Acuvim-L Series

Multifunction Power Meter

TRUE-RMS MEASURING

OVER/UNDER LIMIT ALARM

Max & Min

MAX & MIN RECORD

POWER QUALITY ANALYSIS

TOU, 4 TARIFFS, 12 SEASONS 14 SCHEDULES

Acuvim-L   Multifunction Power Meter

Metering

U 1 **220.3** V
2 **220.1**
Load 3 **220.2**
avg **220.2**

H   P   E   V/A

- **Metering of Distribution Feeders, Transformers, Generators, Capacitor Banks and Motors**
- **Medium and Low Voltage Systems**
- **Commercial, Industrial, Utility**
- **Power Quality Analysis**

ACCUENERGY

UL & cUL Certified

IP54 Protection — The front panel protection level is IP54

0.5s — Active power accuracy is 0.5s

Powerful power quality analysis

DESCRIPTION

The Acuvim-L series are multifunction power meters manufactured by Accuenergy. It is the ideal choice for monitoring and controlling of power distribution system. Some of the features and electric power parameters available on the Acuvim-L are:

- True-RMS Measuring Parameter
- 4-quadrant Energy
- Power Quality Analysis
- Over/Under Limit Alarm
- Energy Pulse Output
- TOU, 4 Tariffs, 12 Seasons, 14 Schedules

Acuvim-L may be used as a data gathering device for an intelligent Power Distribution System or a Plant Automation System. All monitoring data is available via digital RS485 communication port running Modbus® Protocol.

The quality of the power system is important with increasing use of electronic loads such as computers, ballasts or variable frequency drives. With the Acuvim-L power analysis option, any phase current or voltage can be displayed and the harmonic content calculated. By knowing the harmonic distribution, action can be taken to prevent overheated transformers, motors, capacitors, neutral wires and nuisance breaker trips. Redistribution of the system loading can also be determined.

APPLICATIONS

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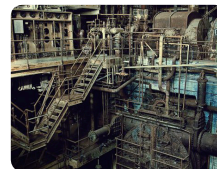
FEATURES

Metering

- **Voltage:** Uln 1, Uln 2, Uln 3, Uln avg, Ull 12, Ull 23, Ull 31, Ull avg
- **Current:** I1, I2, I3, In, I tot, I avg
- **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:** PF1, PF2, PF3, PF
- **Frequency:** F
- **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, Watt-hour Imp 1, Watt-hour Exp 1, Watt-hour Imp 2, Watt-hour Exp 2, Watt-hour Imp 3, Watt-hour Exp 3
- **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, Var-hour Imp 1, Var-hour Exp 1, Var-hour Imp 2, Var-hour Exp 2, Var-hour Imp 3, Var-hour Exp 3
- **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, VA-hour Imp 1, VA-hour Exp 1, VA-hour Imp 2, VA-hour Exp 2, VA-hour Imp 3, VA-hour Exp 3
- **Current Demand:** I1_Dmd, I2_Dmd, I3_Dmd, IN_Dmd, I1_Pre_Dmd, I2_Pre_ Dmd, I3_Pre_Dmd, IN_Pre_Dmd
- **Power Demand:** P_Dmd, Q_Dmd, S_Dmd, P_Pre_Dmd, Q_Pre_Dmd, S_Pre_Dmd
- Load Features
- Four Quadrant Powers

Monitoring

- Power Quality
- Voltage Harmonics $2^{nd} \sim 31^{st}$ for AL, BL and CL; $2^{nd} \sim 63^{rd}$ for DL and EL
- Current Harmonics $2^{nd} \sim 31^{st}$ for AL, BL and CL; $2^{nd} \sim 63^{rd}$ for DL and EL
- Voltage Unbalance Factor U_unbl
- Current Unbalance Factor I_unbl
- Max/Min Statistics
- Meter Running Time and Load Running Time

Alarm

Two (2) parameters may be set within a specified time interval. If indicated parameter 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 indicated parameter can be selected from any of the 50 parameters available.

I/O option module

The Acuvim-CL/DL/EL model can extend the I/O module. Digital input, pulse counter, pulse output and SOE can provided by extention I/O module.

Pulse Output option

Two digital outputs can be configured as pulse output for kWh and kvarh. The pulse rate and width can be set.

Anti-tampering Seal

Users can physically seal the meter similar to a utility meter in order to provide anti-tampering protection. All metrological programming and user-defined parameters are protected with a physical seal.

Power Quality Event Logging

When a power quality event happens, such as voltage sag and fail, etc., Acuvim-Dl/EL will record the timestamp and the triggering condition of the event. It can save 16 power quality events.

Time of Use

Users 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 Acuvim-EL meter will calculate and accumulate energy to different tariffs according to the meter's internal clock timing and TOU settings.

Flexible Current Input

Compatible with different current transformers such as 5A, 1A, 80mA, 100mA, 200mA, 333mV output CT and Rogowski coil all available from Accuenergy.

Wiring Check

The Acuvim - L series meter has the function of wiring check, according to the setting of wiring mode, load features and PF value.
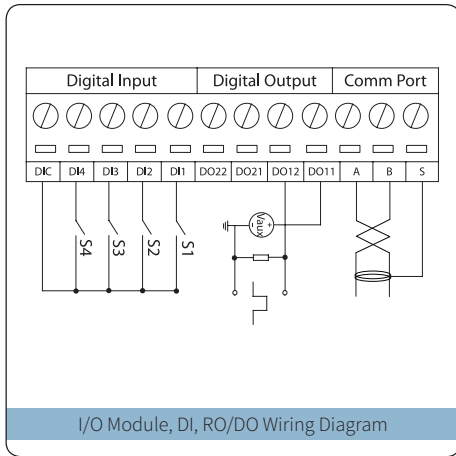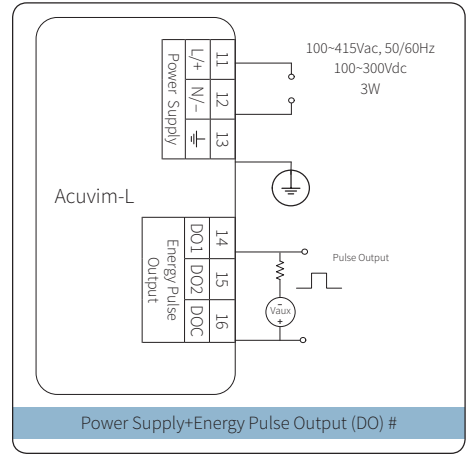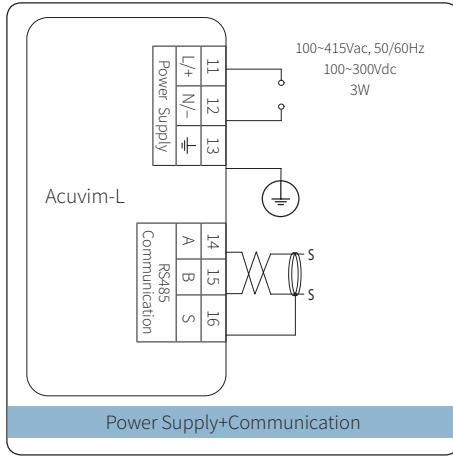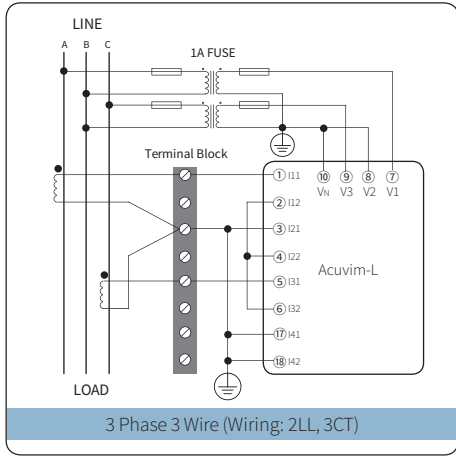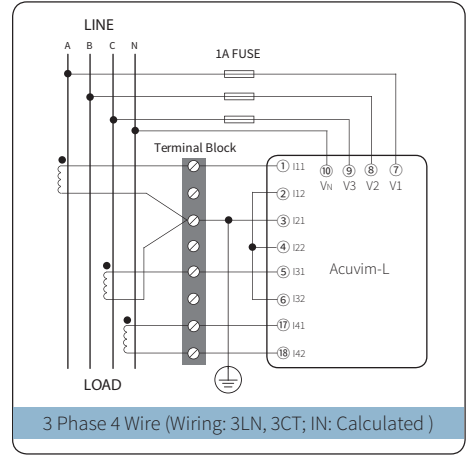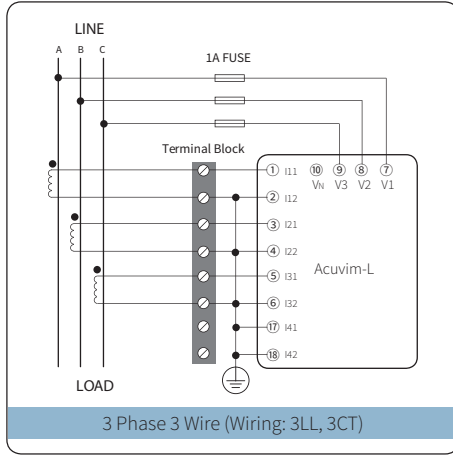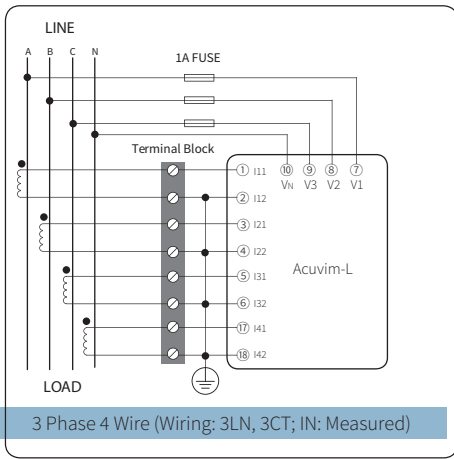
Communication

RS485, industry standard Modbus® RTU protocol; Options are the second RS485 module, PROFIBUS-DP/VO module.

FUNCTION LIST

● Function   ◉ Option   Blank NA

	Function	Parameter	Acuvim-AL	Acuvim-BL	Acuvim-CL	Acuvim-DL	Acuvim-EL	Acuvim-KL
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 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 N_Dmd, I 1_Pre_Dmd, I 2_Pre_ Dmd, I 3_Pre_Dmd, I N_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	●	●	●	●	●	
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, THD_IN	●	●	●	●	●	
	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, IN, 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, IN,P, Q&S; Reverse phase sequence;		●	●	●	●	
POWER QUALITY 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			◉	◉	◉	
COMMUNICATION	RS-485	Modbus®-RTU Protocol			●	●	●	●
	RS-485 Module	Modbus®-RTU Protocol			◉	◉	◉	
	PROFIBUS	PROFIBUS-DP/V0 Protocol			◉	◉	◉	

TYPICAL WIRING

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: 2LL, 3CT)

Power Supply+Communication

100~415Vac, 50/60Hz
100~300Vdc
3W

Power Supply+Energy Pulse Output (DO) #

100~415Vac, 50/60Hz
100~300Vdc
3W

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

Note: "#" Wiring diagram is only applicable to Acuvim BL.

SPECIFICATIONS

METERING			
Parameters	Accuracy	Resolution	Range
Voltage	0.5%	0.1V	20V~1000kV
Current	0.5%	0.001A	0~50000A
Current Demand	0.5%	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	0.5%	1var	-9999Mvar~9999Mvar
Apparent Power Demand	0.5%	1VA	0~9999MVA
Power Factor	0.5%	0.001	-1.0~1.0
Frequency	0.2%	0.01Hz	45.00~65.00Hz
Energy	0.5%	0.1kWh	0~99999999.9kWh
Reactive Energy	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	①5A, ②1A, ③1A(333mV), ④1A(100mV Rope - CT), ⑤1A(80mA/100mA/200mA), ⑥1A(6.68mA)
Metering Range	①0~10A, ②0~2A, ③0~1.2A, ④0~1.2A, ⑤0~1.2A, ⑥0~1.2A
Pickup Current	①5mA, ②1mA, ③5mA, ④5mA, ⑤5mA, ⑥5mA
Withstand	20Arms continuous
	100Arms for 1 second, non-recurring
Burden	0.05VA (typical) @ 5Arms
Accuracy	0.5%

Voltage Inputs (Each Channel)
Nominal Full Scale	400Vac L-N, 690Vac L-L (+20%)
Withstand	1500Vac continuous
	2500Vac, 50/60Hz for 1minute
Input Impedance	2Mohm per phase
Metering Frequency	45Hz~65Hz
Pickup Voltage	10Vac
Accuracy	0.5%

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

Harmonic Resolution
Metered Value	2nd~63rd harmonics

Digital Intput OPTION

Digital Input (DI)
Input Type	Dry Contact
Input Resistance	4kΩ
Pulse Frequency (Max)	100Hz, 50% Duty Ratio
SOE Resolution	2ms

Digital Output OPTION

Digital Output (DO) (Photo-MOS)
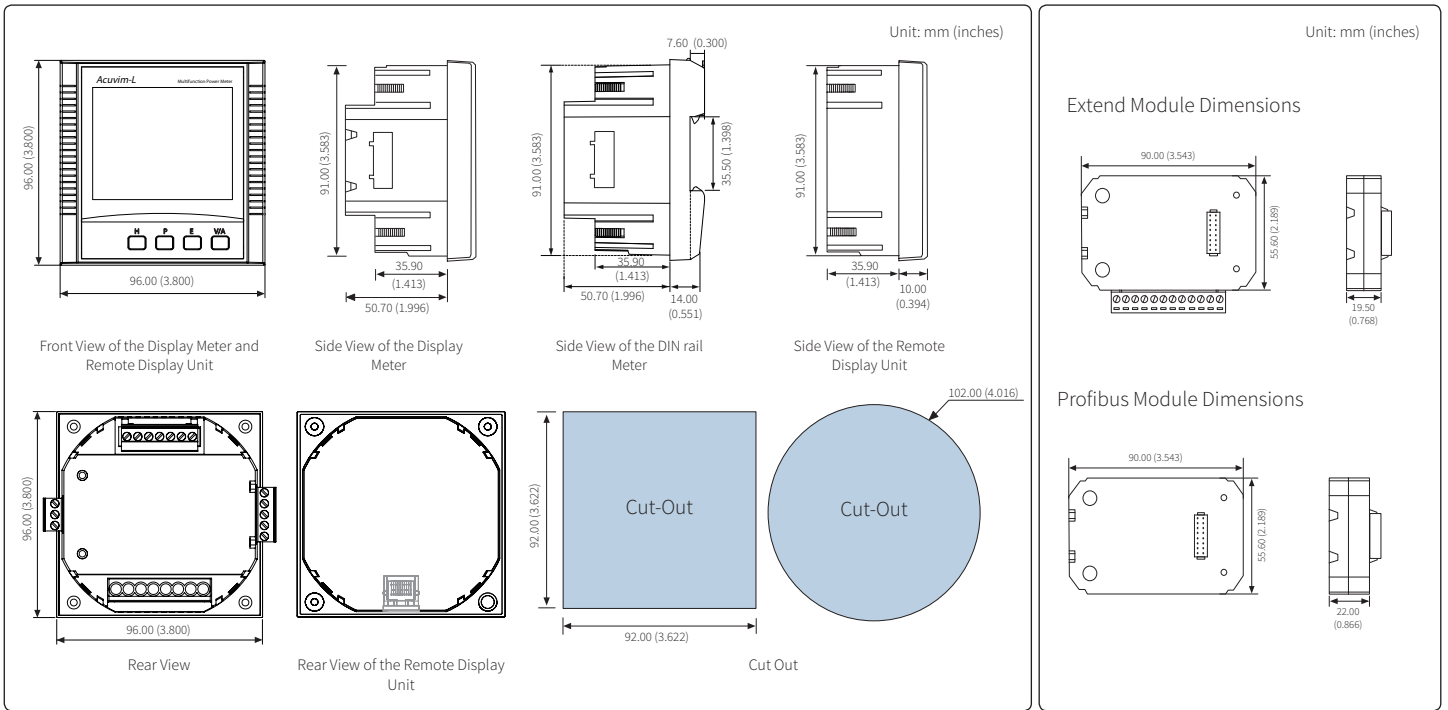|	
Voltage Range	0~250Vac/dc
Load Current	100mA (Max)
Output Frequency (Max)	25Hz, 50% Duty Ratio
Isolation Voltage	2500V

COMMUNICATION

RS-485 (Optional)
Modbus®-RTU Protocol
2-wire connection, Half-duplex, Isolated
1200 to 38400 baud rate
Sencond RS485 (Acuvim-CL, Acuvim-DL and Acuvim-EL can optional)

PROFI-BUS (Optional)
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

CONTROL POWER

Universal	AC or DC

AC/DC Control Power
Operating Range	100~415Vac, 50/60Hz, 100~300Vdc
Burden	3W
Withstand	3250Vac, 50/60Hz for 1 minute

Low Voltage DC Control Power (Optional)
Operating Range	20~60Vdc
Burden	3W

OPERATING ENVIRONMENT

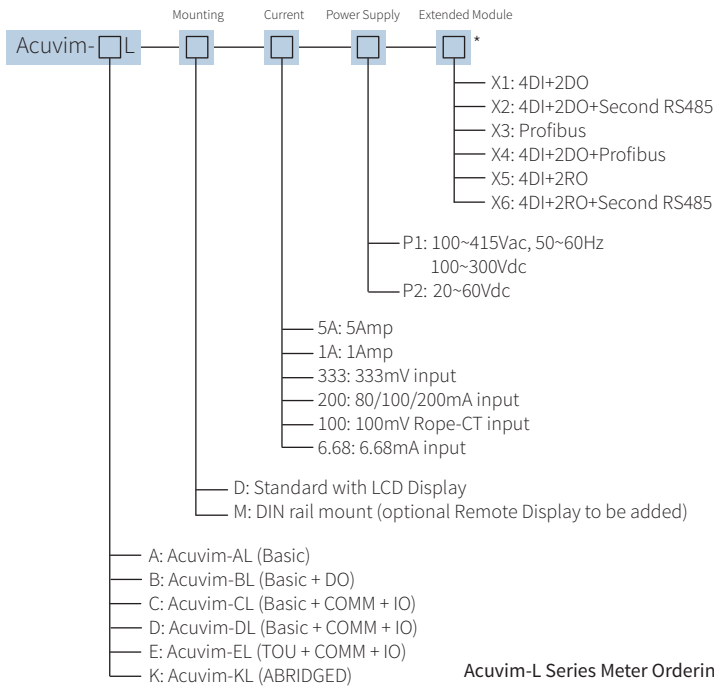|	
Operation Temperature	- 25ºC to 70ºC
Storage Temperature	- 40ºC to 85ºC
Relative Humidity	5% to 95% non-condensing
Pollution Degree	2

STANDARD COMPLIANCE

Measurement Standard	IEC 62053-22 Class 0.5S, 62053-23 Class 2
Environmental Standard	IEC 60068-2
Safety Standard	IEC 61010-1, UL 61010-1, IEC 61557-12
EMC Standard	IEC 61000-4/-2/3/4/5/6/8/11, CISPR 22, IEC 61000-3-2, IEC 61000-6-2/4
Outlines Standard	DIN 43700/ANSI C39.1

DIMENSIONS

Unit: mm (inches)

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

Cut-Out

Cut Out

Unit: mm (inches)

Extend Module Dimensions

Profibus Module Dimensions

Note: 1. The cable length connecting the Remote Display Unit and the DIN Rail Meter is 2 metres (6 feet). Contact your customer service rep if you require a longer cable.

2. The Remote Display Unit and Display Meter have the same cutout.

ORDERING INFORMATION

Acuvim-☐L ☐ ☐ ☐ ☐*

Mounting · Current · Power Supply · Extended Module

- X1: 4DI+2DO
- X2: 4DI+2DO+Second RS485
- X3: Profibus
- X4: 4DI+2DO+Profibus
- X5: 4DI+2RO
- X6: 4DI+2RO+Second RS485

- P1: 100~415Vac, 50~60Hz
  100~300Vdc
- P2: 20~60Vdc

- 5A: 5Amp
- 1A: 1Amp
- 333: 333mV input
- 200: 80/100/200mA input
- 100: 100mV Rope-CT input
- 6.68: 6.68mA input

- D: Standard with LCD Display
- M: DIN rail mount (optional Remote Display to be added)

- A: Acuvim-AL (Basic)
- B: Acuvim-BL (Basic + DO)
- C: Acuvim-CL (Basic + COMM + IO)
- D: Acuvim-DL (Basic + COMM + IO)
- E: Acuvim-EL (TOU + COMM + IO)
- K: Acuvim-KL (ABRIDGED)

Acuvim-L Series Meter Ordering Example: Acuvim-EL - D - 5A - P1 - X2

Remote Display Option

REM - ☐ — DS1: Compatible with Acuvim-L Series "M" (DIN Mount) models only

Remote Display Option Ordering Example: REM - DS1

* **Note:**

1. Extended Modules only supported by the Acuvim-CL, the Acuvim-DL and Acuvim-EL models.

2. Profibus module must be installed on the back of the meter **FLRST** before the other module is attached.

3.Using Rope-CT as current transformer, not support the **IN, WIRING CHECK, POWER QUALITY, SEQUENCE ,PHASE ANGLES and POWER QUALITY EVENT LOGGING** function.