



RISHABH

## Multifunction Meter

***RISH Master 3440* (Class 0.2S - IEC 62053-22)**



Measure



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### Application :

**RISH Master 3440** is a class 0.2S as per IEC 62053-22. It measures more than 46 important electrical parameters of 3phase / 1phase system along with THD & individual harmonics upto 31st. It can communicate through ethernet / RS485 with external device, and it also has Pulse output and 4-20mA analog output.

### Product Features:

**High brightness 3 line 4 digits LED display-**  
Simultaneous display of 3 Parameters

**Active Energy - Class0.2S as per IEC 62053-22**

#### Energy measurement -

Active energy Import (kWh), Active energy export (kWh) Reactive energy Inductive(kVAh), Reactive energy capacitive(kVAh) & Apparent energy (kVAh). Any of the parameters can be freely assigned to 2 optional pulse outputs.

#### Auto Energy Ranging Count on Display-

The Energy count rollover from WATT to KWATT then to MWATT as energy increases over the period.

#### Programmable Energy format & Energy rollover count-

Customer can assign the format for energy display on MODBUS (RS485) in terms of W, kW or MW. Additional to this, customer can also set a rollover count from 7 to 9 digits, after which the energy will roll back to zero. The above settings are applicable for all types of energy.

#### Total Harmonic Distortion (THD)-

The instrument can measure per phase THD of voltage & current, and it can also measure individual 31st harmonic of voltage and current (Display on Modbus only).

#### Wide Auxiliary Supply-

It can accept Input from 100 VAC/DC to 550 VAC/DC

#### Wide Input Voltage Measurement

It can Measurement wide range of input voltage 100VLL to 600VLL.

#### User selectable CT Secondary 5A/1A-

The secondary of external Current Transformer (CT) can be programmed on site to either 5A or 1A locally via front panel keys by entering into Programming mode or remotely via MODBUS (RS485)

#### On site programmable PT/CT ratios-

It is possible to program primary of external potential Transformer (PT), primary of external Current Transformer (CT) on site locally via front panel keys by entering into Programming mode or remotely via MODBUS (RS485).

#### User selectable PT Secondary-

The secondary of external potential Transformer (PT) can be programmed locally via front panel keys by entering into Programming mode or remotely via MODBUS (RS485).

#### User selectable 3 phase 3W or 4W-

User can program on site the network connection as either 3 Phase 3 Wire or 4 Wire locally via front panel keys by entering into Programming mode or remotely via MODBUS (RS485). 1 Phase 2 Wire is available as per order.

#### Onsite selection of Auto scroll / Fixed Screen-

User can set the display in auto scrolling mode or fixed screen mode locally via front panel keys by entering into Programming mode or remotely via MODBUS (RS485).

#### Parameter Screen recall-

In case of power failure, the instrument memorizes the last displayed screen.



#### Phase reversal indication-

The instrument can detect wrong phase sequence or failure of one of the input voltages and displays "phase" error message.

#### User selectable Low Current suppression (below 30 mA)-

User can suppress the readings below 30 mA in the current measurement by onsite programming if required.

#### Min Max storage of parameters possible-

The instrument stores minimum and maximum values for System Voltage and System Current.

#### Run Hour, ON Hour, Number of Interruptions-

Run Hour records the number of hours load is connected. ON Hour is the period for which the auxiliary supply is ON. Number of Interruptions indicates the number of times the Auxiliary Supply was interrupted.

#### Optional MODBUS (RS485) Output-

The optional ModBus output enables the instrument to transmit all the measured parameters over standard MODBUS (RS485).

#### User Assignable Registers for MODBUS-

Customer can assign MODBUS register address as per his need for faster response time.

#### Optional 2 Relay Output ( Pulse output / Limit switch)-

The instrument can be programmed as Pulse output or Limit Switch.

**Pulse Output:** The optional pulse output is a potential free, very fast acting relay contact which can be used to drive an external mechanical counter for energy measurement.

**Limit switch:** The instrument will trip the one or two relays if the programmed parameter exceeds the programmed High & Low Limits.

#### Configuration of the Instrument via MODBUS-

The instrument settings can be configured locally via front panel keys by entering into Programming mode or remotely via MODBUS (RS485).

#### Optional Analog Outputs ( 2 Outputs)-

2 Analog outputs can be programmed from a list of input parameters.

#### Ethernet Interface (Modbus TCP/IP Protocol)-

The optional Ethernet Interface output transmit all the measured parameters on Modbus TCP/IP. Also user can configure their instrument via Ethernet Interface.

#### Enclosure Protection for dust and water-

conforms to IP 54 (front face) as per IEC60529.

#### Compliance to International Safety standards-

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

#### EMC Compatibility-

Compliance to International standard IEC 61326.



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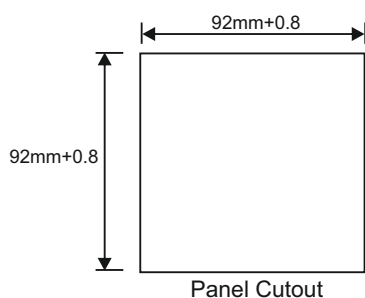
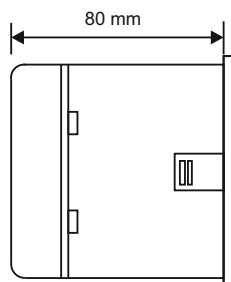
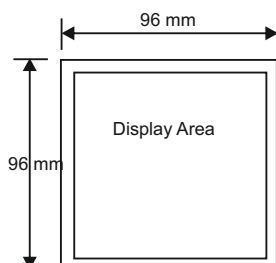


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### Dimensions Details:



### Technical Specifications:

<b>Input Voltage:</b>	
Nominal input voltage (AC RMS) programmable on site.	100VLL to 600 VLL 57.5VLN to 346.42 VLN
System PT primary values	100VLL to 692.8kVLL 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
Nominal input voltage burden	< 0.3VA approx. per phase (at nominal 240V)
<b>Input Current:</b>	
Nominal input current	1A / 5A onsite programmable
System CT primary values	From 1A to 9999A
Max continuous input current	120% of nominal value
Nominal input current burden	< 0.3VA approx. per phase
Overload Withstand:	20 x rated value for 1 second, repeated 5 times at 5 minute intervals
<b>Auxiliary Supply:</b>	
Higher Auxiliary supply range	100-550V AC/DC (230V AC/DC Nominal)
Lower Auxiliary supply range	12-60V AC/DC (24V AC / 48VDC Nominal)
Aux Supply frequency	45 to 65 Hz range
Auxiliary Supply burden (at nominal value)	
With Addon card(Modbus + 2Relay)	< 7 VA approx.
With Ethernet card	< 8 VA approx.
<b>Operating Measuring Ranges:</b>	
Current (Energy Measurement)	1... 120% of nominal value
Starting current :	1mA for 1A & 5mA for 5A (as per Standard IEC62053-22)
Voltage	20... 120% of nominal value
Power Factor	0.5 Lag ... 1... 0.8 Lead
Frequency	45Hz to 66Hz
<b>Reference Conditions for Accuracy</b>	
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 (Current range 20%...100% of nominal value)
Voltage range	50%.....100% of nominal value
<b>Accuracy</b>	
Active Energy	Class 0.2S as per IEC 62053 - 22
Apparent Energy	Class 1
Reactive Energy	Class 2 as per IEC 62053 - 23
Active Power	±0.2% of nominal value
Re-Active Power	±1.0% of nominal value
Apparent Power	±0.2% of nominal value
Power Factor/Phase Angle	±3°
Voltage	±0.2% of nominal value
Current	±0.2% of nominal value
Frequency	± 0.2% of mid frequency
THD (Voltage / Current)	± 3.0%



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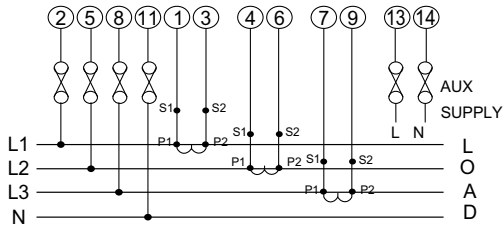


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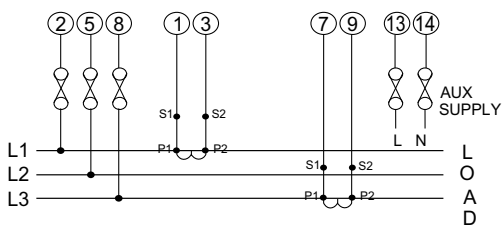


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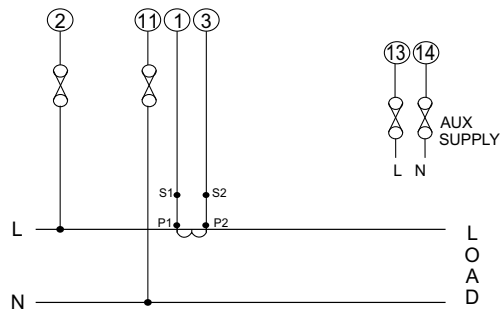
### Electrical Connection:



a) 3 Phase 4 Wire Unbalanced Load



b) 3 Phase 3 Wire Unbalanced Load



c) Single Phase Load

It is recommended that the wires used for connections to the instrument should have lugs soldered at the end. That is, the connections should be made with Lugged wires for secure connections. The Maximum diameter of the lug should be 7.0 mm and maximum thickness 3.5 mm.

Permissible cross section of the connection wires:  $\leq 4.0 \text{ mm}^2$  single wire or  $2 \times 2.5 \text{ mm}^2$  fine wire.

### Technical Specifications:

<b>Display update rate:</b>	1 sec approx.
<b>Applicable Standards:</b>	
EMC	IEC 61326 - 1 : 2012
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

### Isolation:

Protective Class	2
High voltage test	
Input+Aux Vs Surface	4kV RMS, 50Hz, 1min
Input Vs Remaining Circuit	3.3kV RMS, 50Hz, 1min
With analog output Card	2.2kV 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

### 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.
Analog Output (Optional)	For Analog Output ( 4mA - 20mA)

### Limit Output Option

Limit can be assigned to different measured parameters. It can be configured in one of the four modes given below.

- 1) Hi alarm & Energized Relay
- 2) Hi alarm & De-energized Relay
- 3) Lo alarm & Energized Relay
- 4) Lo alarm & De-energized Relay

With user selectable Trip point, Hysteresis, Energizing delay and De-energizing delay.



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### Parameter Measurement and Display:

Sr No	Displayed Parameters	3Phase 4Wire	3Phase 3Wire	1Phase 2Wire
1.	System Volts	✓	✓	✓
2.	System Current	✓	✓	✓
3.	Volts L1 – N	✓	✗	✗
4.	Volts L2 – N	✓	✗	✗
5.	Volts L3 – N	✓	✗	✗
6.	Volts L1 – L2	✓	✓	✗
7.	Volts L2 – L3	✓	✓	✗
8.	Volts L3 – L1	✓	✓	✗
9.	Current L1	✓	✓	✗
10.	Current L2	✓	✓	✗
11.	Current L3	✓	✓	✗
12.	Neutral Current	✓	✗	✗
13.	Frequency	✓	✓	✓
14.	System Active Power (kW)	✓	✓	✓
15.	Active Power L1 (kW)	✓	✗	✗
16.	Active Power L2 (kW)	✓	✗	✗
17.	Active Power L3 (kW)	✓	✗	✗
18.	System Re-active Power (kVAr)	✓	✓	✓
19.	Re-active Power L1 (kVAr)	✓	✗	✗
20.	Re-active Power L2 (kVAr)	✓	✗	✗
21.	Re-active Power L3 (kVAr)	✓	✗	✗
22.	System Apparent Power (kVA)	✓	✓	✓
23.	Apparent Power L1 (kVA)	✓	✗	✗
24.	Apparent Power L2 (kVA)	✓	✗	✗
25.	Apparent Power L3 (kVA)	✓	✗	✗
26.	System Power Factor	✓	✓	✓
27.	Power Factor L1	✓	✗	✗
28.	Power Factor L2	✓	✗	✗
29.	Power Factor L3	✓	✗	✗
30.	Phase Angle L1	✓	✗	✓
31.	Phase Angle L2	✓	✗	✗
32.	Phase Angle L3	✓	✗	✗
33.	Import kWh (8 digit resolution)*	✓	✓	✓
34.	Export kWh (8 digit resolution)*	✓	✓	✓
35.	Ind. kVArh (8 digit resolution)*	✓	✓	✓
36.	Cap. kVArh (8 digit resolution)*	✓	✓	✓
37.	kVAh (8 digit resolution)*	✓	✓	✓
38.	Current Demand	✓	✓	✓
39.	KVA Demand	✓	✓	✓
40.	KW Import Demand	✓	✓	✓
41.	KW Export Demand	✓	✓	✓
42.	KVAr Ind. Demand	✓	✓	✓
43.	KVAr Cap. Demand	✓	✓	✓
44.	Max Current Demand	✓	✓	✓
45.	Max KVA Demand	✓	✓	✓
46.	Max KW Import Demand	✓	✓	✓
47.	Max KW Export Demand	✓	✓	✓
48.	Max KVAr Ind. Demand	✓	✓	✓
49.	Max KVAr Cap. Demand	✓	✓	✓
50.	Run Hour	✓	✓	✓
51.	On Hour	✓	✓	✓
52.	Number of Interruptions	✓	✓	✓
53.	Phase Reversal Indication	✓	✗	✗



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### Parameter Measurement and Display:

Sr No	Displayed Parameters	3Phase 4Wire	3Phase 3Wire	1Phase 2 Wire
54.	THD Volts L1-N	✓	✗	✗
55.	THD Volts L2-N	✓	✗	✗
56.	THD Volts L3-N	✓	✗	✗
57.	THD Volts L1-L2	✗	✓	✗
58.	THD Volts L2-L3	✗	✓	✗
59.	THD Volts L3-L1	✗	✓	✗
60.	THD Current L1	✓	✓	✗
61.	THD Current L2	✓	✗	✗
62.	THD Current L3	✓	✓	✗
63.	THD Voltage Mean	✓	✓	✓
64.	THD Current Mean	✓	✓	✓

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

### Order Code:

#### Ordering Information:

Product Code : MA4S - 4L1 - X - A - X - XXXX - 000

**3** : 3PH-4W / 3PH-3W  
**1** : 1PH-2W

**U** : 100 - 550V AC/DC  
**L** : 12 - 60V AC/DC

**RDZ0** : RS485 - 2 Pulse Output  
**RS10** : RS485 - 1 Pulse Output - 2 Analog Output (4-20mA)  
**EZZ0** : Ethernet  
**ZZZ0** : NONE

### Order Code Example:

**MA4S-4L13AURS20000**

RM 3440 : 3P 100-600VLL 1/5 100-550U 0.2S RS 2A 1P



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