



Data Sheet

RISH MASTER 3440 Multifunction Meter (Class 0.2S)



Measure



Control



Record



Analyze



Optimize

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 - Class 0.2S as per IEC 62053-22

Energy measurement

Active energy Import (kWh), Active energy export (kWh), Reactive energy Inductive (kVArh), Reactive energy capacitive (kVArh) & 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 V AC/DC to 550 V AC/DC

Wide Input Voltage Measurement

It can Measurement wide range of input voltage $100V_{LL}$ to $600V_{LL}$

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 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)

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 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

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

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)



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Product Features

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.

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.

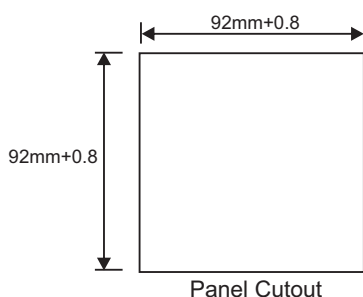
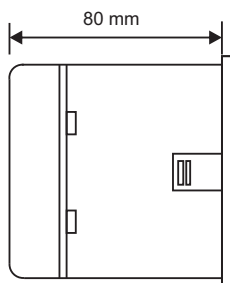
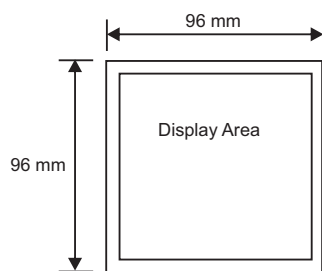
Compliance to International Safety standards

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

EMC Compatibility

Compliance to International standard IEC 61326.

Dimensions Details



Technical Specifications:

Input Voltage

Nominal input voltage (AC RMS)	100V _{LL} to 600 V _{LL}
programmable on site.	57.5V _{LN} to 346.42 V _{LN}
System PT primary values	100V _{LL} to 692.8kV _{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
Nominal input voltage burden	< 0.3VA approx. per phase (at nominal 240V)
	<0.2VA approx. per phase 110V _{LL} (63.5V _{LN})

Input Current

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 for 1A or 5A current input
Overload Withstand:	20 x rated value for 1 second, repeated 5 times at 5 minute intervals

Auxiliary Supply

Auxiliary supply range	100-550V AC/DC (230V AC/DC Nominal) Or 12-60V AC/DC (24V AC / 48VDC Nominal)Or 40-300V AC/DC (Only for RS485+2 Relay option)
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.

Operating Measuring Ranges

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



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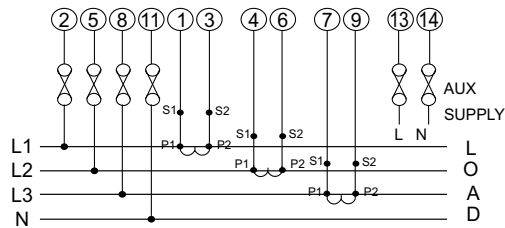


Analyze

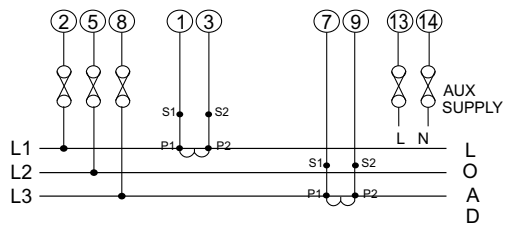


Optimize

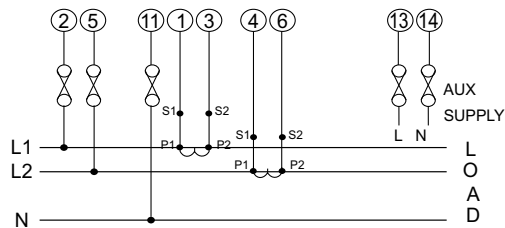
Electrical Connections



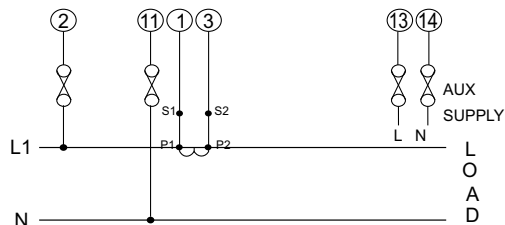
a) 3 Phase 4 Wire Unbalanced Load



b) 3 Phase 3 Wire Unbalanced Load



c) 1 Phase 3 Wire Unbalanced Load



d) 1 Phase 2 Wire Unbalanced 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 $2 \times 2.5 \text{ mm}^2$ multi standard wire.

Technical Specifications

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 (Current range 20%...100% of nominal value)
Voltage range	50%.....100% of nominal value

Accuracy

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%

Display update rate:

1 sec approx.

Applicable Standards

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

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 minute
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



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Technical Specifications

Interfaces

Impulse LED	For Energy testing
Relay (Optional)	250 VAC, 5 AAC, 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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RISH Master 3440

Parameter Measurement and Display

✓ : Available * : Not Available

Sr No	Displayed Parameters	3 Phase 4Wire	3 Phase 3Wire	1 Phase 3Wire	1 Phase 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	✓	✓	✓	✓



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Parameter Measurement and Display

✓ : Available ✗ : Not Available

Sr No	Displayed Parameters	3 Phase 4Wire	3 Phase 3Wire	1 Phase 3Wire	1 Phase 3Wire
52.	Number of Interruptions	✓	✓	✓	✓
53.	Phase Reversal Indication	✓	✗	✗	✗
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.

Ordering Information

Ordering Information	MA4S-	4L1	X	A	X	XXXX	000
Product Type	RISH MASTER 3440 - Class 0.2S						
System Type	1 Phase		1				
	3 Phase (On site configurable as 1 / 3 Phase)		3				
Input	Voltage 3PH : 100-600VL-L (1PH : 57.7-346.41VL-N), CT-1A/5A						
Auxiliary Supply	12-60V AC/DC				L		
	40-300V AC/DC (Only for RS485+2 Relay option)				M		
	100-550V AC/DC				U		
Output Option	RS485 + 2 Relay					RDZ0	
	RS485 + 1 Relay + 2 Analog (4-20mA) Output					RS10	
	Ethernet					EZZ0	
	NONE					ZZZ0	

Order Code Example : MA4S-4L13AURS10000

RISH MASTER 3440 - Input 3 Phase, 100-600L-L, 1A/5A, Aux 100-550V AC/DC, with RS485 + 1 Relay + 2 Analog output, Accuracy Class 0.2S



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Specifications may change without prior notice



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