



# Data Sheet

## RISH EM 3490DSi



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**RISH EM 3490 DSi** measures important electrical parameters of Utility (in normal mode) & Generators (in Power back up) in three phase and single phase Network & replaces the multiple analog panel meters. It measures electrical parameters like AC current, Voltage, frequency, Active energy import. The instrument has optional pulse output as one for Utility and another for Generator.

### Application :

- Energy billing of dual supply installations (Utility and Generator)
- Commercial and industrial sub-metering
- Electrical load monitoring
- Online monitoring

### Product Features:

#### Dual Source Energy Measurements :

- ☞ Separate energy calculations for utility and generator.
- ☞ Forwarded energy calculations in case of current reversal.

#### Direct Cost calculations:

- ☞ Separate direct cost calculations for utility and generator.
- ☞ Cycle wise Bar Graph representation of Generator Energy Consumption

#### Power Quality Measurement:

- ☞ Measurable up to 56th (50Hz) / 46th (60Hz) harmonic on each phase. Maximum any 6 harmonics can be monitored simultaneously for each phase.
- ☞ Measurement of RMS value of fundamental and per phase voltage and current harmonics.
- ☞ (%) THD of per phase voltage and current
- ☞ Distortion factor of individual harmonics.

#### Graphical Analysis:

- ☞ Per phase individual harmonic bar graph representation.
- ☞ Real time vector representation of all 3 Phases for complete system analysis.

#### Energy class 0.5S as per IEC 62053 :

- ☞ Active energy (kWh), Fundamental Reactive energy (kVArh) & Apparent energy (kVAh) measurement.
- ☞ Accuracy as per IEC 62053-22, IEC62053-23
- ☞ Impulse for energy verification

#### Onsite programmable for user desired application:

- ☞ Onsite programmable input voltage (100V<sub>LL</sub> to 500 V<sub>LL</sub>), input current (1A or 5A) and system configuration (3 phase 4Wire (unbalanced) or 3phase 3Wire (unbalanced) network).
- ☞ Onsite programmable CT ratio & PT ratio.
- ☞ Wide auxiliary power supply range: 60-300VAC/DC.

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

- ☞ Displays parameters for both mode utility and generator.

#### Old Register:

- ☞ This register holds the value before the last reset . The old value will be available when scrolled through screen.

#### Time Of DAY (TOD / TOU):

- ☞ Easy programmable tariff schedule
- ☞ 4 seasons, 4 tariff energy registers
- ☞ 4 types of days and 6 time zones per day
- ☞ automatic daily profile storage for a one day& one month
- ☞ cost per kWh calculation
- ☞ configurable billing date for monthly billing

#### Event Logging:

- ☞ Generator Start / Stop Event logging with Date and Time stamping up to 20 events.
- ☞ Max Demand (W, VAr, VA and Current) storage with Date and Time stamping of last event.

#### ACCL(Auto Connect Current Limit):

- ☞ current limiter with auto connect feature.
- ☞ user programmable autoconnect cycles.
- ☞ connect time 3 sec. and disconnect time 8 sec. and hysteresis 2%

#### Custom color setting:

- ☞ User can assign individual colour for each phase as per the application requirement through display and MODBUS.

#### Phase sequence detection:

- ☞ Incorrect phase sequence indication or phase failure indication on any of the input voltages.

#### Direct remote access via MODBUS:

- ☞ Remote access of measured and configuration parameters.
- ☞ User Assignable Registers for MODBUS.
- ☞ Programmable baud rates up to 38.4kbps.

#### Optional Pulse Relay Output:

- ☞ Potential free, very fast acting relay contact
- ☞ Configurable as pulse output which can be used to drive an external counter for energy measurement.
- ☞ Optional pulse output one for Utility and another for Generator.

#### 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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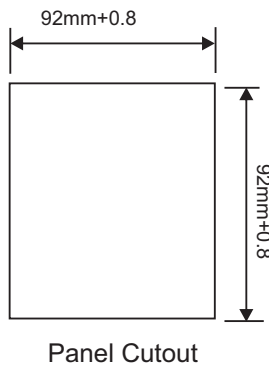
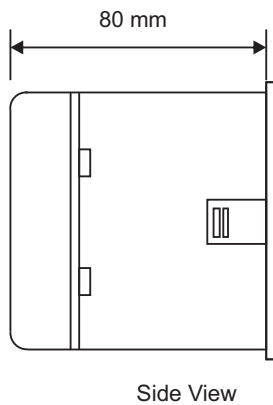
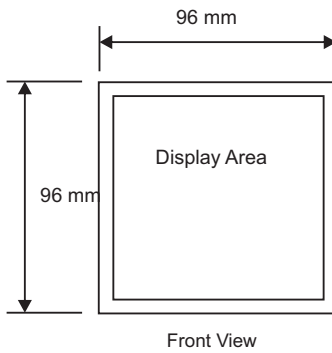


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### Dimensions Details:



### Technical Specifications:

#### Accuracy :

Active Energy	Class 0.5S as per IEC 62053 - 22
Apparent Energy	Class 0.5S as per IEC 62053 - 22
Fundamental Reactive Energy	Class 2 as per IEC 62053 - 23

Reference conditions (As per. IEC/EN 60688) :

Ambient 23°C ± 1°C

Sinusoidal (distortion factor 0.005), 50 / 60 Hz

Active Power	±0.2% of Nominal value
Fundamental Reactive Power	±0.2% of Nominal value
Apparent Power	±0.2% of Nominal value
Power Factor / Phase Angle	±2°
Voltage	±0.2% of Nominal value
Current	±0.2% of Nominal value
Frequency	±0.1% of mid frequency
Harmonics	±1.0%
THD Voltage / Current	±1.0%

#### Input Voltage:

Nominal input voltage (AC RMS)	57.7 - 288.68 V <sub>L-N</sub> On site Programmable (Line-Line 100 - 500 V <sub>L-L</sub> )
System PT primary values	100V <sub>LL</sub> to 692.8 kV <sub>LL</sub> On site Programmable
Max continuous input voltage	347 V <sub>LN</sub> , 600 V <sub>LL</sub>
Voltage Measuring Range	5 V <sub>LN</sub> .... 347 V <sub>LN</sub> , 9 V <sub>LL</sub> .... 600 V <sub>LL</sub> .
Overload Withstand	2x times of Nominal voltage for 1 second, repeated 10 times at 10 second intervals
Frequency Measuring Range	45Hz to 66Hz

#### Input Current:

Nominal input current	1A / 5A AC RMS On site Programmable
System CT primary values	From 1A up to 9999A On site Programmable
Max continuous input current	120% of Nominal value
Current Measuring Range	5% to 120% of Nominal current.
Overload Withstand	20x times of Nominal current for 1 second, repeated 5 times at 5 min intervals.
Starting Current for energy as per IEC 62053-22 class 0.5S	1 mA for 1A range 5 mA for 5A range

#### Auxiliary Supply:

External Aux	60 V – 300V AC-DC
Aux supply frequency	50 / 60 Hz (± 10 %)

#### VA Burden:

Nominal input voltage burden	< 0.2 VA approx. per phase
Nominal input current burden	< 0.2 VA approx. per phase
Auxiliary Supply burden	< 6.5 VA approx



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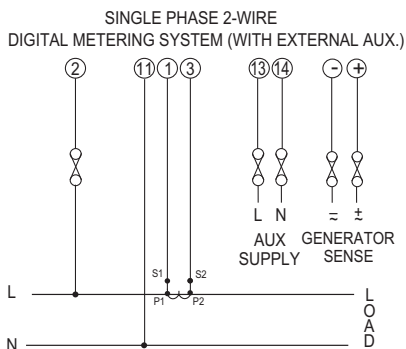
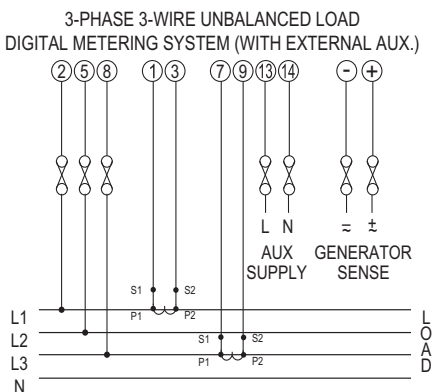
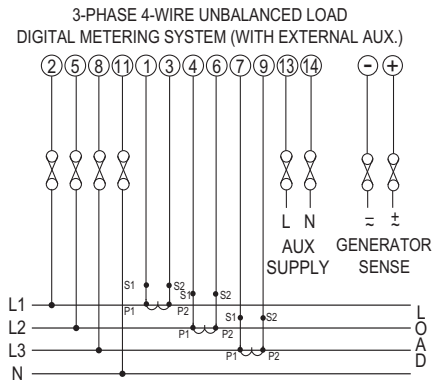
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### Electrical Connection:

#### Network Types :



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 3.5mm.

### Technical Specifications:

#### Real Time Clock (RTC):

Uncertainty  $\pm 2$  minutes / month ( $23^{\circ}\text{C} \pm 1^{\circ}\text{C}$ )  
(trimmable through display or Modbus)

#### Display update rate:

Response time to step input 1 sec approx.

#### Applicable Standards:

EMC	IEC 61326
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	(IP 54 for Front) IEC60529
Pollution degree:	2
Installation category:	III
High Voltage Test	5.23 kV DC for 1 minute between all Electrical circuits.

#### Environmental Conditions, Other information

Operating temperature	-10 to +55°C
Storage temperature	-20 to +65°C
Relative humidity	0... 95% non condensing
Warm up time	Minimum 3 minute
Shock	15g in 3 planes
Vibration	10... 150.... 10 Hz, 0.075mm amplitude
Temperature Coefficient	0.05%/°C

#### Interfaces:

Impulse Led	At the rear of the instrument with an Impulse constant of 4000 impulses/kWh.
Relay	Configured as Limit or Pulse/ACCL output
Load Capacity	240 V AC , 5 A
Contact	Change over contact, bistable
ModBus / RTU	RS485,max. 1200m Baud rate: 4.8k, 9.6k, 19.2k, 38.4k bps

#### Generator Sense:

Monitoring generator ON or OFF 10 to 60 VDC / 20 to 300 VAC, 0.3 VA



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### Display Parameter:

✓ : Available \* : Not Available

Sr No	Displayed Parameters	3 Phase 4Wire	3Phase 3Wire	1 Phase 2Wire
1.	System Voltage	✓	✓	✓
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 Fundamental Reactive Power (kVAr)	✓	✓	✓
19.	Fundamental Reactive Power L1 (kVAr)	✓	*	✓
20.	Fundamental Reactive Power L2 (kVAr)	✓	*	*
21.	Fundamental Reactive 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.	Utility kWh (Up to 14 digit resolution)	✓	✓	✓
34.	Generator kWh (Up to 14 digit resolution)	✓	✓	✓
35.	Fundamental Utility kVArh	✓	✓	✓
36.	Fundamental Generator kVArh	✓	✓	✓
37.	Utility kVAh	✓	✓	✓
38.	Generator kVAh	✓	✓	✓
39.	Current Demand	✓	✓	✓
40.	Apparent Demand	✓	✓	✓
41.	Active Demand	✓	✓	✓
42.	Reactive Demand	✓	✓	✓
43.	Utility Max Current Demand	✓	✓	✓
44.	Generator Max Current Demand	✓	✓	✓
45.	Utility Max kVA Demand	✓	✓	✓
46.	Generator Max kVA Demand	✓	✓	✓
47.	Utility Max kW Demand	✓	✓	✓
48.	Generator Max kW Demand	✓	✓	✓
49.	Utility Max kVAr Demand	✓	✓	✓
50.	Generator Max kVAr Demand	✓	✓	✓



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### Display Parameter:

✓ : Available    ✗ : Not Available

Sr No	Displayed Parameters	3 Phase 4Wire	3Phase 3Wire	1Phase 2Wire
51.	Utility Run Hour	✓	✓	✓
52.	Generator Run Hour	✓	✓	✓
53.	Utility On Hour	✓	✓	✓
54.	Generator On Hour	✓	✓	✓
55.	Utility Number of Interruption	✓	✓	✓
56.	Generator Number of Interruption	✓	✓	✓
57.	Total Run Hour	✓	✓	✓
58.	Total On Hour	✓	✓	✓
59.	Old Utility Max Current Demand	✓	✓	✓
60.	Old Generator Max Current Demand	✓	✓	✓
61.	Old Utility Max kVA Demand	✓	✓	✓
62.	Old Generator Max kVA Demand	✓	✓	✓
63.	Old Utility Max kW Demand	✓	✓	✓
64.	Old Generator Max kW Demand	✓	✓	✓
65.	Old Utility Max kVAh Demand	✓	✓	✓
66.	Old Generator Max kVAh Demand	✓	✓	✓
67.	Old Utility kWh	✓	✓	✓
68.	Old Generator kWh	✓	✓	✓
69.	Old Utility kVAh	✓	✓	✓
70.	Old Generator kVAh	✓	✓	✓
71.	Old Utility kVAh	✓	✓	✓
72.	Old Generator kVAh	✓	✓	✓
73.	Old Utility Run Hour	✓	✓	✓
74.	Old Utility On Hour	✓	✓	✓
75.	Old Utility Number of Interruptions	✓	✓	✓
76.	Old Generator Run Hour	✓	✓	✓
77.	Old Generator On Hour	✓	✓	✓
78.	Old Generator Number of Interruptions	✓	✓	✓
79.	Old Total Run Hour	✓	✓	✓
80.	Old Total On Hour	✓	✓	✓
81.	Phase Reversal Indication	✓	✗	✗
82.	Phaser Diagram	✓	✗	✓
83.	Voltage Waveform	✓	✓	✓
84.	Current Waveform	✓	✓	✓
85.	% THD Voltage L1-N	✓	✗	✓
86.	% THD Voltage L2-N	✓	✗	✗
87.	% THD Voltage L3-N	✓	✗	✗
88.	% THD Voltage L1-L2	✗	✓	✗
89.	% THD Voltage L2-L3	✗	✓	✗
90.	% THD Voltage L3-L1	✗	✓	✗
91.	% THD Current L1	✓	✓	✓
92.	% THD Current L2	✓	✗	✗
93.	% THD Current L3	✓	✓	✗
94.	% THD Voltage Mean	✓	✓	✗
95.	% THD Current Mean	✓	✓	✗



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### Display Parameter:

✓ : Available × : Not Available

Sr No	Displayed Parameters	3 Phase 4Wire	3Phase 3Wire	1Phase 2Wire
96.	RMS voltage of Harmonics	✓	✓	✓
97.	RMS Current of Harmonics	✓	✓	✓
98.	Fundamental Active Power per phase	✓	×	✓
99.	Fundamental Reactive Power per phase	✓	×	✓
100.	Fundamental Apparent Power per phase	✓	×	✓
101.	Fundamental Power Factor per phase	✓	×	✓
102.	Individual Harmonic Active Power per phase	✓	×	✓
103.	Individual Harmonic Reactive Power per phase	✓	×	✓
104.	Individual Harmonic Apparent Power per phase	✓	×	✓
105.	Distortion Factor of all harmonics on phase voltage	✓	✓	✓
106.	Distortion Factor of all harmonics on phase Current	✓	✓	✓
107.	Power Factor of Individual Harmonic per phase	✓	×	✓
108.	Fundamental voltage RMS per phase	✓	✓	✓
109.	Fundamental current RMS per phase	✓	✓	✓

### Ordering Information:

Ordering information	Ordering Code RISH EM 3490DSi
System Type (Connection network)	
3 Phase ( onsite programmable to 3PH4W, 3PH3W )	3
1 Phase	1
Optional:	
MODBUS (RS485) output	M
MODBUS Option not used	NM
Optional: 2 Relay Output	
With 2-relay output	2R
Without relay output	NR

#### Order Code Examples:

1. RISH EM 3490DSi – 3 - M - 2R

RISH Dual Source Energy Meter 3490DSi, three Phase, with MODBUS output, With 2 relay output.

2. RISH EM 3490DSi – 1 - NM - 2R

RISH Dual Source Energy Meter 3490DSi, Single Phase, With 2 relay output.



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