

RISH EM 1320/30/40

Multi-Function Energy Meter

Technical Datasheet



Compact True RMS Energy Meter for Energy Monitoring

RISH EM series is specially designed for Active, Reactive and Apparent Energy Measurement including per phase THD, Powers and others parameters as per different models.

- ▼ True RMS Measurement
- ▼ Energy as per IEC 62053
- ▼ Onsite Programmable
- ▼ Low Back Depth
- ▼ Phase Reversal Indication
- ▼ LCD Display with Back-lit
- ▼ RS485, Limit or Pulse Output



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Measure, Control & Record with a Difference

RISHABH INSTRUMENTS PVT.LTD.
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RISH EM 1320/30/40

Multi-Function Energy Meter



RISH EM series measures important electrical parameters in 3 phase and single phase Network & replaces the multiple analog panel meters. It measures electrical parameters like Active / Reactive / Apparent energy, power as per models. The instrument has optional output as one pulse output for energy measurement.

Applications:

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

Product Features:

True RMS measurement:

- ▶ Measures distorted waveform up to 15th Harmonic.

Energy as per IEC 62053:

- ▶ Independent Import and Export Energy counter.
- ▶ Active energy (kWh), Reactive energy (kVAh), Apparent energy (kVAh) measurement.
- ▶ Accuracy as per IEC 62053-21, IEC62053-23.

THD Measurement:

- ▶ The instrument measures THD per phase voltage & current up to 15th Harmonic.

Onsite programmable:

- ▶ Onsite Programmable System Configuration 3PH4W / 3PH3W / 1PH2W.
- ▶ Onsite Programmable CT ratios and PT ratios

Direct remote access(Optional):

- ▶ Remote configuration of the Instrument via MODBUS.
- ▶ Remote access of measured parameters. Programmable baud rates up to 38.4kbps.

Limit (Alarm) or Pulse 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.
- ▶ Configurable as limit (alarm) switch.

Low back depth:

- ▶ The instrument has very low back depth (behind the panel) of less than 35 mm.

User Configurable Features:

- ▶ User can select any five or ten measurement screens which will be shown on display. Also backlit can be programmed to switched on or off.

LCD Display with Backlit:

- ▶ LCD shows 3 Parameters at a glance.

Parameter Screen recall:

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

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.

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).

Enclosure Protection for dust and water:

- ▶ Conforms to IP 50 (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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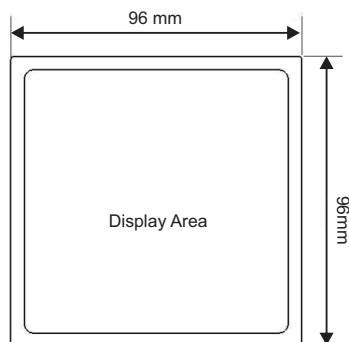
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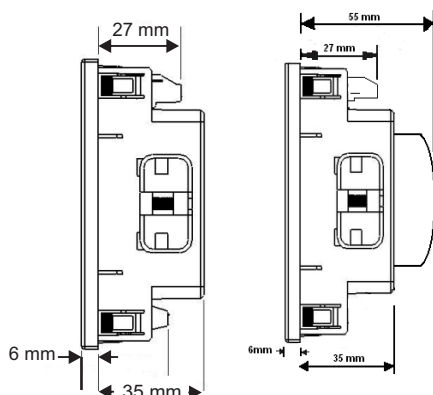
RISH EM 1320/30/40

Multi-Function Energy Meter

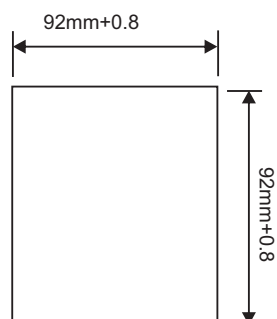
Dimensions Details:



Front View



Side View



Panel Cutout

Technical Specifications:

Input Voltage:

Nominal input voltage (AC RMS)	Phase –Neutral	Line-Line
	63.5 V _{L-N}	110 V _{L-L}
	133 V _{L-N}	230 V _{L-L}
	239.6 V _{L-N}	415 V _{L-L}

System PT primary values 100VLL to 1200kVLL programmable on site.

Max continuous input voltage 120% of nominal value

Input Current:

Nominal input current 1A/5A AC RMS

System CT primary values From 1A to 9999A

Max continuous input current 120% of nominal value

Overload Indication “-OL-” >121% of Nominal value (for voltage and current)

Auxiliary Supply:

External Higher Aux 60 V – 300V AC/DC (± 5% approx)

Higher Aux Nominal Value 230 V AC/DC 50/60 Hz for AC Aux

OR

External Lower Aux 20V – 60 V DC / 20V – 40 V AC

Lower Aux Nominal Value 48 V DC / 24 V AC 50/60 Hz for AC Aux

Aux Supply frequency 45 to 65 Hz range

VA Burden:

Nominal input voltage burden < 0.3 VA approx. per phase

Nominal input current burden < 0.3 VA approx. per phase

Auxiliary Supply burden

With Addon card < 6VA approx.

Without Addon card < 4VA approx.

Operating Measuring Ranges:

Current (Energy Measurement) Starting current : 2mA for 1A & 10mA for 5A
(As per IEC 62053-21) Range: 20mA to 1.2A for 1A
100mA to 6A for 5A

Voltage 50... 120% of nominal value

Power Factor 0.5 Lag ... 1... 0.8 Lead

Frequency 50Hz / 60Hz

Total Harmonic Distortion 0.....50%

Accuracy :

Reference Conditions 23°C +/- 2°C

(As per IEC 62053 - 21)

Active Energy Class 1 as per IEC 62053 - 21

Reactive Energy Class 2 as per IEC 62053 - 23

Apparent Energy Class 1

Active Power ±0.5% of nominal value at cos ϕ = 1

Re-Active Power ±1.0% of nominal value at sin ϕ = 1

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) ± 2.0%



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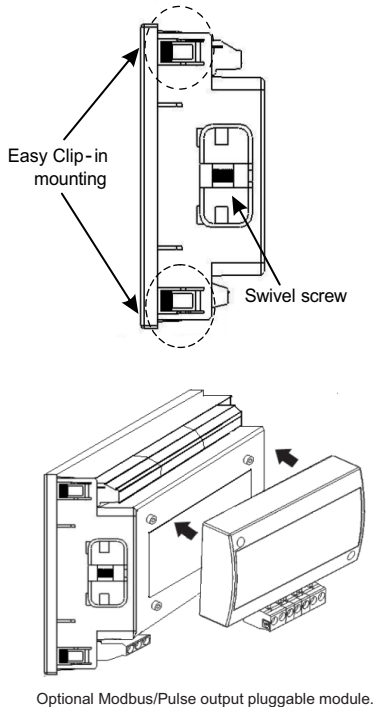
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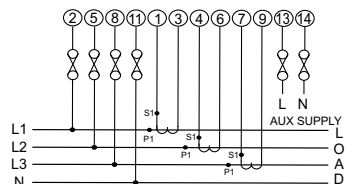
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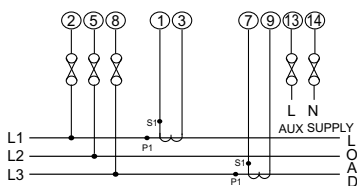
Installation:



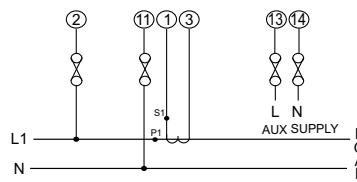
Electrical Connection:



3 Phase 4 wire Unbalanced load



3 Phase 3 wire Unbalanced load



1 Phase 2 Wire

Technical Specifications:

Overload Withstand:

Voltage	2 x rated value for 1 second, repeated 10 times at 10 second intervals
Current	20x I _{max} for 0.5sec

Display update rate:

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

EMC	IEC 61326 - 1 : 2005
Immunity	IEC 61000-4-3. 10V/m min – 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	2kV RMS, 50Hz, 1min

Environmental

Operating temperature	-10 to +55°C
Storage temperature	-20 to +65°C
Relative humidity	0... 90%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
Enclosure	IP 50 (front face only)

Interfaces

Impulse Led	For Energy Calibration at front
Relay(Optional)	240 VAC ,5 A(Configured as limit or pulse output)
Modbus (Optional)	RS485,max.1200m Baud rate : 4.8k,9.6k,19.2k,38.4k bps

NOTE: Variation due to influence Quantity is 100% of class index for all other parameters except Energy.

PT Secondary Ranges for Various Input Voltage:

Input Voltage	PT Secondary Settable Range
110V L-L (63.5V L-N)	100V – 125V L-L (57V – 72V L-N)
230V L-L (133V L-N)	126V – 250V L-L (73V – 144V L-N)
415V L-L (239.6V L-N)	251V – 480V L-L (145V – 277V L-N)

Input connections are made directly to screw-type terminals with indirect wire pressure. Numbering is clearly marked on the connector . Choice of cable should meet local regulations. Terminal for both Current and Voltage inputs will accept up to 4mm² (12AWG) solid or 2.5 mm² standard cable.

Note: It is recommended to use wire with lug for connection with meter.



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Measured Parameter System wise:

✓ : Available

✗ : Not Available

Sr No	Displayed Parameters	3 Phase 4Wire	3Phase 3Wire	1Phase 2Wire
1.	Import Active Energy (kWh)	✓	✓	✓
2.	Export Active Energy (kWh)	✓	✓	✓
3.	Inductive Reactive Energy (kVArh)	✓	✓	✓
4.	Capacitive Reactive Energy (kVArh)	✓	✓	✓
5.	Apparent Energy (kVAh)	✓	✓	✓
6.	System Active Power (kW)	✓	✓	✓
7.	Active Power L1 (kW)	✓	✗	✗
8.	Active Power L2 (kW)	✓	✗	✗
9.	Active Power L3 (kW)	✓	✗	✗
10.	System Re-active Power (kVAR)	✓	✓	✓
11.	Re-active Power L1 (kVAR)	✓	✗	✗
12.	Re-active Power L2 (kVAR)	✓	✗	✗
13.	Re-active Power L3 (kVAR)	✓	✗	✗
14.	System Apparent Power (kVA)	✓	✓	✓
15.	Apparent Power L1 (kVA)	✓	✗	✗
16.	Apparent Power L2 (kVA)	✓	✗	✗
17.	Apparent Power L3 (kVA)	✓	✗	✗
18.	System Power Factor	✓	✓	✓
19.	Power Factor L1	✓	✗	✗
20.	Power Factor L2	✓	✗	✗
21.	Power Factor L3	✓	✗	✗
22.	System Phase Angle	✓	✓	✓
23.	Phase Angle L1	✓	✗	✗
24.	Phase Angle L2	✓	✗	✗
25.	Phase Angle L3	✓	✗	✗
26.	Current Demand	✓	✓	✓
27.	kVA Demand	✓	✓	✓
28.	Import kW Demand	✓	✓	✓
29.	Export kW Demand	✓	✓	✓
30.	Max Current Demand	✓	✓	✓
31.	Max kVA Demand	✓	✓	✓
32.	Max Import kW Demand	✓	✓	✓
33.	Max Export kW Demand	✓	✓	✓
34.	Run Hour	✓	✓	✓
35.	On Hour	✓	✓	✓
36.	Number of Interruptions	✓	✓	✓
37.	System Voltage	✓	✓	✓
38.	Voltage L1	✓	✗	✗
39.	Voltage L2	✓	✗	✗
40.	Voltage L3	✓	✗	✗
41.	Voltage L12	✓	✓	✗
42.	Voltage L23	✓	✓	✗
43.	Voltage L31	✓	✓	✗
44.	System Voltage THD	✓	✓	✓
45.	Voltage L1 THD	✓	✓	✗
46.	Voltage L2 THD	✓	✓	✗
47.	Voltage L3 THD	✓	✓	✗



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Measured Parameter System wise:

✓ : Available

✗ : Not Available

Sr No	Displayed Parameters	3 Phase 4Wire	3Phase 3Wire	1Phase 2Wire
48.	System Current	✓	✓	✓
49.	Current L1	✓	✓	✗
50.	Current L2	✓	✓	✗
51.	Current L3	✓	✓	✗
52.	System Current THD	✓	✓	✓
53.	Current L1 THD	✓	✓	✗
54.	Current L2 THD	✓	✓	✗
55.	Current L3 THD	✓	✓	✗
56.	Neutral Current	✓	✗	✗
57.	Frequency	✓	✓	✓
58.	RPM	✓	✓	✓
59.	Phase Reversal Indication	✓	✓	✗
60.	Current Reversal Indication	✓	✓	✓
61.	Phase Absent Indication	✓	✓	✗
62.	Old Import Active Energy (kWh)	✓	✓	✓
63.	Old Export Active Energy (kWh)	✓	✓	✓
64.	Old Inductive Reactive Energy (kVArh)	✓	✓	✓
65.	Old Capacitive Reactive Energy (kVArh)	✓	✓	✓
66.	Old Apparent Energy (kVAh)	✓	✓	✓
67.	Old Run Hour	✓	✓	✓
68.	Old On Hour	✓	✓	✓
69.	Old Number of Interruptions	✓	✓	✓

Measured Parameter Model wise:

Sr. No	Parameters	EM 1320		EM 1330		EM 1340	
		On Display	On Modbus	On Display	On Modbus	On Display	On Modbus
1.	Import Active Energy (kWh)	✓	✓	✓	✓	✓	✓
2.	Export Active Energy (kWh)	✓	✓	✓	✓	✓	✓
3.	Inductive Reactive Energy (kVArh)	✗	✓	✗	✓	✓	✓
4.	Capacitive Reactive Energy (kVArh)	✗	✓	✗	✓	✓	✓
5.	Apparent Energy (kVAh)	✗	✓	✗	✓	✓	✓
6.	System Active Power (kW)	✗	✓	✓	✓	✓	✓
7.	Active Power L1 (kW)	✗	✓	✓	✓	✓	✓
8.	Active Power L2 (kW)	✗	✓	✓	✓	✓	✓
9.	Active Power L3 (kW)	✗	✓	✓	✓	✓	✓
10.	System Re-active Power (kVAR)	✗	✓	✗	✓	✓	✓
11.	Re-active Power L1 (kVAR)	✗	✓	✗	✓	✓	✓
12.	Re-active Power L2 (kVAR)	✗	✓	✗	✓	✓	✓
13.	Re-active Power L3 (kVAR)	✗	✓	✗	✓	✓	✓
14.	System Apparent Power (kVA)	✗	✓	✗	✓	✓	✓
15.	Apparent Power L1 (kVA)	✗	✓	✗	✓	✓	✓
16.	Apparent Power L2 (kVA)	✗	✓	✗	✓	✓	✓
17.	Apparent Power L3 (kVA)	✗	✓	✗	✓	✓	✓
18.	System Power Factor	✗	✓	✓	✓	✓	✓
19.	Power Factor L1	✗	✓	✓	✓	✓	✓
20.	Power Factor L2	✗	✓	✓	✓	✓	✓
21.	Power Factor L3	✗	✓	✓	✓	✓	✓



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Measured Parameter Model wise:

✓ : Available

✗ : Not Available

Sr. No	Parameters	EM 1320		EM 1330		EM 1340	
		On Display	On Modbus	On Display	On Modbus	On Display	On Modbus
22.	System Phase Angle	✗	✓	✓	✓	✓	✓
23.	Phase Angle L1	✗	✓	✓	✓	✓	✓
24.	Phase Angle L2	✗	✓	✓	✓	✓	✓
25.	Phase Angle L3	✗	✓	✓	✓	✓	✓
26.	Current Demand	✗	✓	✗	✓	✓	✓
27.	kVA Demand	✗	✓	✗	✓	✓	✓
28.	Import kW Demand	✗	✓	✗	✓	✓	✓
29.	Export kW Demand	✗	✓	✗	✓	✓	✓
30.	Max Current Demand	✗	✓	✓	✓	✓	✓
31.	Max kVA Demand	✗	✓	✓	✓	✓	✓
32.	Max Import kW Demand	✗	✓	✓	✓	✓	✓
33.	Max Export kW Demand	✗	✓	✓	✓	✓	✓
34.	Run Hour	✗	✓	✓	✓	✓	✓
35.	On Hour	✗	✓	✓	✓	✓	✓
36.	Number of Interruptions	✗	✓	✓	✓	✓	✓
37.	System Voltage	✗	✓	✓	✓	✓	✓
38.	Voltage L1	✗	✓	✓	✓	✓	✓
39.	Voltage L2	✗	✓	✓	✓	✓	✓
40.	Voltage L3	✗	✓	✓	✓	✓	✓
41.	Voltage L12	✗	✓	✓	✓	✓	✓
42.	Voltage L23	✗	✓	✓	✓	✓	✓
43.	Voltage L31	✗	✓	✓	✓	✓	✓
44.	System Voltage THD	✗	✗	✗	✗	✓	✓
45.	Voltage L1 THD	✗	✗	✗	✗	✓	✓
46.	Voltage L2 THD	✗	✗	✗	✗	✓	✓
47.	Voltage L3 THD	✗	✗	✗	✗	✓	✓
48.	System Current	✗	✓	✓	✓	✓	✓
49.	Current L1	✗	✓	✓	✓	✓	✓
50.	Current L2	✗	✓	✓	✓	✓	✓
51.	Current L3	✗	✓	✓	✓	✓	✓
52.	System Current THD	✗	✗	✗	✗	✓	✓
53.	Current L1 THD	✗	✗	✗	✗	✓	✓
54.	Current L2 THD	✗	✗	✗	✗	✓	✓
55.	Current L3 THD	✗	✗	✗	✗	✓	✓
56.	Neutral Current	✗	✓	✗	✓	✓	✓
57.	Frequency	✗	✓	✓	✓	✓	✓
58.	RPM	✗	✓	✓	✓	✓	✓
59.	Phase Reversal Indication	✓	✗	✓	✗	✓	✗
60.	Current Reversal Indication	✓	✗	✓	✗	✓	✗
61.	Phase Absent Indication	✓	✗	✓	✗	✓	✗
62.	Old Import Active Energy (kWh)	✗	✓	✗	✓	✓	✓
63.	Old Export Active Energy (kWh)	✗	✓	✗	✓	✓	✓
64.	Old Inductive Reactive Energy (kVAh)	✗	✓	✗	✓	✓	✓
65.	Old Capacitive Reactive Energy (kVAh)	✗	✓	✗	✓	✓	✓
66.	Old Apparent Energy (kVAh)	✗	✓	✗	✓	✓	✓
67.	Old Run Hour	✗	✓	✗	✓	✓	✓
68.	Old On Hour	✗	✓	✗	✓	✓	✓
69.	Old Number of Interruptions	✗	✓	✗	✓	✓	✓



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Ordering Information:

Order Code	WH00-	X	X	X	X	X	X	X	000000
Product Type	RISH EM 1320	2							
	RISH EM 1330	3							
	RISH EM 1340	4							
System Type	3PH 3W/4W	3							
	1 Phase	1							
Input Voltage	63.5VL-N	1							
	133VL-N	2							
	230VL-N	3							
	239.6VL-N	4							
	254VL-N	5							
	110VL-L	6							
	230VL-L	7							
	415VL-L	8							
	440VL-L	9							
Input Current	5A / 1A	5							
Power Supply	60 - 300V AC/DC	U							
RS 485	With RS 485	R							
	Without RS 485	Z							
Pulse Output	Pulse output	P							
	Pulse O/P not used	Z							

Order Code Examples:

1. WH00-4385URP000000

RISH EM 1340, 3PH 3W/4W, 415VL-L, 5A / 1A, With RS 485, Pulse output

2. WH00-3335URP000000

RISH EM 1330, 1 Phase, 230VL-N, 5A / 1A, With RS 485, Pulse output



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