RISHABH

Data Sheet

RISH MASTER 3440i/3440iDL

Multifunction Meter (Class 0.2S)



RoHS CE

Measure Control Record Analyze Optimize

RISH Master 3440i is a class 0.2S as per IEC 62053-22. It measures more than 46 important electrical parameters in 3 phase 4 wire, 3 phase 3 wire and 1 phase 2 wire system along with THD & individual harmonics upto 31st. It can communicate through ethernet /RS485 with external device, and it also has Pulse output for energy measurement, Limit output and 4-20mA analog output. In addition to this, RISH Master 3440iDL has Timer and RTC based relay, sag, swell & over current logging and an inbuilt 8MB flash for datalogging.

Product Features

Touch screen graphics LCD

Rish Master 3440i/3440iDL has touch sensible color graphics LCD display with resolution of 320X240

Active Energy - Class 0.2S as per IEC 62053-22

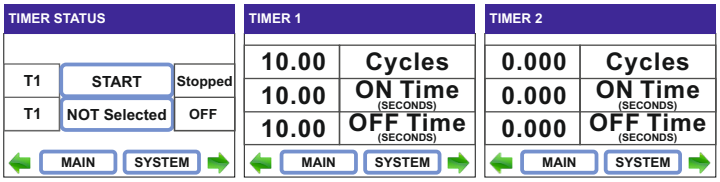
RTC (Real Time Clock) (RM3440iDL)

Inbuilt real time clock for display of date and time, along with time stamping for data logging and Event recording

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
- **Limit (Alarm)** switch. to trip one or two relays if the programmed parameter exceeds the programmed High & Low Limits
- **RTC relay** for RM3440iDL to control some instrument automatically over the period of a week repetitively
- **Timer Relay Output** for RM3440iDL to operate relay in cyclic manner



Optional Analog Outputs (2 Outputs)

2 Analog outputs can be programmed from a list of input parameters.

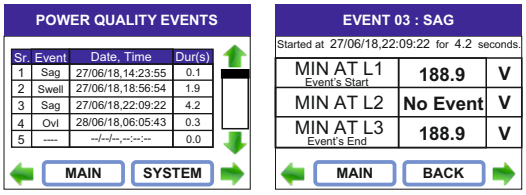
Data logging (RM440iDL)

Meter has inbuilt 8MB Flash for datalogging. Following options are available:

- Event Logging: Previous 5 events of factory default parameters can be logged with Date and time
- Time based logging: User selectable parameters (1 to 30) can be logged at regular intervals(1 to 60min) with Date and Time stamp in internal memory and and can be accessed via Modbus or Ethernet or USB
- If 1 Parameter for example energy is selected with logging interval of 15 minutes, log of maximum 948 days are available for user. If 30 Parameters are selected with logging interval of 60 minutes, log of maximum 355 days are available for user
- Load Profile logging : Logging of energy consumed and peak Demand (Power and Current) in a day and in month for efficient tracking of load behaviour
- Maximum 1 year daily and 14years of monthly log is available for user

Sag, Swell and OverCurrent (RM440iDL)

Sag, Swell and Over Current detection and storage for recent 30 such events with their date & time of detection, duration (min. 100 msec) and start and end phase indication of the corresponding event



Direct remote access (Optional)

Remote configuration of the Instrument and access of measured parameter via Modbus or through Ethernet interface (Modbus TCP/IP)

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

Programmable Energy format & Energy rollover count

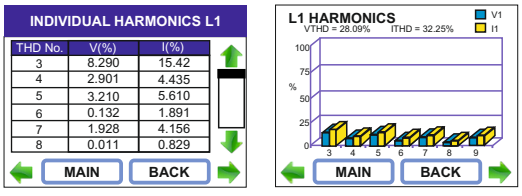
Customer can assign the format for energy display on MODBUS (RS485) in terms of W, kW or MW. Additional to this, customer can also set a rollover count from 7 to 9 digits, after which the energy will roll back to zero. The above settings are applicable for all types of energy

Auto Energy Ranging Count on Display

The Energy count rollover from Watt to KWatt then to MWatt as energy increases over the period

THD and Individual Harmonics measurement

The instrument can measure per phase THD of voltage & current, and individual (upto 31st) harmonics of voltage and current



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

Product Features

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

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

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

User Assignable Registers for MODBUS
Customer can assign MODBUS register address as per his need for faster response time.

User selectable CT and PT secondary
The secondary of the Current Transformer (CT) and Potential Transformer (PT) can be programmed via front panel by entering into Programming mode or remotely via MODBUS (Rs485)/ Ethernet.

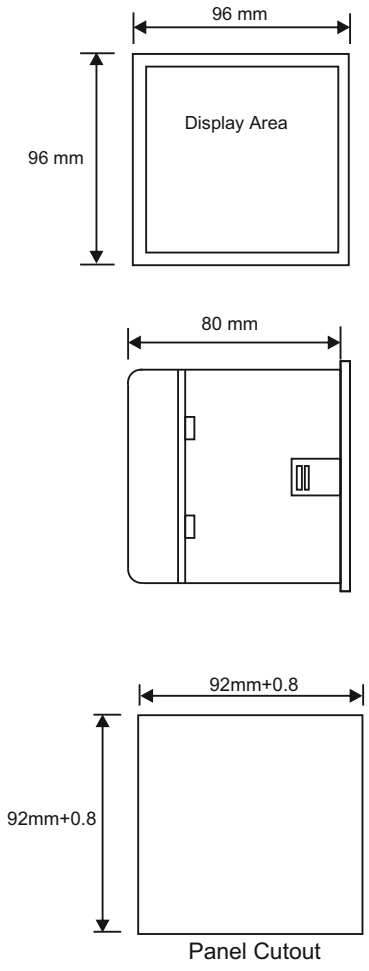
Parameter Screen recall
In case of power failure, the instrument memorizes the last displayed screen.

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

Enclosure Protection for dust and water
conforms to IP 54 (front face) as per IEC60529.

EMC Compatibilityds
Compliance to International standard IEC 61326.

Dimensions Details



Technical Specifications:

Input Voltage

Nominal input voltage (AC RMS)	100V_{LL} to 600 V_{LL}, 57.5V_{LN} to 346.42 V_{LN} Programmable on site
System PT primary values	100V_{LL} to 765kV_{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)

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
Overload Withstand	20 x rated value for 1 second, repeated 5 times at 5 minute intervals

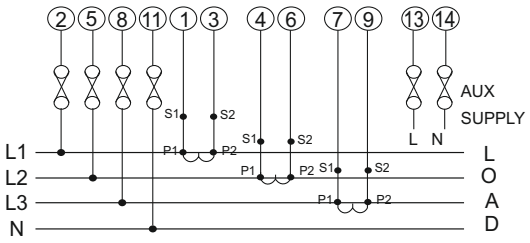
Auxiliary Supply

Higher Auxiliary supply range	100-550V AC/DC (230V AC/DC Nominal)
Lower Auxiliary supply range	12-60V AC/DC (24V AC / 48VDC Nominal)
Aux Supply frequency	45 to 65 Hz range
Auxiliary Supply burden (at nominal value)	
• With Addon card (Modbus + 2Relay)	< 8 VA approx.
• With Ethernet card	< 9 VA approx.

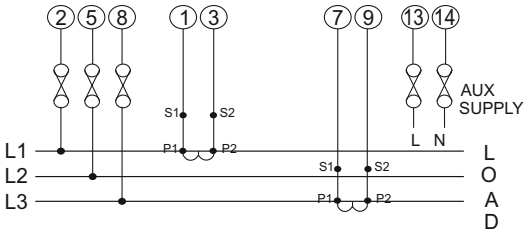
Operating Measuring Ranges

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

Electrical Connections



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 3.5 mm.

Permissible cross section of the connection wires:

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%
Auxilary supply	230V AC/DC ± 1%
Auxilary 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

Technical Specifications:

Interfaces

Impulse LED	For Energy testing
Relay (Optional)	250V AC, 5A AC 30V DC, 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.

Parameter Measurement and Display

✓ : Available × : Not Available

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

Parameter Measurement and Display

✓ : Available × : Not Available

Sr No	Displayed Parameters	3Phase 4Wire	3Phase 3Wire	1Phase 2Wire
54.	RTC #	✓	✓	✓
55.	Individual Harmonics V	✓	✓	✓
56.	Individual Harmonics I	✓	✓	✓
57.	Timer 1 No. of Cycles, ON, OFF Delay #	✓	✓	✓
58.	Timer 2 No. of Cycles, ON, OFF Delay #	✓	✓	✓
59.	Sag, Swell & Overcurrent #	✓	✓	✓
60.	THD Volts L1-N	✓	×	×
61.	THD Volts L2-N	✓	×	×
62	THD Volts L3-N	✓	×	×
63.	THD Volts L1-L2	×	✓	×
64.	THD Volts L2-L3	×	✓	×
65.	THD Volts L3-L1	×	✓	×
66	THD Current L1	✓	✓	×
67.	THD Current L2	✓	×	×
68.	THD Current L3	✓	✓	×
69.	THD Voltage Mean	✓	✓	✓
70.	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.
- Parameters are available for *RM3440iDL* only.

Model wise Features

Features	RM3440i	RM3440iDL
System Type	3P/1P as per	programmable
RTC	×	✓
Relay Options	Pulse/ Limit	Pulse/ Limit/
Optional Analog Outputs	✓	✓
Datalogging	×	✓
Sag, Swell & Overcurrent	×	✓
Remote Modbus Access	✓	✓
Remote Ethernet Access	✓	✓
Energy Measurement (Wh,VArh,VAh)	✓	✓
Programmable Energy format & Energy Rollover Count	✓	✓
Auto Energy Ranging on display	✓	✓
Per Phase V & I THD	✓	✓
Upto 31st individual harmonics	✓	✓
Autoscroll	✓	✓
Phasor Diagram	✓	✓
Phase Sequence Indication	✓	✓
User Selectable CT/ PT	✓	✓
User Assignable Modbus Registers	✓	✓
Measurement Screen Recall	✓	✓

Ordering Information

Ordering Information	MA4S-	4T1	X	A	X	XXXX	000
Product Type	RISH MASTER 3440i / 3440i DL - 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)						
	(1PH : 57.7-346.41VL-N), CT-1A/5A						
Auxiliary Supply	12-60V AC/DC				L		
	100-550V AC/DC				U		
Output Option	NONE					ZZZ0	
	RS485 + 2 Relay (For Rish Master 3440i)					RDZ0	
	RS485 + 1 Relay + 2 Analog (4-20mA) Output (For Rish Master 3440i)					RS10	
	Ethernet (For Rish Master 3440i)					EZZ0	
	RS485 + 2 Relay + Datalogging (For Rish Master 3440i DL)					RDZD	
	RS485 + 1 Relay + 2 Analog (4-20mA) Output + Datalogging (For Rish Master 3440i DL)					RS1D	
	Ethernet + Datalogging (For Rish Master 3440i DL)					EZZD	

Order Code Example : MA4S-4T13ALRDZD000
RISH MASTER 3440i DL - Input 3 Phase, 100-600L-L, 1A/5A, Aux 12-60V AC/DC, with RS485 + 2 Relay output, with Datalogging , Accuracy Class 0.2S

Order Code Example : MA4S-4T13ALRS10000
RISH MASTER 3440i - Input 3 Phase, 100-600L-L, 1A/5A, Aux 12-60V AC/DC, with RS485 + 1 Relay + 2 Analog (4-20mA) output, Accuracy Class 0.2S

Specifications may change without prior notice

Measure Control Record Analyze Optimize

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