



# Data Sheet

## RISH LM1360+ RJ12

Multifunction Meter



Measure



Control



Record



Analyze



Optimize

**RISH LM1360+ RJ12** 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 two 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:

#### Plug and play current transformer

RJ12 connection is available for External CT connection which enables easy, fast and error free installation, 2 meter long cable is provided with CT.

#### True RMS Measurement

True RMS measurement with Sampling rate of 128 samples per cycle up to 31st 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.

#### Dual Tariff Facility

2 Tariff based on digital input available.

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.

#### Old Values

Old value storage after Reset.

#### Energy as per IEC 62053

Active Energy accuracy Class 1 as per IEC 62053.

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

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

#### Digital Inputs

2 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.

#### 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 14 years of monthly log is available for user.

#### THD and Individual Harmonics Measurement

The instrument measures per phase THD and individual harmonic up to 31st harmonics for voltage & current.

#### 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.

#### Compliance to International Standards

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

EMC Compliance to International standard IEC 61326.



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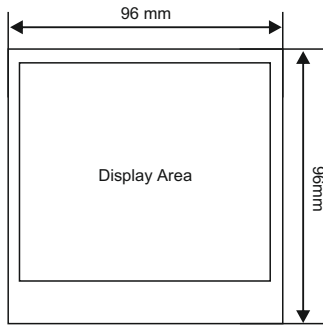


Analyze

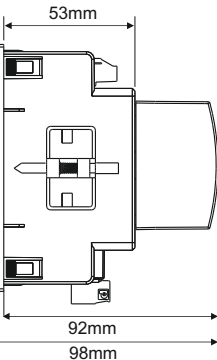
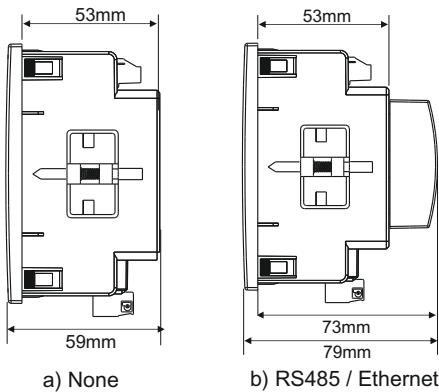


Optimize

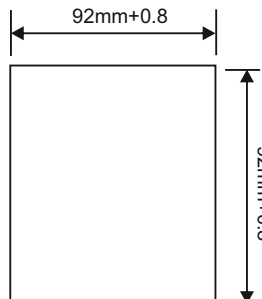
### Dimensions Details



Front View



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
System PT primary values	100VLL to 1200kVLL programmable on site
Max Continuous input Voltage	120% of nominal value
Overload Withstand	2 x rated 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)	100 mA
System CT primary values	1A to 9999A
Max continuous input current	120% of nominal value
Overload Indication	"-OL-" > 121% of Nominal Value
Overload Withstand	20 x rated value for 1 second repeated 5 times at 5 minute interval

#### Auxiliary Supply:

Higher Auxiliary supply range	100-550V 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 65 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 Bacnet card	< 10VA approx.

#### Operating Measuring Ranges:

Current (Energy Measurement)	1....120% of nominal value
Starting current	As per Standard IEC62053-21(Class 1)
Voltage	20... 120% of nominal value
Power Factor	0.5 Lag ... 1... 0.8 Lead
Frequency	40Hz to 66Hz

#### Reference Conditions for Accuracy:

Reference temperature	23°C +/- 2°C
Input Waveform	Sinusoidal (distortion factor 0.005)
Input frequency	50/60 Hz ± 2%
Auxiliary supply	230V AC/DC ± 10%
Auxiliary supply frequency	50/60 Hz ± 1%
Total Harmonic Distortion	50% upto 15th Harmonic 10% upto 31st Harmonic (Current Range 20%....100% of nominal value)
Voltage range	50%.....100% 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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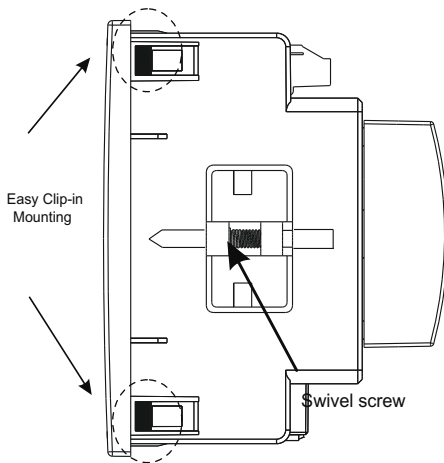


Analyze

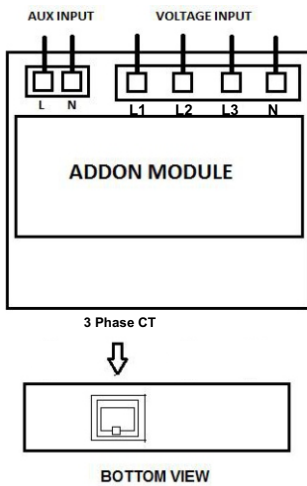


Optimize

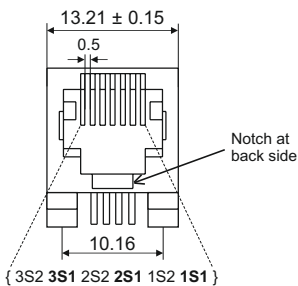
### Installation:



### Electrical Connection:



Connection diagram for External CT



Meter Side RJ 12 Connection

### Accuracy:

Active Energy	Class 1 as per IEC 62053 - 21
Apparent Energy	Class 1
Reactive Energy	Class 2 as per IEC 62053 - 23
Active Power	± 0.5 % of Nominal Value
Re-Active Power	±1.0% of nominal value
Apparent Power	±0.5% of nominal value
Power Factor/Phase Angle	±3°
Voltage	±0.5% of nominal value
Current	±0.5% of nominal value
Frequency	± 0.2% of mid frequency
THD (Voltage / Current)	± 3.0%

### Display update rate:

Response time to step input	1 sec approx.
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### Applicable Standards:

EMC	IEC 61326-1:2012, Table 2
Immunity	IEC 61000-4-3. 10V/m – Level 3 industrial Low level
Safety	IEC 61010-1-2010 , Permanently connected use
IP for water & dust	IEC60529
Pollution degree:	2
Installation category:	III
<b>Isolation:</b>	
Protective Class	2
High voltage test	
Input+Aux Vs Surface	4kV RMS, 50Hz, 1min
Input Vs Remaining Circuit	3.3kV RMS, 50Hz, 1min
<b>Environmental:</b>	
Operating temperature	-20 to +70°C
Storage temperature	-25 to +75°C
Relative humidity	0... 95%RH (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
Number of Sweep cycles	10 per axis
Enclosure	IP 20 (Terminal side) and IP54(Front side)

### Interfaces:

Impulse Led	For Energy testing
Relay(Optional)	250 VAC, 5 A AC
	30VDC, 5A DC
Modbus (Optional)	RS485, max. 1200m
	Baud rate : 4.8k, 9.6k, 19.2k, 38.4k, 57.6kbps.
Ethernet (Optional)	Ethernet access on Modbus TCP/IP Protocol.
BACnet (Optional)	BACnet IP with BACnet protocol version 12



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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
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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Optimize

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## RISH LM1360+ RJ12

### 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 31st Harmonics)	✓	✓	✓	✓	✓
79.	Individual Harmonics VL2 (Up to 31st Harmonics)	✓	✓	✓	✗	✗
80.	Individual Harmonics VL3 (Up to 31st Harmonics )	✓	✓	✗	✗	✗
81.	Individual Harmonics IL1(Up to 31st Harmonics )	✓	✓	✓	✓	✓
82.	Individual Harmonics IL2(Up to 31st Harmonic )	✓	✗	✓	✗	✗
83.	Individual Harmonics IL3(Up to 31st 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.



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### Order Code:

Ordering Information	MA6L -	4	3	01	01	X	X	1	0000
Model Name	LM1360+	4							
System	3PH 3W/4W		3						
Input Voltage	100-600VLL			01					
Input Current	RJ12 (100 mA)				01				
Communication	BACnet					B			
	RS485 + 2DI + 2DO					C			
	Ethernet + Datalogging					D			
	RS485 + 2DI + 2DO + Datalogging					U			
	RS485 + 2DO					R			
Power Supply	Lower Aux (12-60V AC/DC)						L		
	Higer Aux (100-550V AC/DC)						H		
Accuracy class	Accuracy class 1							1	

### Order Code Example:

#### MA6L-430101UH10000

LM1360+ 3Phase input with input voltage 100-600VLL with RJ 12(100mA) current input ,with MODBUS (RS485), 2DI, 2 Digital output, with datalogging and auxiliary voltage 100 to 550 V AC DC, with accuracy class 1.

### Rishabh Current Transformers with RJ12 Output



3 Phase RJ12 CT



3 Phase Nano CT with RJ12



Single Phase RJ12 CT



Measure



Control



Record



Analyze



Optimize



Specifications may change without prior notice



Measure



Control



Record



Analyze



Optimize

## RISHABH INSTRUMENTS LIMITED

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