Data Sheet

RISH ML14XX
Multiload Monitor (Class 1 / 0.5S)

RISHABH

RISH ML1410

LD SYS
230.1 V
4.002 A
920.8 W
50.01 Hz
IMP
0000 19672 kWh
SYS

Impulse

RoHS CE

Measure   Control   Record   Analyze   Optimize

RISH MLXX is Multiload Monitor with 4 Three Phase or 12 Three phase Three wire symmetric load or 12 Single Phase load option. It measures important electrical parameters of multiple loads simultaneously in a single unit, eliminating the need and cost of multiple panel meters. It provides quick, easy and error free current connections with plug and play connectors. It measures real time electrical parameters like Active/ Reactive / Apparent energy and power, current, THD, demand, max demand for each load. The instrument has 4 configurable relay outputs, which can be used for Limit/ Pulse/ Residual Current/ 3Phase Load Health Monitoring/ Tariff/ RTC/ Timer tripping or alarms. This instrument communicates with either MODBUS or Ethernet connection.

Applications

- Large Power Distribution System
- Residual Current Monitoring
- Residual Current Monitoring
- Sub Tenant Energy Consumption
- 3 Phase Load Health Monitoring
- Data Center Metering
- Individual Load Management

Product Features

Multiple Circuit Monitoring

- Measures & monitors Instantaneous Current, Voltage, Power & Energy for multiple loads simultaneously
- Meter allows 4 Three Phase or 12 3-phase 3-wire symmetric load or 12 Single Phase or Hybrid Load connections with the help of 12 Current and 1 channel 3 phase voltage measurement

Plug and Play Current transformer

RJ 12 connector is available for External CT connection, which enables easy, fast and error free installation. 2 meter long cable is provided with the CT

Direct remote access

- Remote configuration of the Instrument via MODBUS or Ethernet
- Remote access of measured parameters

Relay Output (optional)

Potential free, very fast acting relay contact configurable as:

- **Pulse** output which can be used to drive an external counter for energy measurement
- **Limit** (alarm) switch
- **Timer** mode for switching ON & OFF for configurable number of times
- Switch for **unhealthy Three Phase load**
- Energy **Tariff** based tripping
- **RTC** based tripping and un-tripping for configurable days of the week
- **Residual Current (RCM)** based tripping
- **Remote Relay Control** using MODBUS or ethernet

THD and Individual Harmonics Measurement

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

RTC (Real Time Clock)

Inbuilt real time clock for display of date and time

Easy & Cost Effective Installations

Multiple circuit Connections on Single board provide easy & economical installation process

Big LCD display with Backlit

- LCD shows 4 measurement parameters along with 9 digit energy parameter at a glance. It also shows load graphics for individual phases of the load
- The four keys provided at the front help in easy navigation between the loads and the corresponding measurement parameter screens

Residual Current Monitoring

The residual current flowing through a path can be acquired by using the CT with specified specifications and connecting it to an RJ12 input of the instrument

Prepaid Tariff based tripping

- This feature provides the luxury of tripping the load whose energy has crossed the required threshold of the configured tariff amount
- The user just needs to set the energy, top-up amount and the rate per unit (kilo) of energy

Health Monitoring of Three Phase Load

- This feature is applicable only for Three Phase loads
- A Three Phase load (such as a Three Phase motor) can be monitored for phase failure, phase reversal, voltage & current unbalance, under frequency, under voltage, over voltage and over current
- Further, set a relay on this mode and trip the configured load fo protection against such faults

Onsite programmable

- Onsite Programmable System Configuration 3PH4W/ 3PH3W/ 1PH2W/ 3P3W Symmetric / RCM / No Load for each channel
- Onsite Programmable CT Primary, PT Primary and PT Secondary

Energy as per IEC 62053

- Independent counter for Import Active energy (kWh), Export Active energy (kWh), Capacitive Reactive energy (kVArh), Inductive Reactive energy (kVArh) or Apparent energy (kVAh) measurement
- Active Energy accuracy Class 1 as per IEC 62053 - 21 or Class 0.5S as per IEC 62053-22 (on order)

Measure   Control   Record   Analyze   Optimize

Product Features

Data logging
Meter has inbuilt 8MB Flash for datalogging

Event Logging: Previous 5 events of fixed parameters can be logged with Date and time

Time based logging: User selectable parameters (1 to120) can be logged at regular intervals (1 to 60 min) with Date and Time stamp in internal memory and 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 5.5 years are available for user

• If 120 Parameters are selected with logging interval of 60 minutes, log of maximum 197 days are available for user

• **Load Profile logging**: Logging of energy consumed and peak Demand (Power and Current) in a day and in a month for efficient tracking of load behaviours. Maximum 1 year daily and 14 years of monthly log is available for user
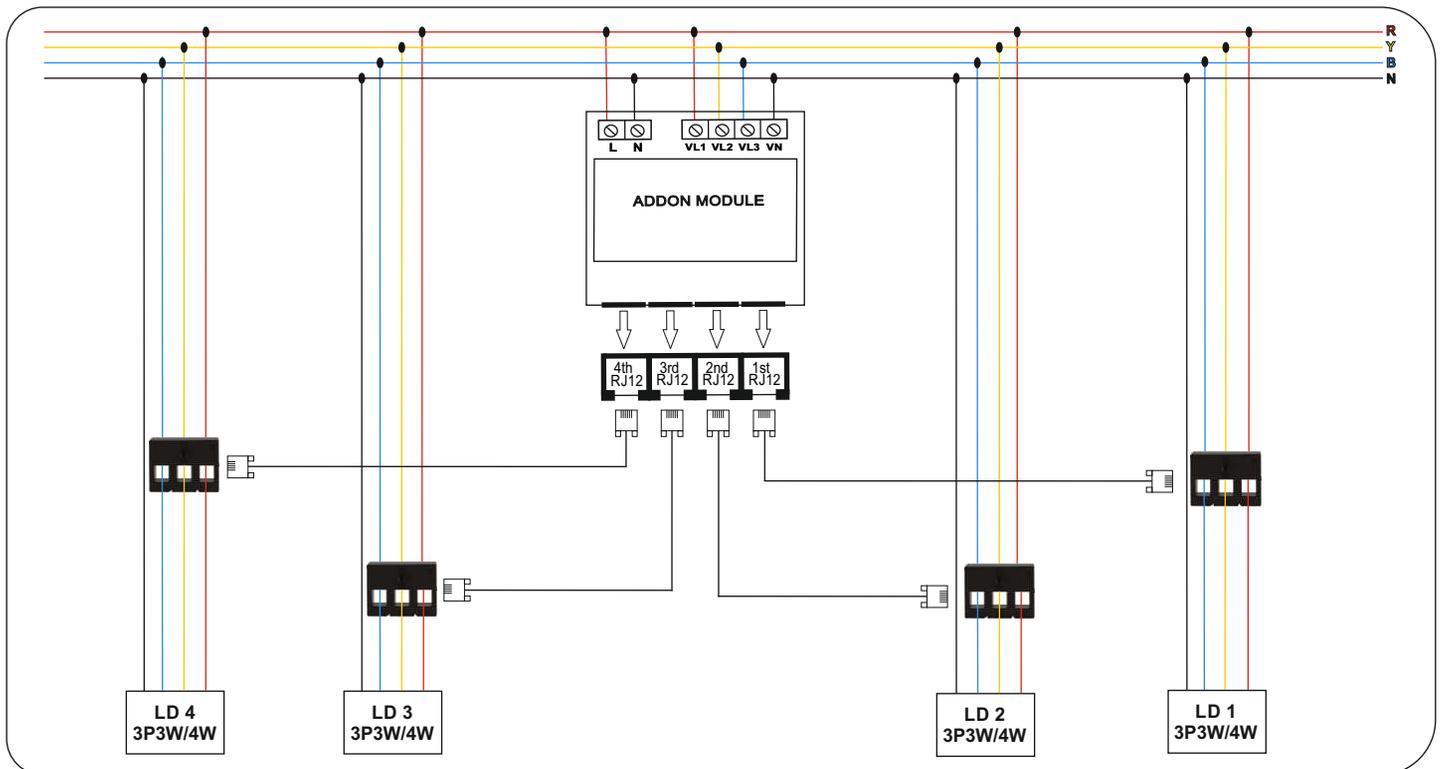
Compliance to International Safety standards
Compliance to International Safety standard IEC 61010-1- 2010

EMC Compatibility
Compliance to International standard IEC 61326

All 3Phase Load Connections with 3Phase RJ12 CT

3 Phase CT

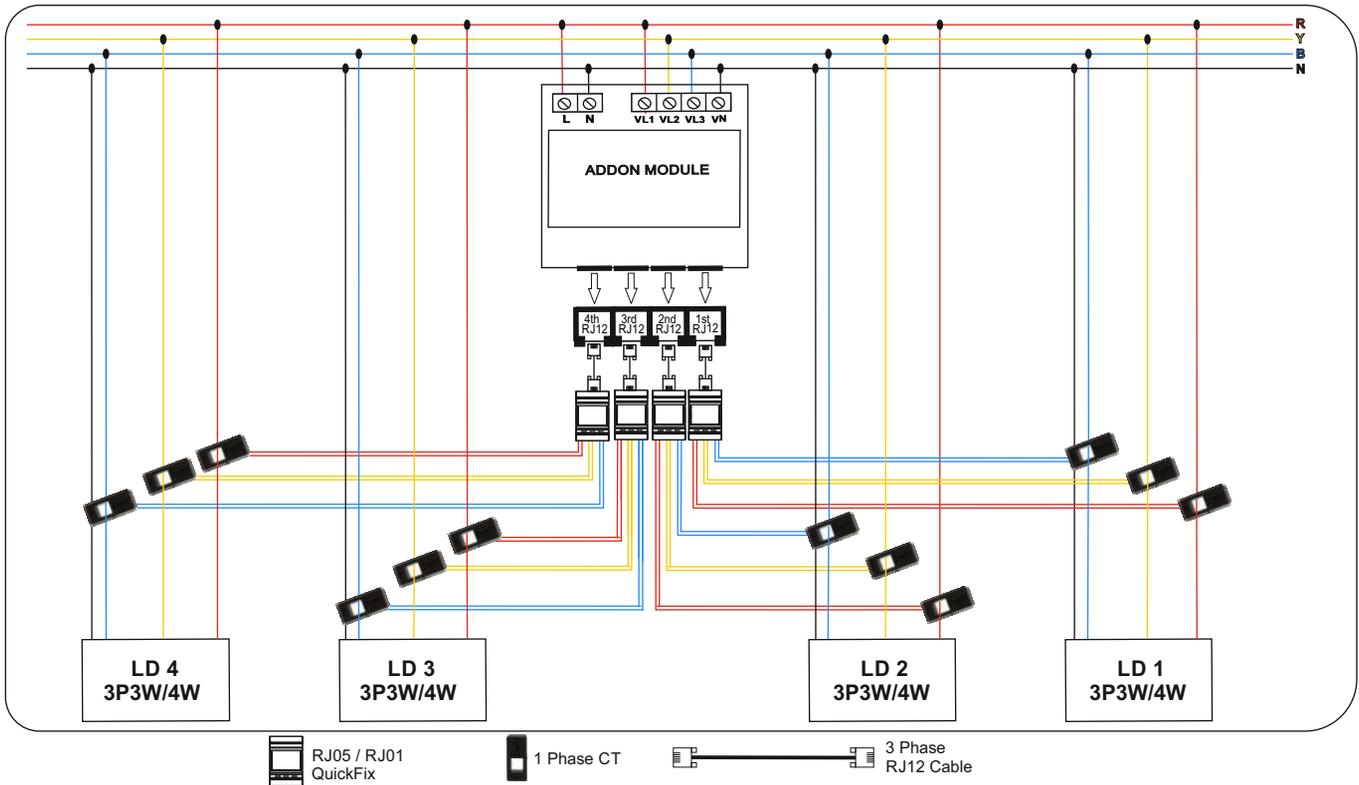3 Phase RJ12 Cable

Measure   Control   Record   Analyze   Optimize

All 3Phase Load Connections With 1Phase 5A/1A CT

RJ05 / RJ01 QuickFix	1 Phase CT		3 Phase RJ12 Cable

*Note : User can use 3 phase 5A/1A CT instead of 3x 1 phase 5A/1A CT.

All 1Phase Load Connections With 1Phase 5A/1A CT

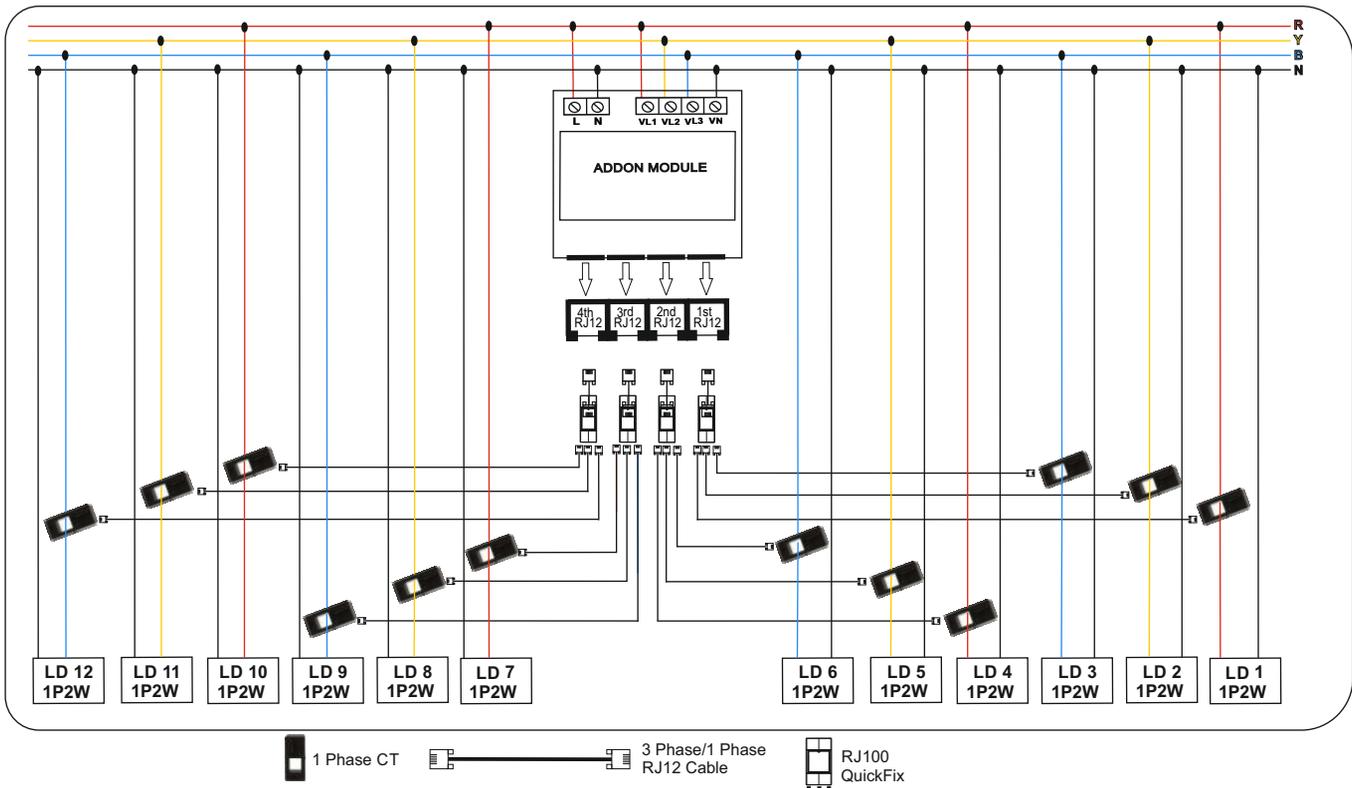|			
RJ05 / RJ01 QuickFix	1 Phase CT		3 Phase RJ12 Cable
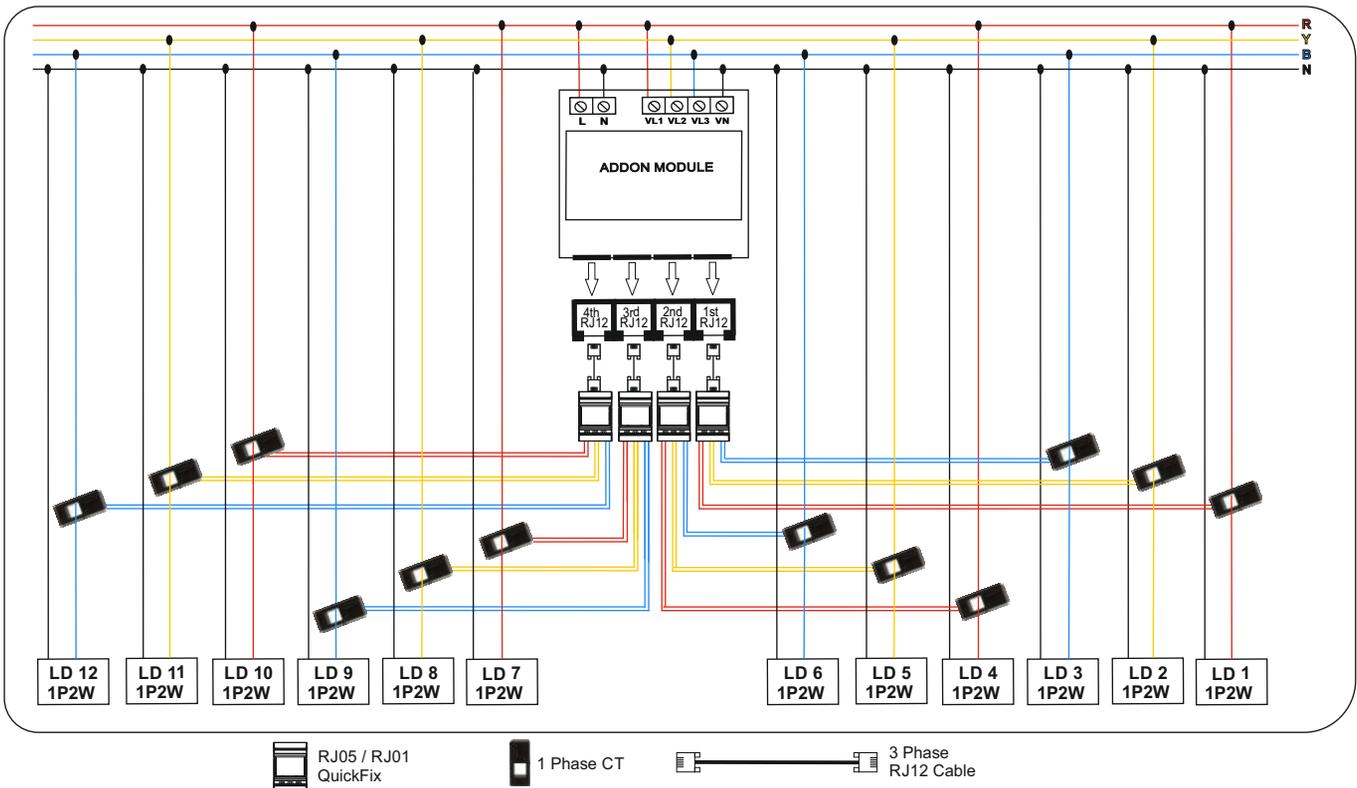
Measure   Control   Record   Analyze   Optimize

All 1Phase 2 Wire Load Connections With 1Phase RJ12 CT

1 Phase CT	3 Phase/1 Phase RJ12 Cable	RJ100 QuickFix

All 3Phase Load Plus RCM Connections

3 Phase CT	RC30 QuickFix	CBCT 30mA to 30A	3 Ph RJ12 Cable
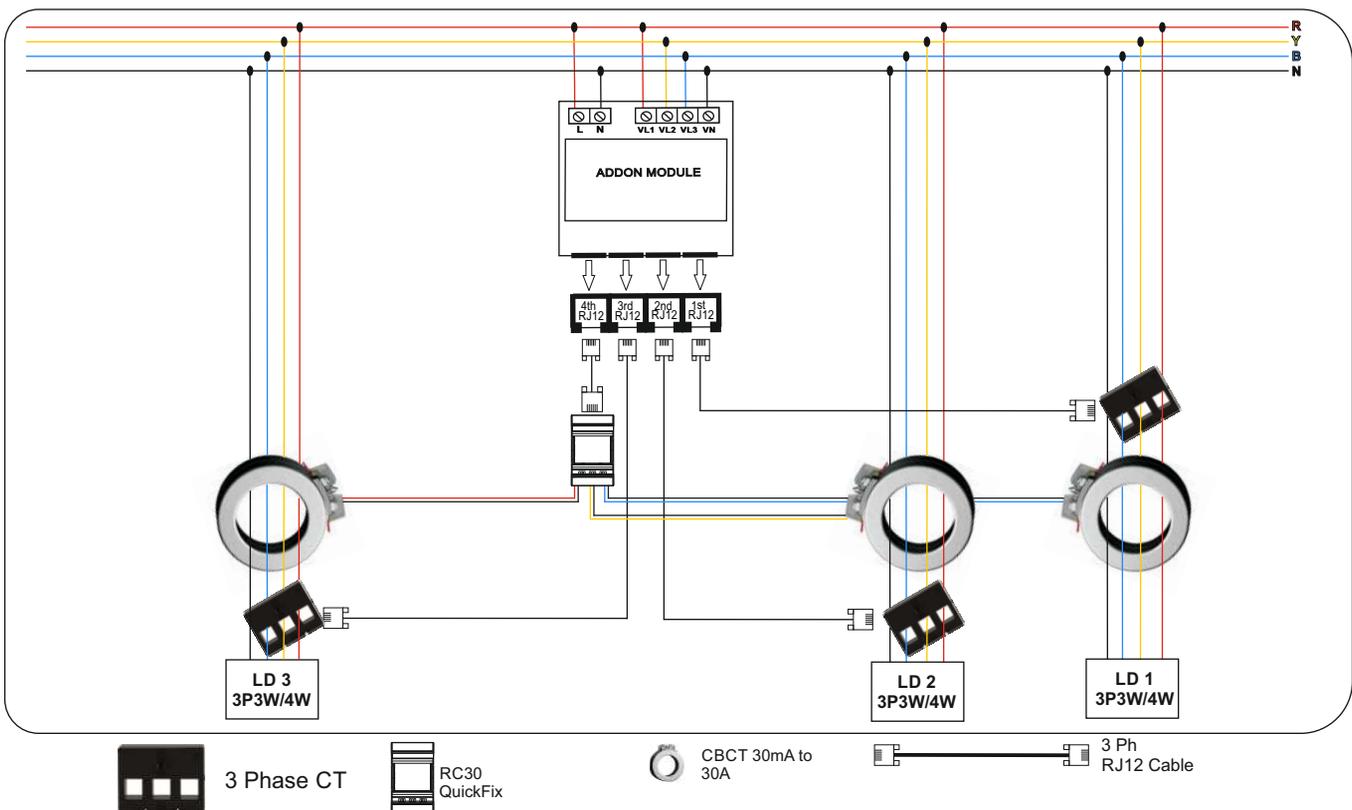
*Note : User can use 3 phase 5A/1A CT with "QuickFix 5A/1A to RJ12 Converter" for above application. Many combinations are possible in above application.

Measure   Control   Record   Analyze   Optimize

All 1Phase 5A/1A CT Plus RCM Connections

RC30 RC30 QuickFix		RJ05 RJ05 / RJ01 QuickFix		CBCT 30mA to 30A		3 Phase RJ12 Cable
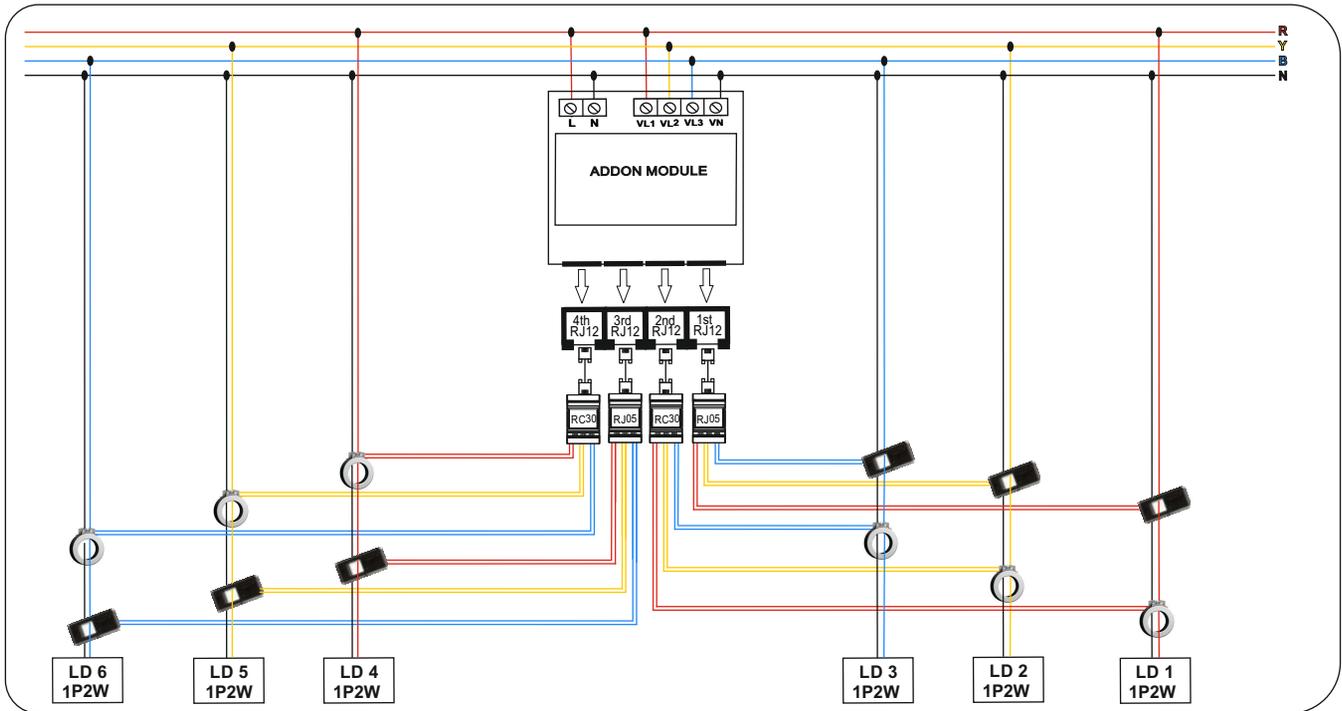
*Note : User can use 1 phase RJ12 CT with "QuickFix 3x 1Phase RJ12 Converter" for above application. Many combinations are possible in above application.

Hybrid Load Connections

3 Phase CT	1 Phase CT	3 Phase RJ12 Cable	RJ05 / RJ01 QuickFix
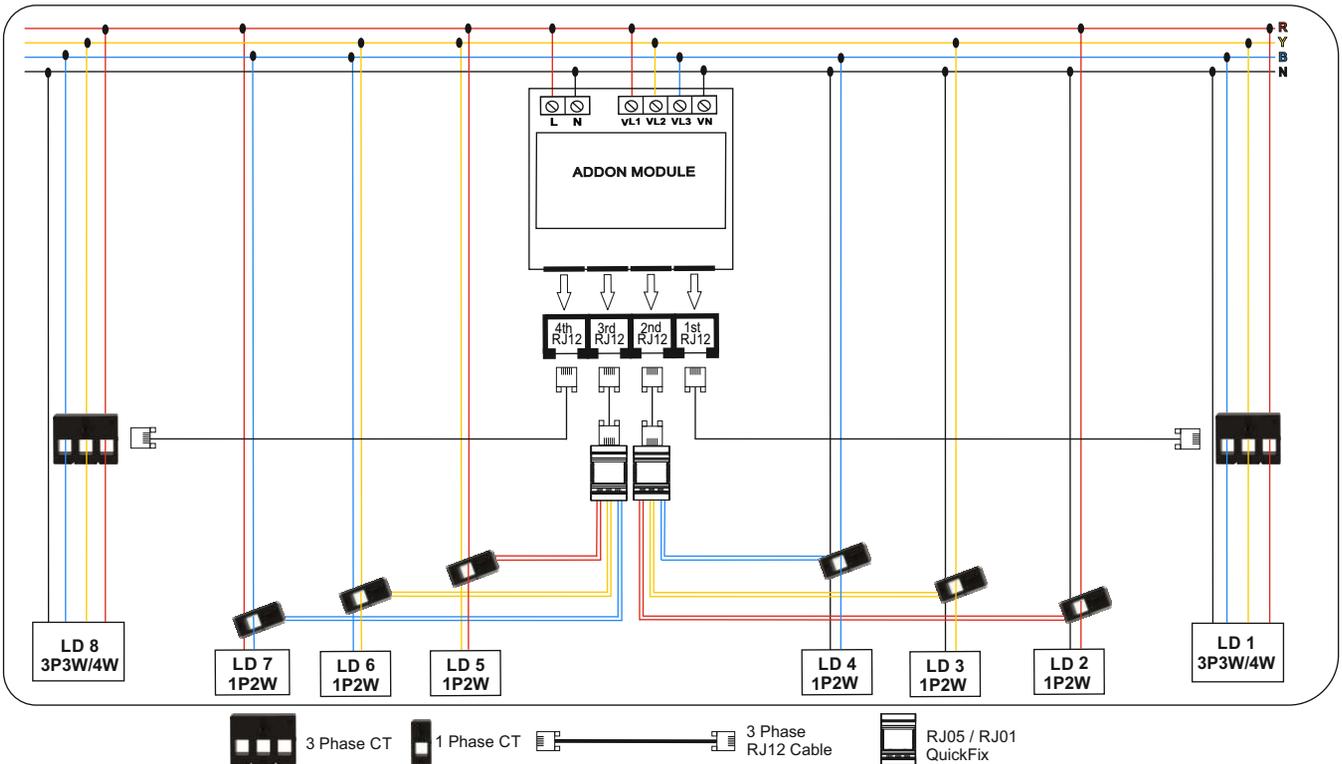
*Note : Many combinations of 1 Phase 3 Phase load along with RCM are possible in above hybrid load connection.

Measure **Control** **Record** **Analyze** **Optimize**

All 3Phase 3 Wire Symetric Load Connections With 1Phase RJ12 CT
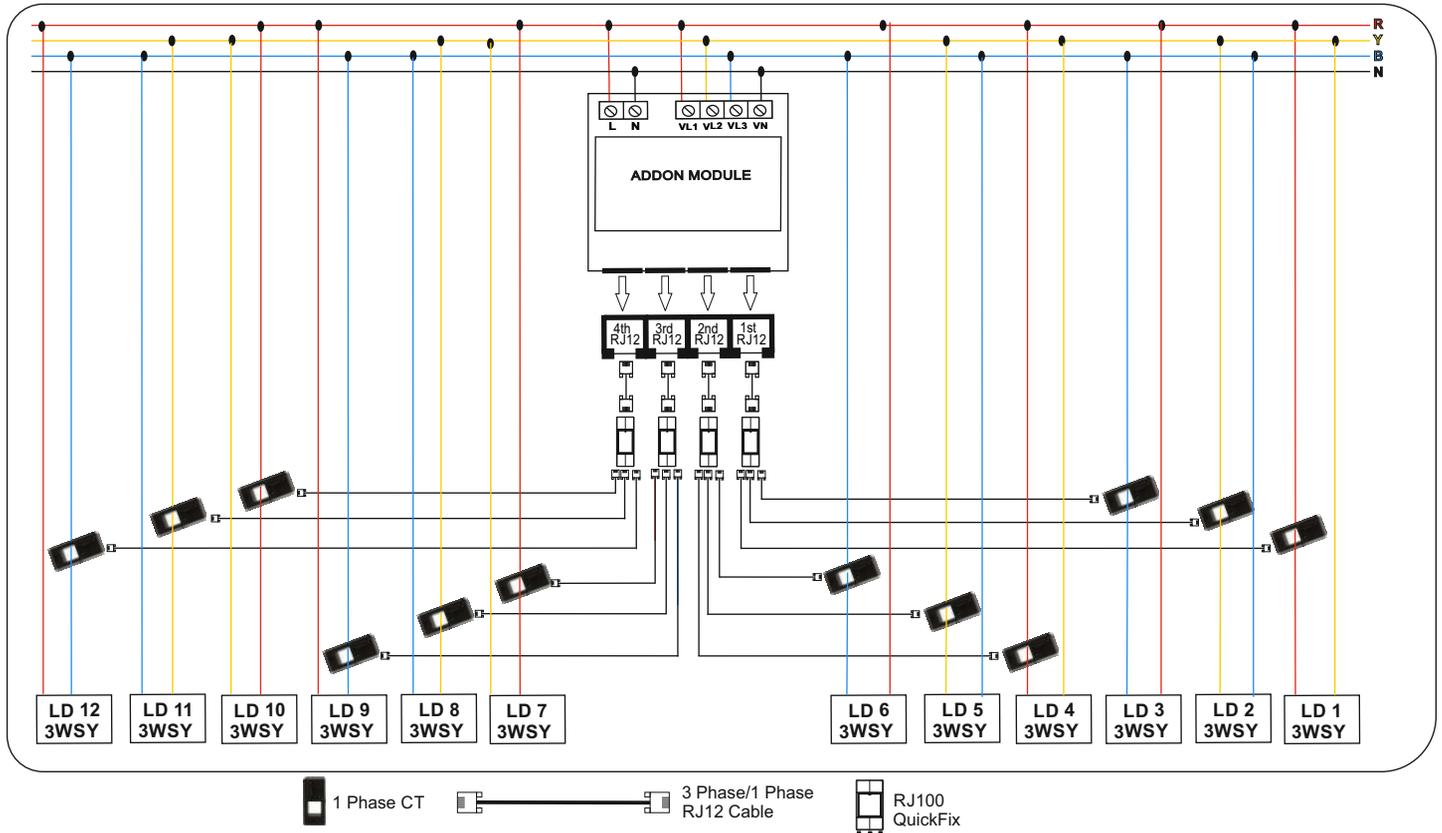
Symbol	Description
1 Phase CT	
3 Phase/1 Phase RJ12 Cable	
RJ100 QuickFix	

Measure   **Control**   **Record**   **Analyze**   **Optimize**

Data Sheet

Data Sheet

RISH ML14XX

Dimensions Details

```
96mm
```

Front Display
Area

96mm

```
106mm
```

Front View

```
56mm
51mm
```

75mm

Side View

```
92mm+0.8
```

92mm+0.8
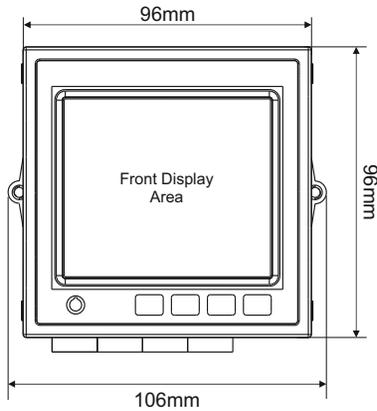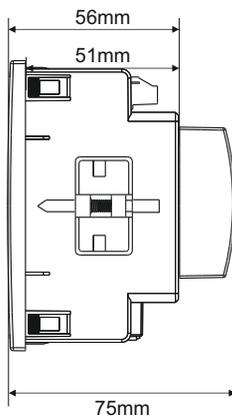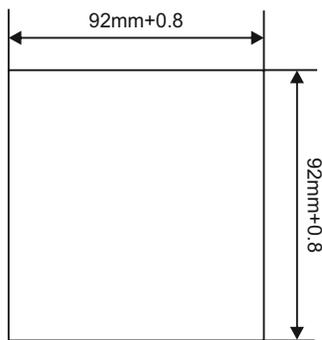
Panel Cutout

Technical Specifications

Input Voltage

Nominal input voltage (AC RMS)	$100V_{LL}$ to $600V_{LL}$ ($57.5\ V_{LN}$ to $346.42\ V_{LN}$) programmable on site.
System PT primary values	$100V_{LL}$ to $1200kV_{LL}$ 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	100 mA
System CT primary values	From 1A to 9999A
Max continuous input current	120% of nominal value
Overload Withstand	5 x rated value for 1 second, repeated 5 times at 5 minute intervals
Overload Indication	"-OL-" >121% of Nominal value
Nominal input current burden	< 0.05VA approx. per phase

Auxiliary Supply

Auxiliary supply range	100-550V AC/DC
Aux Supply frequency	45 to 65 Hz range
Auxiliary Supply burden(at 230V AC DC)	
With Addon card	< 8 VA approx (2 Relay) < 10 VA approx (4 Relay)
With Ethernet card	< 9 VA approx.

Operating Measuring Ranges

Current (Energy Measurement)	1...120% of nominal value
Starting current	As per Standard IEC62053-21 (Class 1) As per Standard IEC62053-22 (Class 0.5S) (optional)
Voltage	20...120% of nominal value
Power Factor	0.5 Lag ... 1... 0.8 Lead
Frequency	45Hz to 66Hz

Reference Conditions for Accuracy

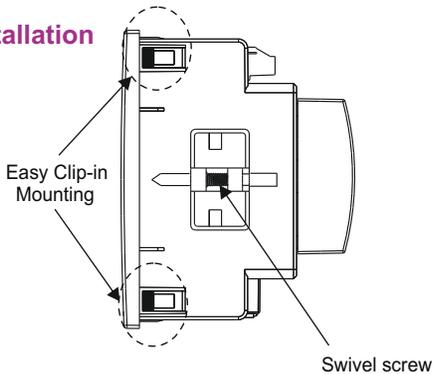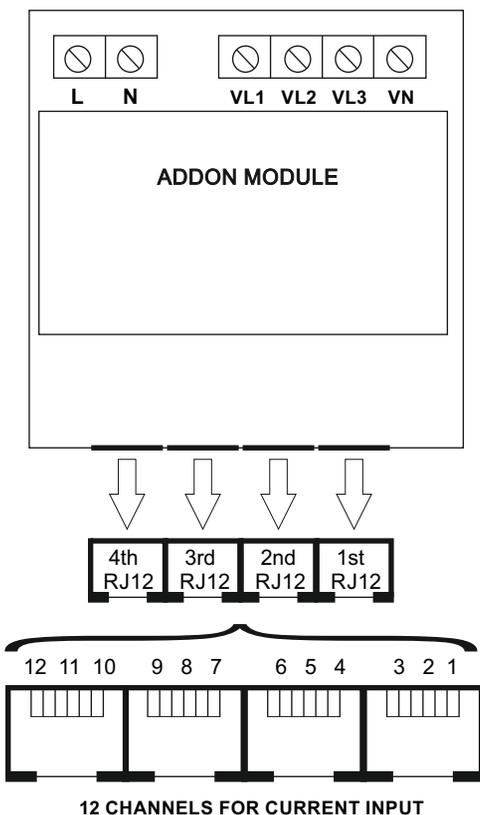|	
Reference temperature	23°C +/- 2°C
Input Waveform	Sinusoidal (distortion factor 0.005)
Input frequency	50/60 Hz ± 2%
Auxiliary supply	230V AC/DC ± 1%
Auxiliary supply frequency	50/60 Hz ± 1%
Total Harmonic distortion	50% up to 15th Harmonics, 10% up to 31st Harmonics
Voltage range	50%...100% of nominal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

Measure **Control** **Record** **Analyze** **Optimize**

Electrical Connections:

Installation

Easy Clip-in Mounting

Swivel screw

Electrical Connection (Backview)

L N   VL1 VL2 VL3 VN

ADDON MODULE

| 4th RJ12 | 3rd RJ12 | 2nd RJ12 | 1st RJ12 |

12 11 10   9 8 7   6 5 4   3 2 1

12 CHANNELS FOR CURRENT INPUT

Note : Use a single RJ12 input for "**1** Three Phase load" or "**3** Single Phase loads" or 3P3W-Symmetric load.

13.21 ± 0.15

0.5

Notch at back side

10.16

{ 3S2 **3S1** 2S2 **2S1** 1S2 **1S1** }

Meter Side RJ 12 Connection
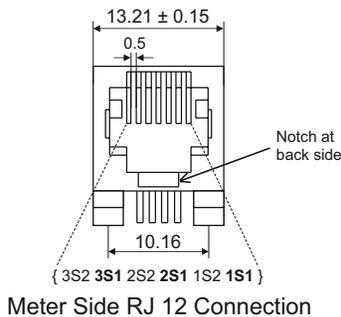
Technical Specifications:

Accuracy

Active Energy	Class 1 as per IEC 62053 - 21
	Class 0.5S as per IEC 62053 - 22 (optional)
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
Current (RCM)	±5.0% of reading
Frequency	± 0.2% of mid frequency
THD (Voltage/Current)	± 3.0%

Display update rate

Response time to step input	1 sec approx.

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	IEC 60529
Pollution degree	2
Installation category	III

Isolation

Protective Class	2
High voltage test:	
1. Input + Aux vs Surface	4kV RMS, 50Hz, 1min
2. Input vs Remaining Circuit	3.3kV RMS, 50Hz, 1min

Environmental

Operating temperature	-20 to +70°C
Storage temperature	-25 to +75°C
Relative humidity	0...95% RH (non condensing)
Warm up time	Minimum 3 minutee
Shock (As per IEC60068-2-27)	Half sine wave, Peak acceleration 30gn (300 m/s^2), duration 18ms.
Vibration	10...150...10 Hz, 0.15mm amplitude
Number of Sweep cycles	10 per axis
Enclosure	IP 20 (Terminal side) and IP 54 (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.

Weight   320 grams Approx.

Measure   Control   Record   Analyze   Optimize

Measured Load Parameters System wise (Availability on Display & MODBUS)   ✓ : Available   × : Not Available

Sr. No.	Load Parameters	3P 4W	3P 3W	1P 2W / 3P 3WSy
1	System Import Active Energy[1]	✓	✓	×
2	System Export Active Energy[1]	✓	✓	×
3	System Capacitive Reactive Energy[1]	✓	✓	×
4	System Inductive Reactive Energy[1]	✓	✓	×
5	System Apparent Energy[1]	✓	✓	×
6	Channel Import Active Energy[1]	✓	×	✓
7	Channel Export Active Energy[1]	✓	×	✓
8	Channel Capacitive Reactive Energy[1]	✓	×	✓
9	Channel Inductive Reactive Energy[1]	✓	×	✓
10	Channel Apparent Energy[1]	✓	×	✓
11	System Active Power (kW)	✓	✓	×
12	System Reactive Power (kVAr)	✓	✓	×
13	System Apparent Power (kVA)	✓	✓	×
14	Channel Active Power (kW)	✓	×	✓
15	Channel Reactive Power (kVAr)	✓	×	✓
16	Channel Apparent Power (kVA)	✓	×	✓
17	System Power Factor	✓	✓	×
18	Channel Power Factor	✓	×	✓
19	System Phase Angle	✓	✓	×
20	Channel Phase Angle	✓	×	✓
21	System Import kW Demand	✓	✓	×
22	System Export kW Demand	✓	✓	×
23	System Capacitive kVAr Demand	✓	✓	×
24	System Inductive kVAr Demand	✓	✓	×
25	System kVA Demand	✓	✓	×
26	System Current Demand	✓	✓	×
27	Channel Import kW Demand	✓	×	✓
28	Channel Export kW Demand	✓	×	✓
29	Channel Capacitive kVAr Demand	✓	×	✓
30	Channel Inductive kVAr Demand	✓	×	✓
31	Channel kVA Demand	✓	×	✓
32	Channel Current Demand	✓	×	✓
33	System Max Import kW Demand	✓	✓	×
34	System Max Export kW Demand	✓	✓	×
35	System Max Capacitive kVAr Demand	✓	✓	×
36	System Max Inductive kVAr Demand	✓	✓	×
37	System Max kVA Demand	✓	✓	×
38	System Max Current Demand	✓	✓	×
39	Channel Max Import kW Demand	✓	×	✓
40	Channel Max Export kW Demand	✓	×	✓
41	Channel Max Capacitive kVAr Demand	✓	×	✓
42	Channel Max Inductive kVAr Demand	✓	×	✓
43	Channel Max kVA Demand	✓	×	✓
44	Channel Max Current Demand	✓	×	✓
45	System Run Hour	✓	✓	×
46	Channel Run Hour	✓	×	✓
47	On Hour	✓	✓	✓

Measure   **Control**   **Record**   **Analyze**   **Optimize**

Measured Load Parameters System wise (Availability on Display & MODBUS)   ✓ : Available   × : Not Available

Sr. No.	Load Parameters	3P 4W	3P 3W	1P 2W / 3P 3WSy
48	Number of Interruptions	✓	✓	✓
49	System Current	✓	✓	×
50	Channel Currents	✓	✓	✓
51	System Current THD	✓	✓	×
52	Channel Current THD	✓	✓	✓
53	Current Channel Individual Harmonics (Up to 31st)	✓	✓	✓
54	System Neutral Current	✓	×	×
55	Frequency	✓	✓	✓
56	RPM	✓	✓	✓
57	Phase Sequence Indication	✓	✓	×
58	Phase Sequence Indication	✓	×	✓
59	Phase (Current & Voltage) Absent Indication	✓	×	×

Note: 1. Energy on display is auto ranging & unit for Energy parameters on modbus are dependent on CT PT ratio or unit selected by user.
Note: 2. Parameters Applicable for 1Phase 2 Wire are applicable for 1Phase 2Wire Line to Line mode as well.

Measured Voltage Parameters (Availability on Display System wise)   ✓ : Available   × : Not Available

Sr. No.	Load Parameters	3P 4W	3P 3W	1P 2W	3P 3WSy
60	System Voltage L-N[2]	✓	×	×	×
61	System Voltage L-N[2]	×	✓	×	×
62	Voltage L1[2]	✓	×	if Related	×
63	Voltage L1[2]	✓	×	if Related	×
64	Voltage L3[2]	✓	×	if Related	×
65	Voltage L12[2]	✓	✓	×	✓
66	Voltage L23[2]	✓	✓	×	✓
67	Voltage L31[2]	✓	✓	×	✓
68	System Voltage L-N THD[2]	✓	✓	×	×
69	System Voltage L-L THD[2]	✓	✓	×	×
70	System Voltage L-L THD[2]	✓	×	if Related	×
71	Voltage L2 THD[2]	✓	×	if Related	×
72	Voltage L3 THD[2]	✓	×	if Related	×
73	Voltage L12 THD	×	✓	×	✓
74	Voltage L23 THD	×	✓	×	✓
75	Voltage L31 THD[2]	×	✓	×	✓
76	Individual Harmonics of VL 1(Up to 31st Harmonics)[2]	✓	×	if Related	×
77	Individual Harmonics of VL 2 (Up to 31st Harmonics)[2]	✓	×	if Related	×
78	Individual Harmonics of VL 3 (Up to 31st Harmonics)[2]	✓	×	if Related	×
79	Individual Harmonics of VL 12(Up to 31st Harmonics)[2]	×	✓	×	✓
80	Individual Harmonics of VL 23 (Up to 31st Harmonics)[2]	×	✓	×	✓
81	Individual Harmonics of VL 31 (Up to 31st Harmonics)[2]	×	✓	×	✓

Note: 2. All the listed Voltage Parameters are available on modbus but only those which are relevant to the load are shown on display screen.
For 1P2W load, only that phase voltage from which the load current is acquired, i.e., the Related voltage, is shown on display.

Measure   Control   Record   Analyze   Optimize

Total / Overall Parameters (Availability on Display & MODBUS)

✓ : Available   ✕ : Not Available

Sr. No.	Load Parameters	Availability
82	Total System Voltage LN avg	✓
83	Total System Voltage LL avg	✓
84	Total System Current sum	✓
85	Total System Active Power sum	✓
86	Total System Reactive Power sum	✓
87	Total System Apparent Power sum	✓
88	Total System PF avg	✓
89	Total System PA avg	✓
90	Total System Wh Import sum	✓
91	Total System Wh Export sum	✓
92	Total System VArh Capacitive sum	✓
93	Total System VArh Inductive sum	✓
94	Total System VAh sum	✓
95	Total System Wh Import overflow count	✓
96	Total System Wh Export overflow count	✓
97	Total System VArh Capacitive overflow count	✓
98	Total System VArh Inductive overflow count	✓
99	Total System VAh overflow count	✓
100	Total System kW Import Demand sum	✓
101	Total System kW Export Demand sum	✓
102	Total System kVAr Capacitive Demand sum	✓
103	Total System kVAr Inductive Demand sum	✓
104	Total System kVA Demand sum	✓
105	Total System A Demand sum	✓
106	Total System kW Import Max Demand	✓
107	Total System kW Export Max Demand	✓
108	Total System kVAr Capacitive Max Demand	✓
109	Total System kVAr Inductive Max Demand	✓
110	Total System kVA Max Demand	✓
111	Total System Current Max Demand	✓

Measure   Control   Record   Analyze   Optimize

Ordering Information :

Ordering Information	MLM1-	X	3	01	01	X	H	X	0000
Product Type	RISH ML 1400 - Class 1.0	0							
	RISH ML 1410 - Class 0.5S	1							
System Type	3 Phase (On site configurable as 1 / 3 Phase)								
Input voltage	100-500VLL 50/60Hz								
Input Current	CT-RJ12-100mA								
Output Option	RS485 + 2 Relay					A			
	RS485 + 2 Relay + USB					B			
	RS485 + 2 Relay + USB + DL					C			
	RS485 + 4 Relay					D			
	RS485 + 4 Relay + DL					E			
	Ethernet					F			
	Ethernet + DL					G			
Auxiliary Supply	100 - 550V AC/DC								
Accuracy	Class 1.0 (RISH ML 1400 - Class 1.0)							1	
	Class 0.5S (RISH ML 1410 - Class 0.5S)							5	

Order Code Example : MLM1-130101EH50000

Rish ML1410 : Input RJ12 100mA, 100-500VLL 50/60Hz, Aux 100-550V AC/DC, with RS485 + 4 Relay output + Datalogging, Accuracy Class 0.5S

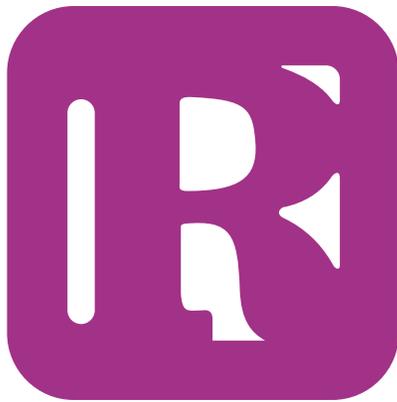**Measure**   **Control**   **Record**   **Analyze**   **Optimize**

Measure   **Control**   **Record**   **Analyze**   **Optimize**