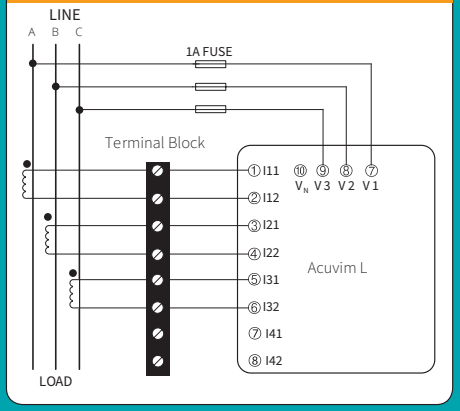
WIRING DIAGRAMS

TYPICAL WIRING RCT*/mV CURRENT INPUT

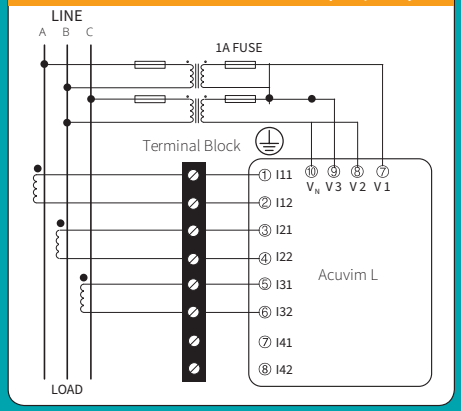
3 Phase 4 Wire (3LN, 3CT)



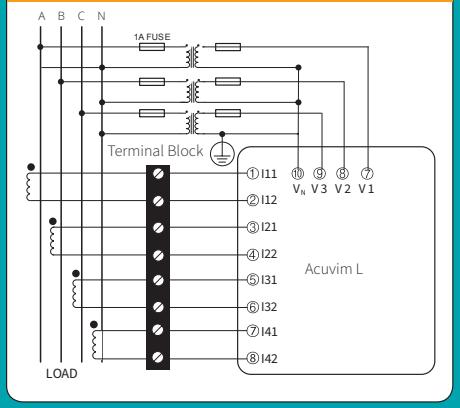
3 Phase 3 Wire (3LL, 3CT)



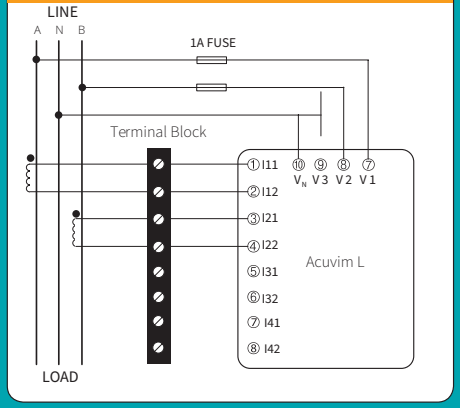
3 Phase 3 Wire with PT and 3CT(2LL, 3CT)*



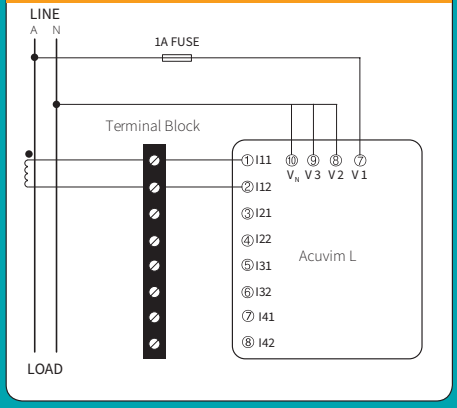
3 Phase 4 Wire with PT (3LN, 3CT)



Single Phase 3 Wire (1LL, 2CT)



Single Phase 2 Wire (1LN, 1CT)



*RCT model doesn't have 4th CT input channel

ACCESSORIES

DIN Rail Adapter

The AXM-DIN Rail Adapter is the easy way to mount the Acuvim L Series multifunction power meter on either horizontal or vertical DIN rail. The adapter quickly secures to the meter and is compatible with all I/O module options.

Protective Display Cover

The Protective Display Cover is designed for Acuvim L Series power meters and other 96mm by 96mm display panel meters. Crucial in harsh environments, it increases the IP environmental rating of a meter's display to IP66 or NEMA 4X.

USB RS485 Converter

This professional-grade, plug-and-play USB to Serial RS485 Converter is compliant with both USB 1.1 and 2.0 standards and is designed to provide a convenient, reliable USB connection to Acuvim L meters and other serial devices. It requires no external power supply and provides both surge and static electricity protection.

ORDERING INFORMATION

Meter Model	Mounting Option	Current Input	Power Supply
Acuvim-BL	**D**: Standard with LCD Display	**5A**: 5A/1A *(Input Field Selectable)*	**P1V3**: 100~415Vac, 50~60Hz 100~300Vdc
Acuvim-CL	**M**: DIN Rail Mount *(Optional Remote Display to be added)*	**RCT***: AcuCT-Flex Input	**P2V3**: 20~60Vdc
Acuvim-EL		**333**: 333mV Input	

Ordering Example: **Acuvim-CL-D-RCT-P2V3**

**Meters with RCT Current Input do not support I4, WIRING CHECK, POWER QUALITY, SEQUENCE, PHASE ANGLES, or POWER QUALITY EVENT LOGGING functions.*

Communication Module *(Optional)*	Protocols
L	**WEB:** Protocol: Modbus-TCP/IP, DNP 3.0 Over IP V2, BACnet-IP, SNMP V3, HTTP/ HTTPs post, FTP post, SMTP, NTP, HTTPs webserver; 4GB Datalogging
Ordering Example:	**L-WEB**

I/O Module *(Optional)*	Input/Output Type
L	**X1:** 4DI+2DO
	X2: 4DI+2DO+Second RS485
	X3: PROFIBUS
	X4: 4DI+2DO+PROFIBUS
	X5: 4DI+2RO
	X6: 4DI+2RO+Second RS485
Ordering Example:	**L-X4**

Accessories *(Optional)*	
REM-DS1V3:	Remote Display *Compatible with Acuvim-L Series "M" (DIN Mount) models only*
AXM-DIN:	DIN Rail Adapter *Compatible with Acuvim-L Series "D" (Panel Mount) models only*
96-IP66:	Screen Protector for 96 x 96mm meters
USB-RS485:	USB-to-RS485 Converter
Ordering Example:	**AXM-DIN**

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