



# Data Sheet

## *RISH EM 2340* *Programmable Dual Source* *Energy Meter*



### Compact True RMS Dual Source Energy Meter

RISH EM 2340 is specially designed for Active, Reactive and Apparent Energy Measurement including per phase THD, Powers and others parameters.

- ▼ 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



Measure



Control



Record



Analyze



**RISH EM 2340** measures important electrical parameters of Utility and Generator in 3 phase and single phase Network & replaces the multiple analog panel meters. It measures electrical parameters like Active / Reactive / Apparent energy , power. The instrument has 2 configurable optional outputs as pulse output for energy measurement or limit output.

### Applications:

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

### Product Features:

#### True RMS measurement:

- ▶ Measures distorted waveform up to 15th Harmonic.

#### Dual Source Energy Measurement as per IEC 62053:

- ▶ Independent Energy counter for Generator and Utility.
- ▶ Generator sense signal (10 to 60VDC/20 to 300VAC)
- ▶ Active energy (kWh), Reactive energy (kVArh), 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



Measure



Control

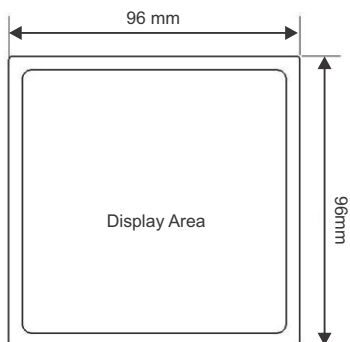


Record

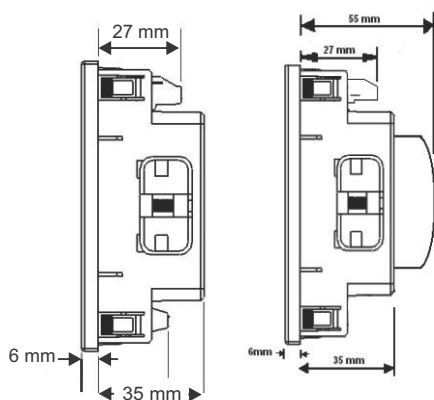


Analyze

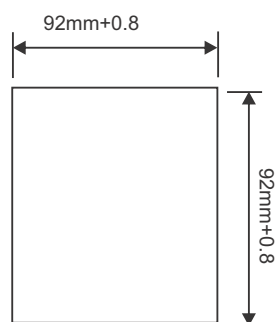
### Dimensions Details:



Front View



Side View



Panel Cutout

### Technical Specifications:

#### Input Voltage:

Nominal input voltage (AC RMS)	100V <sub>L-L</sub> to 500 V <sub>L-L</sub> (57.7 V <sub>L-N</sub> to 290 V <sub>L-N</sub> )
System PT primary values	100 V <sub>L-L</sub> to 1200 kV <sub>L-L</sub> 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	20 V – 60V DC / 20 V – 40V 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	< 6 VA approx.
Without addon card	< 4 VA approx.

#### Generator Sense:

AC voltage	20... 300 VAC
DC voltage	10... 60 VDC

#### Operating Measuring Ranges:

Current (Energy Measurement) (As per IEC 62053 - 21)	Starting current : 2mA for 1A & 10mA for 5A 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 (As per IEC 62053 - 21)	23°C +/- 2°C
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 $\phi$ = 1
Re-Active Power	±1.0% of nominal value at sin $\phi$ = 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%



Measure



Control

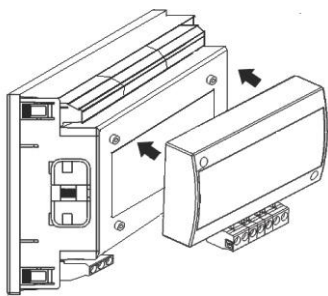
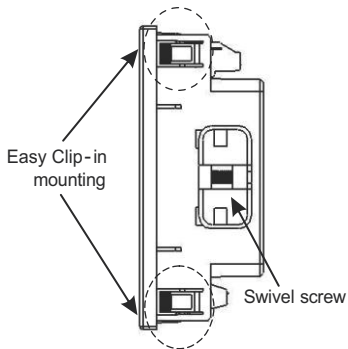


Record



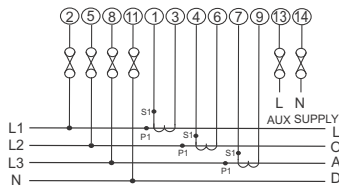
Analyze

### Installation:

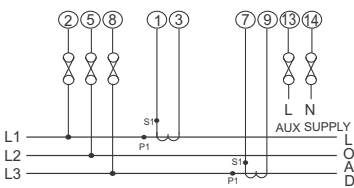


Optional Modbus/Pulse output pluggable module.

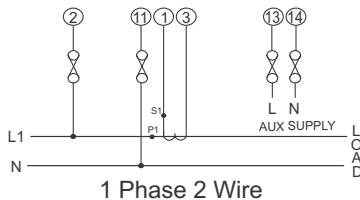
### Electrical Connection:



3 Phase 4 wire Unbalanced load



3 Phase 3 wire Unbalanced load



1 Phase 2 Wire

### Technical Specifications:

#### Overload Withstand:

Voltage 2 x Nominal value for 1 second, repeated 10 times at 10 second intervals

Current 20 x I<sub>max</sub> for 0.5sec

#### Display update rate:

Response time to step input 1 sec approx.

#### 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 IEC 60529

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(300m/s<sup>2</sup>), 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) 240VAC, 5A(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.**

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 4mm<sup>2</sup> (12AWG) solid or 2.5 mm<sup>2</sup> standard cable.

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



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### Display Parameter:

✓ : Available

✗ : Not Available

Sr No	Displayed Parameters	3 Phase 4Wire	3Phase 3Wire	1Phase 2Wire
1.	Utility Active Energy (kWh)	✓	✓	✓
2.	Generator Active Energy (kWh)	✓	✓	✓
3.	Utility Reactive Energy (kVArh)	✓	✓	✓
4.	Generator Reactive Energy (kVArh)	✓	✓	✓
5.	Apparent Energy (kVAh) (Utility & Generator)	✓	✓	✓
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(Utility / Generator)	✓	✓	✓
27.	kVA Demand(Utility / Generator)	✓	✓	✓
28.	kW Demand (Utility / Generator)	✓	✓	✓
29.	Max Current Demand(Utility & Generator)	✓	✓	✓
30.	Max kVA Demand(Utility & Generator)	✓	✓	✓
31.	Max kW Demand(Utility & Generator)	✓	✓	✓
32.	Run Hour (Utility & Generator & Total)	✓	✓	✓
33.	On Hour (Utility & Generator & Total)	✓	✓	✓
34.	Number of Interruptions (Utility & Generator)	✓	✓	✓
35.	System Voltage	✓	✓	✓
36.	Voltage L1	✓	✗	✗
37.	Voltage L2	✓	✗	✗
38.	Voltage L3	✓	✗	✗
39.	Voltage L12	✓	✓	✗
40.	Voltage L23	✓	✓	✗
41.	Voltage L31	✓	✓	✗
42.	System Voltage THD	✓	✓	✓
43.	Voltage L1 THD	✓	✓	✗
44.	Voltage L2 THD	✓	✓	✗
45.	Voltage L3 THD	✓	✓	✗
46.	System Current	✓	✓	✓
47.	Current L1	✓	✓	✗
48.	Current L2	✓	✓	✗
49.	Current L3	✓	✓	✗



Measure



Control



Record



Analyze

### Display Parameter:

✓ : Available

✗ : Not Available

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



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### Ordering Information:

Ordering information	Ordering Code RISH EM 2340
<b>System Type (Connection network)</b>	
3 Phase (onsite programmable to 3PH4W,3PH3W and 1PH2W)	3
1 Phase	1
<b>Auxiliary Supply Voltage</b>	
60 - 300 V AC DC	EA
20 - 60 V DC / 20 - 40 V AC	LA
<b>Optional:</b>	
MODBUS (RS485) output	R
MODBUS Option not used	Z
<b>Optional: Pulse/Limit Output</b>	
With 1 output	P1
With 2 output	P2
Without Output	Np

**Note:- 1.For Three Phase, input voltage is 100- 500 VLL (Onsite programmable) and For Single Phase, input voltage is 57.7- 290 VLN (Onsite programmable)**

**2.Input Current is 5 Amps / 1 Amps (Onsite Programmable)**

#### Order Code Examples:

##### 1. RISH EM 2340 – 3 – EA - R - P2

RISH **Dual Source Energy Meter**, three Phase, 100V to 500 VLL Nominal input voltage, 5 Amps / 1 Amps , external aux (60V – 300V AC/DC), with MODBUS output, With 2 output (2 Pulse/Limit output).

##### 2. RISH EM 2340 – 1 – LA - Z - P2

RISH **Dual Source Energy Meter**, Single Phase, 57.7V to 290 VLN Nominal input voltage, 5 Amps / 1 Amps , external aux (20V – 60V DC / 20 - 40 V AC), With 2 output (2 Pulse/Limit output).



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