RISHABH

Data Sheet

RISH Master 3440i

Multifunction Device

RoHS CE

Measure Control Record Analyze

Data Sheet

RISH Master 3440i

Application :

RISH Master 3440i measures important electrical parameters & replaces the multiple analog panel meters. It measures electrical parameters like AC current, Voltage, frequency, Power, Energy (Active/ Reactive/Apparent), Harmonic Distortion. The instrument has optional output as one pulse output or two pulse output for energy measurement.

Product Features:

Touch screen graphics LCD:
Rish Master **3440i** has touch sensible color graphics LCD display with resolution of 320x240.

Phasor Diagram:
Pictorial representation of all 3 Phases (Voltage & Current) in terms of vectors.

Custom color setting:
User can assign individual colour for each each phase as per the application requirement through display .

WaveForm:
Pictorial representation of all 3 phases Current & voltage in terms of sinusoidal waveform.

Energy measurement (Import and Export):
Active energy (kWh), Reactive energy (kVArh) and Apparent energy (kVAh). Any of the parameters can be freely assigned to 2 optional pulse outputs.

Energy Count storage:
In case of power failure, the instrument memorizes the last energy count.

Min Max storage of parameters possible:
The instrument stores minimum and maximum values for System Voltage and System Current. Every 40 sec minimum and maximum readings are updated.

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.

True RMS measurement:
The instrument measures distorted waveform up to 15th Harmonic.

Phase reversal indication:
The instrument can detect wrong phase sequence or failure of one of the input voltages and displays error message.

Programmable Energy format & Energy rollover count:
Customer can assign the format for energy display on MODBUS (RS485) in terms of Wh, kWh or MWh. Additional to this, customer can also set a rollover count from 7 to 14 digits (for Wh), 7 to 12 digits (for kWh) & 7 to 9 digits (for MWh), after which the energy will roll back to zero. The above settings are applicable for all types of energy.

Optional MODBUS (RS485) Output (With Optical Isolation)
The optional ModBus output enables the instrument to transmit all the measured parameters over standard MODBUS (RS485).

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.

Optional Pulse Output (1 or 2 Relay 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 – 4-20mA or 0 -1 mA): 2 Analog outputs can be programmed from a list of input parameters.

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- 2001

EMC Compatibility:
Compliance to International standard IEC 61326

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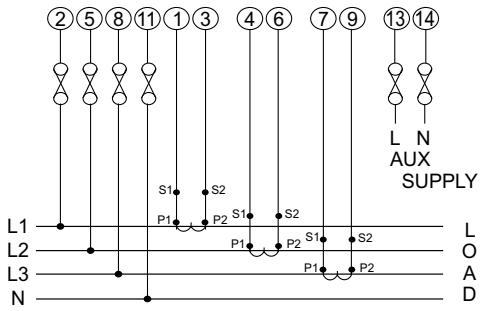
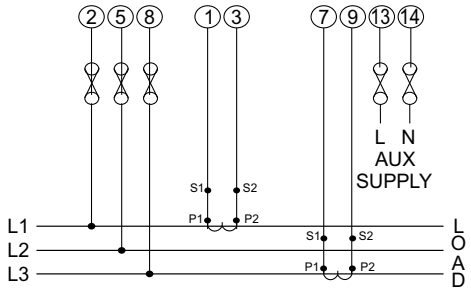
Electrical Connection:

Network Types :



a) 3 Phase 4 Wire Unbalanced Load



b) 3 Phase 3 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 3.5mm.

Permissible cross section of the connections wires:
<= 4.0 mm sqr. single wire or 2x2.5mm sqr. fine wire

Technical Specifications:

Input Voltage:	
Nominal input voltage (AC RMS)	Phase –Neutral 57.7 - 346 V_{L-N} Line-Line 100 - 600 V_{L-L}
System PT primary values	100VLL to 692kVLL programmable on site*.
Max continuous input voltage	120% of rated value
Input Current:	
Nominal input current	1A / 5A AC RMS.
System CT secondary values	1A & 5A programmable on site.
System CT primary values	From 1A up to 9999A* (for 1 or 5 Amp)
Max continuous input current	120% of rated value
Auxiliary Supply:	
AC /DC Auxiliary Supply	60 – 300 VAC /DC OR 65 – 300 VAC /DC for Ethernet Option OR 12 – 60 VAC /DC
AC Auxiliary supply frequency range	45 to 66 Hz
VA Burden:	
Nominal input voltage burden	< 0.35 VA approx. per phase
Nominal input current burden	< 0.3 VA approx. per phase
Auxillary Supply burden	< 6.5 VA approx. < 8 VA approx. for Analog / Ethernet option
Overload Withstand:	
Voltage	2 x rated value for 1 second, repeated 10 times at 10 second intervals
Current	20x for 1 second, repeated 5 times at 5 min
Operating Measuring Ranges:	
Voltage	10… 120% of rated value
Current	5 … 120% of rated value
Frequency	40…70 Hz
Power Factor	0.5 Lag ... 1... 0.8 Lead
Reference conditions for Accuracy:	
Reference temperature	23°C +/- 2°C
Input waveform	Sinusoidal (distortion factor 0.005)
Input frequency	50 or 60 Hz ±2%
Auxiliary supply voltage	Rated Value ±1%
Auxiliary supply frequency	Rated Value ±1%
Voltage Range	50... 100% of Nominal Value. 60... 100% of Nominal Value for THD.
Current Range	10... 100% of Nominal Value. 20... 100% of Nominal Value for THD.
Power	Cos phi / sin phi = 1 for Active / Reactive Power & Energy. 10... 100% of Nominal Current & 50... 100% of Nominal Voltage.
Power Factor / Phase Angle	40... 100% of Nominal Current & 50... 100% of Nominal Voltage

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*Max Power setting 462.962 MVA Per phase
i.e (CT Primary x PT Primary (VLL) / 1.73205) < 462.962 MVA

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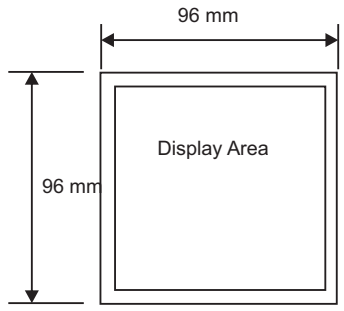
Technical Specifications:

Accuracy:

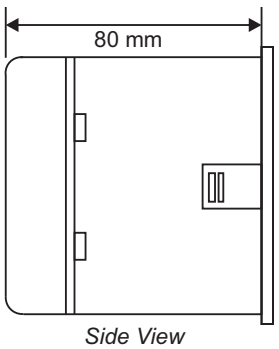
	Class 1.0 (Standard)	Class 0.5 (on request)	Class 0.2 (on request)
Voltage	± 0.5% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Current	± 0.5% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Frequency	± 0.15% of mid frequency	± 0.15% of mid frequency	± 0.15% of mid frequency
Active Power	± 0.5% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Re-Active Power	± 0.5% of Nominal value	± 0.5% of Nominal value	± 0.4% of Nominal value
Apparent Power	± 0.5% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Active energy (kWh)	± 1.0% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Re Active energy (kVArh)	± 1.0% of Nominal value	± 0.5% of Nominal value	± 0.5% of Nominal value
Apparent energy (kVAh)	± 1.0% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Accuracy of Analog Output	1 % of Output end value	1 % of Output end value	1 % of Output end value
Power Factor	±1% of Unity	±1% of Unity	±1.0% of Unity
Angle	±1% of range	±1% of range	±1% of range
Total Harmonic Distortion	±1%	±1%	±1%

Note:- Measurement error is normally much less than the error specified above. Variation due to influence quantity is less than twice the error allowed for reference condition

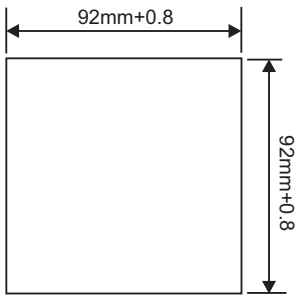
Dimensions Details:



Front View



Side View



Panel Cutout

Influence of Variations:

Temperature coefficient : (for rated value range of use (0…50°C))	0.025%/°C - Voltage (50... 120% of rated value) 0.05%/°C - Current (10... 120% of rated value)

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 61010-1-2001 , Permanently connected use
IP for water & dust	IEC60529
Pollution degree:	2
Installation category:	III
High Voltage Test	2.2 kV AC, 50Hz for 1 minute between all electrical circuits

Environmental

Operating temperature	-10 to +55°C
Storage temperature	-20 to +65°C
Relative humidity	0... 90% non condensing
Warm up time	Minimum 3 minute
Shock	15g in 3 planes
Vibration	10... 55 Hz, 0.15mm amplitude
Enclosure	IP54 (front face only)

Energy Pulsed Output Option :

Relay contact	1 NO + 1 NC
Switching Voltage & Current for Relay	240 VDC ,5 A

Default pulse rate divisor

1	1 per Wh (up to 3600W),	1 per kWh (up to 3600kW),	1 per MWh (above 3600 kWh)
10	1 per 10 Wh (up to 3600W),	1 per 10kWh (up to 3600kW),	1 per 10MWh (above 3600 kWh)
100	1 per 100Wh (up to 3600W),	1 per 100kWh (up to 3600kW),	1 per 100MWh (above 3600 kWh)
1000	1 per 1000Wh (up to 3600W),	1 per 1000kWh (up to 3600kW),	1 per 1000MWh (above 3600 kWh)

Other Pulse rate divisors (applicable only when Energy on RS485 is in **Wh**)

Pulse duration	60 ms, 100 ms or 200 ms

Note : Above conditions are also applicable for Reactive and Apparent Energy .

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Parameter Measurement and Display:

Sr No	Displayed Parameters	3Phase 4Wire	3Phase 3Wire
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.	Import kVArh (8 digit resolution)	✓	✓
36.	Export kVArh (8 digit resolution)	✓	✓
37.	kVAh (8 digit resolution)	✓	✓
38.	KAh (8 digit resolution)	✓	✓
39.	Current Demand	✓	✓
40.	KVA Demand	✓	✓
41.	KW Import Demand	✓	✓
42.	KW Export Demand	✓	✓
43.	Max Current Demand	✓	✓
44.	Max KVA Demand	✓	✓
45.	Max KW Import Demand	✓	✓
46.	Max KW Export Demand	✓	✓
47.	Run Hour	✓	✓
48.	On Hour	✓	✓
49.	Number of Interruptions	✓	✓
50.	Phase Reversal Indication	✓	✓

Parameter Measurement and Display:

Sr No	Displayed Parameters	3Phase 4Wire	3Phase 3Wire
51.	THD Volts L1-N	✓	×
52.	THD Volts L2-N	✓	×
53.	THD Volts L3-N	✓	×
54.	THD Volts L1-L2	×	✓
55.	THD Volts L2-L3	×	✓
56.	THD Volts L3-L1	×	✓
57.	THD Current L1	✓	✓
58.	THD Current L2	✓	✓
59.	THD Current L3	✓	✓
60.	THD Voltage Mean	✓	✓
61.	THD Current Mean	✓	✓

Order Code:

Ordering information	**Ordering Code** RISH Master 3440i
Accuracy Class	
Accuracy 1.0% **(Standard)**	1.0
Accuracy 0.5% **(on request)**	0.5
Accuracy 0.2% **(on request)**	0.2
Auxiliary Voltage	
60-300V AC DC	H
12-60V AC DC	L
Optional:	
RS 485 + 2 Pulse output	1
RS 485 + 1 Pulse output + 2 Analog output	2
Ethernet	3
Option not used	Z

Order Code Example:

RISH Master 3440i 0.2 – H – 1
RISH Master 3440i , Accuracy 0.2**%** ,60 - 300V AC DC Auxiliary supply, with MODBUS (RS485),with 2 pulse output.

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All specifications are subject to change without notice

Measure Control Record Analyze

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