



# Data Sheet

## RISH LM1380

Multifunction Meter



Measure



Control



Record



Analyze



Optimize

**RISH LM1380** measures important electrical parameters in 3 phase 4 wire, 3 phase 3 wire, 1 phase 3 wire, 2 phase 2 wire and 1 phase 2 wire Network. It displays many parameters at a glance. It measures electrical parameters like Active / Reactive / Apparent energy, Reactive quadrant wise energy and all basic parameters. The instrument has two optional digital outputs available as pulse or alarm with programmable pulse duration and width. This instrument also has four optional digital inputs for monitoring the external contact status, pulse counting and/or energy accumulation according to tariff.

### Applications:

- Internal Energy billing/monitoring/auditing
- Sub-metering
- Electrical load monitoring
- Genset, Test Benches and Laboratories

### Product Features:

#### True RMS Measurement

True RMS measurement with Sampling rate of 128 samples per cycle upto 63<sup>rd</sup> Harmonic.

#### Relay Output (optional)

Potential free, very fast acting relay contact configurable for following:

**Pulse** output which can be used to drive an external counter for energy measurement.

**Limit** (alarm) switch. Limit output also configurable for three logical combination of parameters.

**Timer** output which can be used to operate relay in cyclic manner.

**Pre-Paid Cost** based energy tripping.

Switch for **unhealthy three phase load**.

**Remote Relay Control** using MODBUS.

#### Intelligent Load Management

##### Pre-Paid Cost Based Energy Tripping

This feature allows to trip the load whose energy has crossed the required threshold configured by user.

##### Health Monitoring of Three Phase Load

This feature is applicable only for Three phase load (such as a Three phase motor) which can be monitored for phase failure, phase reversal, voltage & current unbalance, under frequency, under voltage, over voltage and over current.

#### Direct remote access(Optional)

Remote configuration of the Instrument and access of measured parameter via Modbus Rs485.

#### High Max System Power Limit

Upto 9000 MVA (L-N) system power is measurable.

#### Multi Tariff Facility

8 Tariff based on digital input or RTC or Modbus.

6 Energy sources configurable for tariff based energy.

#### User Assignable Screens

Instrument measures more than 85 parameters and these parameters are displayed through different screens, out of which user can select minimum 1no. and maximum 10 nos. of screens as per application requirement.

#### Current TDD

This instrument measures system current TDD (Total Demand Distortion) as per IEE-519.

#### Programmable Voltage and power units

This instrument allows user to select the units for voltage (V and KV) and power (W, KW, MV) on MODBUS.

#### Energy as per IEC 62053 and IEC 61557-12 (Edition 2.0)

Active Energy accuracy Class 0.2S as per IEC 62053-22 and Class 0.2 as per IEC 61557-12, Reactive Energy accuracy Class 2 as per IEC 62053-23 and IEC 61557-12 and Apparent Energy accuracy Class 1 as per IEC 61557-12.

Independent Import and Export Energy counter. Active energy (kWh), Reactive energy (kVArh), Apparent energy (kVAh) measurement of system as well as phase-wise.

Measures Reactive quadrant wise energy for system as well as per phase.

#### Data logging:

Meter has inbuilt 8MB Flash for datalogging.

**Event Logging:** Previous 5 events of factory default parameters can be logged with Date and time.

**Time based logging:** User selectable parameters (1 to 30) can be logged at regular intervals(1 to 60min) with Date and Time stamp in internal memory and can be accessed via Modbus or Ethernet or USB.

If 1 Parameter for example energy is selected with logging interval of 15 minutes, log of maximum 948 days are available for user.

If 30 Parameters are selected with logging interval of 60 minutes, log of maximum 355 days are available for user.

**Load Profile logging :** Logging of energy consumed and peak Demand(Power and Current) in a day and in month for efficient tracking of load behaviors.

Maximum 1 year daily and 14years of monthly log is available for user.

#### Digital Inputs

4 Digital Inputs (Optional) can be configured as:

Status to indicate if the input is present or not.

Pulse Counter for counting pulses from external sources.

Tariff Input to store separate energy counters on the basis of digital inputs present.

#### THD and Individual Harmonics Measurement

The instrument measures per phase THD and individual harmonic up to 63rd harmonics for voltage & current.

#### Old Values

Old value storage after Reset.

#### Compliance to International Standards

Compliance to International Safety standard IEC 61010-1-2010.

EMC Compliance to International standard IEC 61326.



Measure



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Record

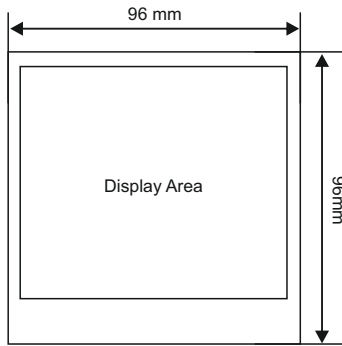


Analyze

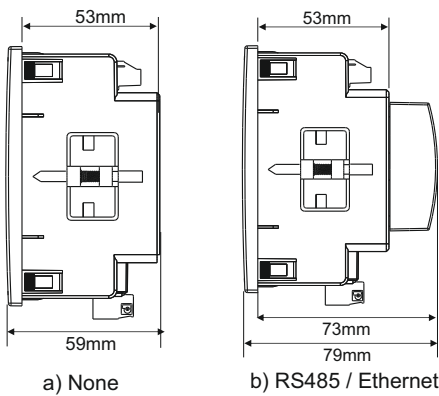


Optimize

### Dimensions Details

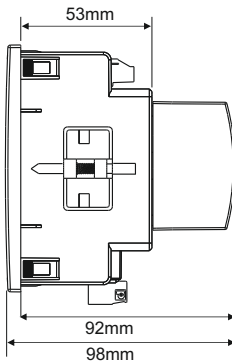


Front View



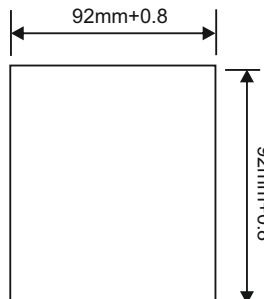
a) None

b) RS485 / Ethernet



c) RS485 + Ethernet

Side View



Panel Cutout

### Technical Specifications:

#### Input Voltage:

Nominal input voltage (Vn)	100VLL to 600 VLL AC RMS
Programmable on site	57.5VLN to 346.42 VLN AC RMS
System PT primary values	100VLL to 1200kVLL programmable on site
Measuring Range	20%....120% of nominal value
Overload Withstand	2 x Nominal value for 1 second, repeated 10 times at 10 second intervals
Overload Indication	"-OL-" >121% of Nominal value
Nominal input voltage burden	< 0.3VA approx. per phase (at nominal 240V)

#### Input Current:

Nominal input current(In)	1A / 5A programmable on site
System CT primary values	1A to 9999A programmable on site
Measuring Range	1%....200% of nominal value (1%....180% of nominal value for CF = 2)
Overload Withstand	20 x Nominal value for 1 second, repeated 5 times at 5 minute intervals
Overload Indication	"-OL-" >205% of Nominal value
Nominal input current burden	< 0.3VA approx. per phase

#### Auxiliary Supply:

Higher Auxiliary supply range	100-550V AC/DC (230V AC/DC nominal)
As per IEC 61557-12	100-320V AC/DC (230V AC/DC nominal)
Lower Auxiliary supply range	12-60V AC/DC (24 V AC /48 V DC nominal)
Aux Supply frequency	45 to 66 Hz range
Auxiliary Supply burden (at nominal value)	
With Add-on RS485 card	< 6VA approx.
With Add-on Ethernet card	< 8VA approx.
With Add-on RS485+Ethernet card	< 10VA approx.

#### Operating Measuring Ranges:

Current (Energy Measurement)	1....200% of nominal value
Starting current	0.1% of Nominal
Voltage	20... 120% of nominal value
Power Factor	0.5 Lag ... 1... 0.8 Lead
Frequency	40Hz to 70Hz
Note : Variation due to frequency other than $\pm 10\%$ of 50/60Hz is less than twice the class index.	

#### Reference Conditions for Accuracy:

Reference temperature	23°C +/- 2°C
Input Waveform	Sinusoidal (distortion factor 0.005)
Input frequency	50/60 Hz $\pm 2\%$
Auxiliary supply frequency	50/60 Hz $\pm 1\%$
Total Harmonic Distortion	THDv $\leq 50\%$ upto 63rd Harmonic at Vn THDi $\leq 200\%$ upto 63rd Harmonic at In THDi $\leq 180\%$ upto 63rd Harmonic at In CF=2
Voltage range	20%....120% of nominal value
Current range	10%....200% of nominal value

#### Display Specification:

Display	4 Line 4 Digit and 1 Line 9 Digit row LCD with Backlit
Response time to step input	1 sec approx.
LED Indications	Integration of energy (Impulse)
Display scrolling	Automatic/Manual (Programmable)
Push buttons	4 Buttons



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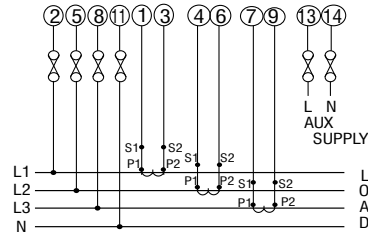
Analyze



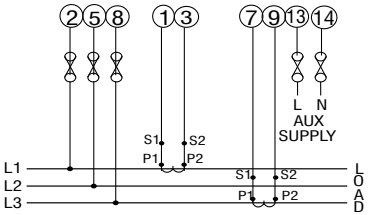
Optimize

### Electrical Connection

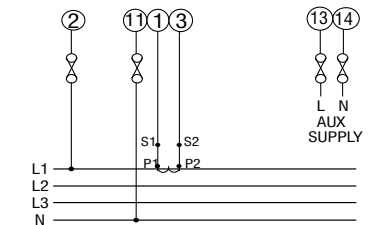
#### Network Types :



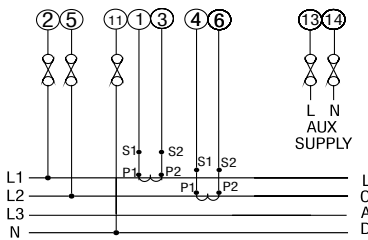
a) 3 Phase 4 Wire



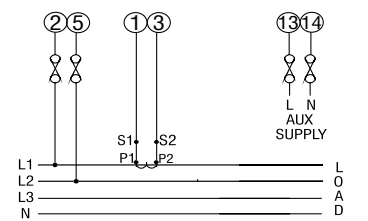
b) 3 Phase 3 Wire



c) Single Phase Load



d) 1 Phase 3 Wire



e) 2 Phase 2 Wire

#### Note:

1. It is recommended that the wires used for connections to the instrument should have lugs soldered at the end i.e., the connections should be made with Lugged wires for secure connections.

2. For MODBUS B refers to positive, A refers to Negative and G refers to ground.

#### Wiring Guidelines

Solid with Pin type lugs (sq. mm)	1 to 2.5
Stranded with pin types lugs (sq. mm)	1 to 2.5
Torque value (Nm)	
1. Aux and Voltage terminals	0.5 to 0.6
2. Current Terminals	0.4 to 0.5
3. Rs485 and relay output terminals	0.3 to 0.4
Length available for lug entry in terminal (mm)	9.5

#### Accuracy:

Active Energy (Bidirectional)

Class 0.2S as per IEC 62053-22

Class 0.2 as per IEC 61557-12

Apparent Energy

Class 1 as per IEC 61557-12

Reactive Energy (Bidirectional)

Class 2 as per IEC 62053-23 and IEC 61557-12

Parameter	Accuracy
Voltage	± 0.2% of Nominal value
Current	± 0.2% of Nominal value
Frequency	± 0.1% Mid Frequency
Active Power	± 0.2% of Nominal value
Reactive Power	± 0.1% of Nominal value
Apparent Power	± 0.2% of Nominal value
Power factor/ angle	± 3 degree
THD (V/I) w.r.t fundamental	± 5% (upto 63rd Harmonic)
Individual Harmonics	± 5% (upto 63rd Harmonic)

#### Applicable Standards:

Electromagnetic Compatibility

IEC 61326 - 1, Table 2

Immunity

IEC 61000-4-2,-3,-4,-5,-6,-8,-11

Emission

CISPR 11

Safety

IEC 61010-1-2010

IP for water & dust

IEC60529

Pollution degree

2

Installation category

III

High voltage test

All Circuit Vs Surface

4kV RMS, 50Hz for 1min

Input / Aux Vs Others

3.3kV RMS, 50Hz for 1min

DI/Relay/RS485/USB vs Others

3.3kV RMS, 50Hz for 1min

DI Vs DI / Relay Vs Relay

2.2kV RMS, 50Hz for 1min

#### Environmental:

Operating temperature

-20 to +70°C

Storage temperature

-40 to +85°C

Relative humidity

0... 95% (non condensing)

Warm up time

Minimum 3 minute

Shock (As per IEC60068-2-27)

Half sine wave, Peak acceleration

30gn (300 m/s<sup>2</sup>), duration 18ms

Vibration

10... 150...10 Hz, 0.15mm amplitude

Altitude

< 2000 m

Number of Sweep cycles

10 per axis

Enclosure

IP 20 (Terminal side) and IP54 (Front side)

Weight

320 grams approx.

#### Installation:

Mechanical Housing

Lexan 940 (polycarbonate), Flammability

Class V-0 acc. to UL 94, self extinguishing,

non dripping, free of halogen

Panel Mounted (96X96)

Mounting Position

Connection Element

Conventional screw type terminal with indirect

wire terminals

Connection Terminal

4 mm<sup>2</sup> solid or 2.5 mm<sup>2</sup> stranded cable

#### Interfaces:

Impulse Led

For Energy testing

4 Digital Input (Optional)

20... 300 VAC / 10... 60 VDC Optical couplers,

Min pulse width 10ms, Min length between 2

pulses 18ms, VA < 0.25VA at 240 VAC

2 Digital Output (Optional)

Type - Relay, 250 VAC, 5 AAC / 30VDC, 5A DC

Programmable Pulse Duration and Pulse Width

RS485, max.1200m

Baud rate : 4.8k, 9.6k,19.2k, 38.4k, 57.6kbps

Ethernet

Ethernet access on modbus TCP/IP Protocol

BACnet (Optional)

BACnet IP with BACnet protocol version 12



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# Data Sheet

## RISH LM1380

### Measured Parameter System wise:

✓ : Available

\* : Not Available

✓<sup>4</sup>: L3 Not applicable

Sr No	Parameters	3Phase 4Wire	3Phase 3Wire	1Phase 3Wire	2Phase 2Wire	1Phase 2Wire
1.	System Import Active Energy <sup>1</sup>	✓	✓	✓	✓	✓
2.	L1,L2,L3 Import Active Energy <sup>1</sup>	✓	*	✓ <sup>4</sup>	*	*
3.	System Export Active Energy <sup>1</sup>	✓	✓	✓	✓	✓
4.	L1,L2,L3 Export Active Energy <sup>1</sup>	✓	*	✓ <sup>4</sup>	*	*
5.	System Total Active Energy <sup>1</sup>	✓	✓	✓	✓	✓
6.	L1,L2,L3 Total Active Energy <sup>1</sup>	✓	*	✓ <sup>4</sup>	*	*
7.	System Net Active Total Energy <sup>1</sup>	✓	✓	✓	✓	✓
8.	System Inductive Reactive Energy <sup>1</sup>	✓	✓	✓	✓	✓
9.	L1,L2,L3 Inductive Reactive Energy <sup>1</sup>	✓	*	✓ <sup>4</sup>	*	*
10.	System Capacitive Reactive Energy <sup>1</sup>	✓	✓	✓	✓	✓
11.	L1,L2,L3 Capacitive Reactive Energy <sup>1</sup>	✓	*	✓ <sup>4</sup>	*	*
12.	System Total Reactive Energy <sup>1</sup>	✓	✓	✓	✓	✓
13.	L1,L2,L3 Total Reactive Energy <sup>1</sup>	✓	*	✓ <sup>4</sup>	*	*
14.	System Apparent Energy <sup>1</sup>	✓	✓	✓	✓	✓
15.	System Apparant while Active Import Energy <sup>1</sup>	✓	✓	✓	✓	✓
16.	System Apparant while Active Export Energy <sup>1</sup>	✓	✓	✓	✓	✓
17.	L1,L2,L3 Apparent Energy <sup>1</sup>	✓	*	✓ <sup>4</sup>	*	*
18.	System Import Inductive Energy <sup>1</sup>	✓	✓	✓	✓	✓
19.	System Export Inductive Energy <sup>1</sup>	✓	✓	✓	✓	✓
20.	System Import Capacitive Energy <sup>1</sup>	✓	✓	✓	✓	✓
21.	System Export Capacitive Energy <sup>1</sup>	✓	✓	✓	✓	✓
22.	System Total Import Reactive Energy <sup>1</sup>	✓	✓	✓	✓	✓
23.	System Total Export Reactive Energy <sup>1</sup>	✓	✓	✓	✓	✓
24.	System Total Inductive Reactive Energy <sup>1</sup>	✓	✓	✓	✓	✓
25.	System Total Capacitive Reactive Energy <sup>1</sup>	✓	✓	✓	✓	✓
26.	L1, L2, L3 Inductive Import Energy <sup>1</sup>	✓	*	✓ <sup>4</sup>	*	*
27.	L1, L2, L3 Inductive Export Energy <sup>1</sup>	✓	*	✓ <sup>4</sup>	*	*
28.	L1, L2, L3 Capacitive Import Energy <sup>1</sup>	✓	*	✓ <sup>4</sup>	*	*
29.	L1, L2, L3 Capacitive Export Energy <sup>1</sup>	✓	*	✓ <sup>4</sup>	*	*
30.	L1, L2, L3 Total Import Energy <sup>1</sup>	✓	*	✓ <sup>4</sup>	*	*
31.	L1, L2, L3 Total Export Energy <sup>1</sup>	✓	*	✓ <sup>4</sup>	*	*
32.	L1, L2, L3 Total Inductive Energy <sup>1</sup>	✓	*	✓ <sup>4</sup>	*	*
33.	L1, L2, L3 Total Capacitive Energy <sup>1</sup>	✓	*	✓ <sup>4</sup>	*	*
34.	System Active Power (kW) <sup>3</sup>	✓	✓	✓	✓	✓
35.	L1,L2,L3 Active Power (kW) <sup>3</sup>	✓	*	✓ <sup>4</sup>	*	*
36.	System Total Re-active Power <sup>3</sup>	✓	✓	✓	✓	✓
37.	L1,L2,L3 Total Re-active Power <sup>3</sup>	✓	*	✓ <sup>4</sup>	*	*
38.	System Fundamental Re-active Power	✓	✓	✓	✓	✓
39.	L1,L2,L3 Fundamental Re-active Power	✓	*	✓ <sup>4</sup>	*	*
40.	System Distorted Re-active Power	✓	✓	✓	✓	✓
41.	L1,L2,L3 Distorted Re-active Power	✓	*	✓ <sup>4</sup>	*	*
42.	System Apparent Power <sup>3</sup>	✓	✓	✓	✓	✓
43.	L1,L2,L3 Apparent Power <sup>3</sup>	✓	*	✓ <sup>4</sup>	*	*
44.	System Power Factor	✓	✓	✓	✓	✓
45.	L1,L2,L3 Power Factor	✓	*	✓ <sup>4</sup>	*	*
46.	System Displacement Power Factor	✓	✓	✓	✓	✓
47.	L1,L2,L3 Displacement Power Factor	✓	*	✓ <sup>4</sup>	*	*
48.	System Reactive Power Factor	✓	✓	✓	✓	✓
49.	L1,L2,L3 Reactive Power Factor	✓	*	✓ <sup>4</sup>	*	*
50.	System LF Factor SgnQ(1-(P/S))	✓	✓	✓	✓	✓
51.	L1,L2,L3 LF Factor SgnQ(1-(P/S))	✓	*	✓ <sup>4</sup>	*	*
52.	System Phase Angle <sup>3</sup>	✓	✓	✓	✓	✓



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# Data Sheet

## RISH LM1380

### Measured Parameter System wise:

✓ : Available    ✗ : Not Available    ✓<sup>4</sup>: L3 Not applicable

Sr No	Parameters	3Phase 4Wire	3Phase 3Wire	1Phase 3Wire	2Phase 2Wire	1Phase 2Wire
53.	L1,L2,L3 Phase Angle <sup>3</sup>	✓	✗	✓ <sup>4</sup>	✗	✗
54.	Current Demand	✓	✓	✓	✓	✓
55.	kVA Demand	✓	✓	✓	✓	✓
56.	Import kW Demand	✓	✓	✓	✓	✓
57.	Export kW Demand	✓	✓	✓	✓	✓
58.	Inductive Var Demand	✓	✓	✓	✓	✓
59.	Capacitive Var Demand	✓	✓	✓	✓	✓
60.	Max Current Demand	✓	✓	✓	✓	✓
61.	Max kVA Demand	✓	✓	✓	✓	✓
62.	Max Import kW Demand	✓	✓	✓	✓	✓
63.	Max Export kW Demand	✓	✓	✓	✓	✓
64.	Max Inductive Var Demand	✓	✓	✓	✓	✓
65.	Max Capacitive Var Demand	✓	✓	✓	✓	✓
66.	Run Hour	✓	✓	✓	✓	✓
67.	On Hour	✓	✓	✓	✓	✓
68.	Number of Interruptions	✓	✓	✓	✓	✓
69.	System Voltage <sup>3</sup>	✓	✓	✓	✓	✓
70.	L1,L2,L3 Voltage <sup>3</sup>	✓	✗	✓ <sup>4</sup>	✗	✗
71.	L12,L23,L31 Voltage <sup>3</sup>	✓	✓	✓ <sup>4</sup>	✗	✗
72.	System Voltage THD	✓	✓	✓	✓	✓
73.	L1-L2-L3 Voltage THD	✓	✓	✓ <sup>4</sup>	✗	✗
74.	System Current <sup>3</sup>	✓	✓	✓	✓	✓
75.	L1-L2-L3 Current <sup>3</sup>	✓	✓	✓ <sup>4</sup>	✗	✗
76.	System Current THD	✓	✓	✓	✓	✓
77.	L1-L2-L3 Current THD	✓	✓	✓ <sup>4</sup>	✓	✓
78.	Individual Harmonics VL1(Up to 63rd Harmonics)	✓	✓	✓	✓	✓
79.	Individual Harmonics VL2 (Up to 63rd Harmonics)	✓	✓	✓	✗	✗
80.	Individual Harmonics VL3 (Up to 63rd Harmonics )	✓	✓	✗	✗	✗
81.	Individual Harmonics IL1(Up to 63rd Harmonics )	✓	✓	✓	✓	✓
82.	Individual Harmonics IL2(Up to 63rd Harmonic )	✓	✗	✓	✗	✗
83.	Individual Harmonics IL3(Up to 63rd Harmonics )	✓	✓	✗	✗	✗
84.	Neutral Current (Calculated)	✓	✗	✓	✗	✗
85.	Frequency <sup>3</sup>	✓	✓	✓	✓	✓
86.	RPM	✓	✓	✓	✓	✓
87.	Phase Sequence Indication	✓	✓	✗	✗	✗
88.	Current Reversal Indication	✓	✗	✓	✓	✓
89.	Phase (V-I) Absent Indication	✓	✗	✓	✗	✗
90.	Tariff Source 1 Energy Count	✓	✓	✓	✓	✓
91.	Tariff Source 2 Energy Count	✓	✓	✓	✓	✓
92.	Tariff Source 3 Energy Count	✓	✓	✓	✓	✓
93.	Tariff Source 4 Energy Count	✓	✓	✓	✓	✓
94.	Tariff Source 5 Energy Count	✓	✓	✓	✓	✓
95.	Tariff Source 6 Energy Count	✓	✓	✓	✓	✓
96.	Old Max A Demand <sup>2</sup>	✓	✓	✓	✓	✓
97.	Old Max VA Demand <sup>2</sup>	✓	✓	✓	✓	✓
98.	Old Max kW Import Demand <sup>2</sup>	✓	✓	✓	✓	✓
99.	Old Max kW Export Demand <sup>2</sup>	✓	✓	✓	✓	✓
100.	Old Max Var Inductive Demand <sup>2</sup>	✓	✓	✓	✓	✓
101.	Old Max Var Capacitive Demand <sup>2</sup>	✓	✓	✓	✓	✓
102.	Old System Import Active Energy <sup>2</sup>	✓	✓	✓	✓	✓
103.	Old L1-L2-L3 Import Active Energy <sup>2</sup>	✓	✗	✓ <sup>4</sup>	✗	✗
104.	Old System Export Active Energy <sup>2</sup>	✓	✓	✓	✓	✓



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### Measured Parameter System wise:

✓ : Available

✗ : Not Available

✓<sup>4</sup>: L3 Not applicable

Sr No	Parameters	3Phase 4Wire	3Phase 3Wire	1Phase 3Wire	2Phase 2Wire	1Phase 2Wire
105.	Old L1-L2-L3 Export Active Energy <sup>2</sup>	✓	✗	✓ <sup>4</sup>	✗	✗
106.	Old System Inductive Reactive Energy <sup>2</sup>	✓	✓	✓	✓	✓
107.	Old L1-L2-L3 Inductive Reactive Energy <sup>2</sup>	✓	✗	✓ <sup>4</sup>	✗	✗
108.	Old System Capacitive Reactive Energy <sup>2</sup>	✓	✓	✓	✓	✓
109.	Old L1-L2-L3 Capacitive Reactive Energy <sup>2</sup>	✓	✗	✓ <sup>4</sup>	✗	✗
110.	Old System Apparent Energy <sup>2</sup>	✓	✓	✓	✓	✓
111.	Old L1-L2-L3 Apparent Energy <sup>2</sup>	✓	✗	✓ <sup>4</sup>	✗	✗
112.	Old Run Hour <sup>2</sup>	✓	✓	✓	✓	✓
113.	Old On Hour <sup>2</sup>	✓	✓	✓	✓	✓
114.	Old Number of Interruptions <sup>2</sup>	✓	✓	✓	✓	✓
115.	VLN Unbalance <sup>2</sup>	✓	✓	✓	✗	✗
116.	VLL Unbalance <sup>2</sup>	✓	✓	✓	✗	✗
117.	Current Unbalance <sup>2</sup>	✓	✓	✓	✗	✗

Note: 1. Energy on display is autoranging & unit for Energy parameters on modbus are dependent on CT PT ratio or unit selected by user.

2. Parameters are available only on modbus.

3. Min-max parameter are also available.

### Order Code:

Ordering Information	MA8L -	1	3	01	01	X	X	2	0000
Meter Interface	RS485					B			
	Ethernet					C			
	RS485 - 4DI - 2DO					D			
	RS485 - Ethernet - 4DI - 2DO					E			
	Ethernet - 4DI - 2DO					F			
	BACnet IP (Factory Settable)					G			
Auxiliary Supply	Lower Aux.						L		
	Higher Aux.						H		

### Order Code Example:

#### MA8L-130101EH20000

LM1380 3 Phase input with input voltage 100-600VLL, 1A/5A internal CT, with Ethernet, RS485, USB, 4 DI, 2 Relay Output and Auxiliary Voltage 100 to 550 V AC DC, with Accuracy Class 0.2s.



Measure



Control



Record



Analyze



Optimize



Specifications may change without prior notice



Measure



Control



Record



Analyze



Optimize

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