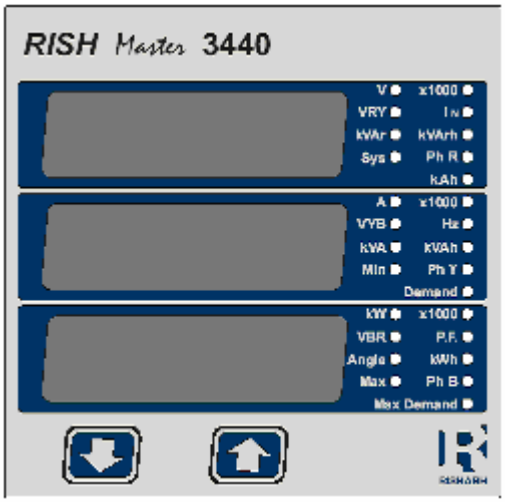
RISH Master *3440* Digital Multifunction Instrument

Application:

Rish Master 3440 measures important electrical parameters in 3 phase and single phase Network & replaces the multiple analog panel meters. It measures electrical parameters like AC current, Voltage, frequency, active energy *import* & active energy *export, Current Demand, kW Demand, kVA Demand and Max Current Demand, Max kW Demand and Max kVA Demand*. The instrument has optional output as one pulse output or two pulse output for energy measurement.



Product Features:

On site programmable PT/CT ratios:

It is possible to program primary of external potential Transformer (PT), primary of external Current Transformer (CT) on site locally via front panel keys by entering into Programming mode or remotely via MODBUS (RS485)

User selectable CT Secondary 5A / 1A

The secondary of external Current Transformer (CT) can be programmed on site to either 5A or 1A locally via front panel keys by entering into Programming mode or remotely via MODBUS (RS485)

User selectable PT Secondary

The secondary of external potential Transformer (PT) can be programmed on locally via front panel keys by entering into Programming mode or remotely via MODBUS (RS485)

User selectable 3 phase 3W or 4W

User can program on site the network connection as either 3 Phase 3 Wire or 4 Wire locally via front panel keys by entering into Programming mode or remotely via MODBUS (RS485). For single phase applications, single phase version is available.

Low back depth:

The instrument has very low back depth (behind the panel) of less than 80 mm in spite of optional features like pulse output

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).

Phase reversal indication

The instrument can detect wrong phase sequence or failure of one of the input voltages and displays "phase" error message.

Energy measurement (Import and Export):

Active energy (kWh), Reactive energy (kVArh), Apparent energy (kVAh) & Ampere Hour (kAh). Any of the parameters can be freely assigned to 2 optional pulse outputs.

True RMS measurement

The instrument measures distorted waveform up to 15th Harmonic.

High brightness 3 line 4 digits LED display:

Simultaneous display of 3 Parameters

User selectable Low Current suppression(below 30 mA) : User can suppress the readings below 30 mA in the current measurement by onsite programming if required.

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.

Number of parameters measured: more than 46

The instrument measures more than 46 electrical parameters of 3 Phase network.

Parameter Screen recall:

In case of power failure, the instrument memorizes the last displayed screen. The displayed screen will get memorized only if user keeps this screen for minimum 40 sec duration before power failure for fixed screen mode.

Energy Count storage:

In case of power failure, the instrument memorizes the last energy count. Every 40 sec, the instrument updates the energy counter in the non-volatile memory.

Hour Run, ON Hour, Number of Interruptions: Hour run 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.

Optional MODBUS (RS485) Output

The optional ModBus output enables the instrument to transmit all the measured parameters over standard MODBUS (RS485).

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

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.

Configuration of the Instrument via MODBUS: The instrument settings can be configured locally via front panel keys by entering into Programming mode or remotely via MODBUS (RS485). Note: The MODBUS communication parameters can only be set locally via front panel keys in the Programming mode.

Optional Analog Outputs (1 or 2 Outputs): 1 or 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

Technical Specifications:

Input Voltage:

Nominal input voltage (AC RMS)	Phase –Neutral	57.7 - 277V L-N	Line-Line	100 - 480V L-L
Max continuous input voltage	120% of rated value			

Input Current:

Nominal input current	1 or 5A AC RMS (programmable on site)
System CT primary values	Std. values up to 4kA (1 or 5 Amp)
Max continuous input current	120% of rated value

Auxiliary Supply:

AC Auxiliary Supply	110 V AC -15% / +20% / 230 V AC -15% / +20% / 380 VAC-15% / +20 ,45 to 66 Hz
ACDC Auxiliary Supply	100V… 250 VAC DC

VA Burden:

Nominal input voltage burden	< 0.2 VA approx. per phase
Nominal input current burden	< 0.6 VA approx. per phase
AC Supply burden	4 VA

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	5… 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%
Power Factor	0.866 lag….1….0.866 lead

Accuracy:

Voltage	**±0.5% of range (50... 100% of rated value)**
Current	**±0.5% of range (10... 100% of rated value)**
Frequency	**0.15% of mid frequency**
Active Power	**±0.5% of range (10... 100% of rated value)**
Re-Active Power	**±0.5% of range (10... 100% of rated value)**
Apparent Power	**±0.5% of range (10... 100% of rated value)**
Active energy (kWh)	**1% (IEC 62053-21) Active P.F. 0.866 lag... 1...0.866 lead**
Re Active energy (kVArh)	**1% (IEC 62053-21) 0.866 lag... 1...0.866 lead**
Apparent energy (kVAh)	**1%**
Ampere Hour (kAh)	**1%**
Phase angle & Power Factor	**1 % of range**
Accuracy of Analog Output	**1 % of Output end value**

Influence of Variations:

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

Pulsed Output Option:

Energy (can be programmed for different energy parameters simultaneously):

Relay contact	1 NO + 1 NC		
Switching Voltage & Current for Relay	240 VDC ,5 A		
Default pulse rate divisor	1 per Wh (up to 3600W),	1 per kWh (up to 3600kW),	1 per MWh (above 3600 kWh)
Other Pulse rate divisors			
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)
Pulse duration	60 ms, 100 ms or 200 ms		

Above options are also applicable to Apparent & reactive Energy.

Ampere Hour:

Default pulse rate divisor	CT secondary = 1A Max pulse rate 3600 pulses/Ah * CT secondary = 5A Max pulse rate 720 pulses/Ah
Other Pulse rate divisors	
10	CT secondary = 1A Max pulse rate 3600 pulses/10Ah * CT secondary = 5A Max pulse rate 720 pulses/10Ah
100	CT secondary = 1A Max pulse rate 3600 pulses/100Ah * CT secondary = 5A Max pulse rate 720 pulses/100Ah
1000	CT secondary = 1A Max pulse rate 3600 pulses/1000Ah * CT secondary = 5A Max pulse rate 720 pulses/1000Ah
Pulse duration	60 ms, 100 ms or 200 ms

$$\text{*No. of Pulses} = \frac{\text{Maximum Pulses}}{\text{CT Ratio}}$$

Where, CT Ratio = (CT primary/ CT Secondary)

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.

PT Secondary Ranges for Various Input Voltage:

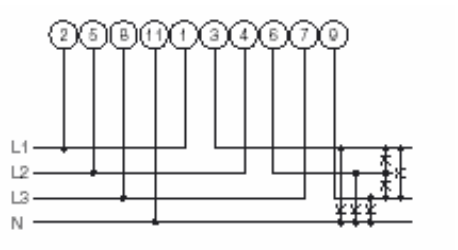
Input Voltage	PT Secondary Settable Range
110V L-L (63.5V L-N)	100V – 120V L-L (57V – 69V L-N)
230V L-L (133V L-N)	121V – 239V L-L (70V – 139V L-N)
415V L-L (239.6V L-N)	240V – 480V L-L (140V – 277V L-N)

DISPLAYED PARAMETERS:

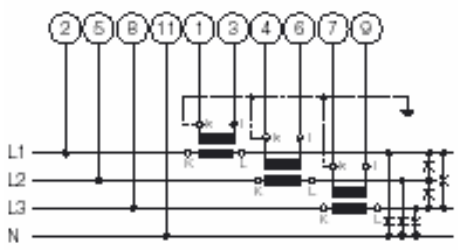
Sr No	Displayed Parameters	3 Phase 4 Wire	3 Phase 3 Wire	Single phase 2 Wire
1.	System Volts	P	P	P
2.	System Current	P	P	P
3.	Volts L1 – N	P	O	O
4.	Volts L2 – N	P	O	O
5.	Volts L3 – N	P	O	O
6.	Volts L1 – L2	P	P	O
7.	Volts L2 – L3	P	P	O
8.	Volts L3 – L1	P	P	O
9.	Current L1	P	P	O
10.	Current L2	P	P	O
11.	Current L3	P	P	O
12.	Neutral Current	P	O	O
13.	Frequency	P	P	P
14.	System Active Power (kW)	P	P	P
15.	Active Power L1 (kW)	P	O	O
16.	Active Power L2 (kW)	P	O	O
17.	Active Power L3 (kW)	P	O	O
18.	System Re-active Power (kVAr)	P	P	P
19.	Re-active Power L1 (kVAr)	P	O	O
20.	Re-active Power L2 (kVAr)	P	O	O
21.	Re-active Power L3 (kVAr)	P	O	O
22.	System Apparent Power (kVA)	P	P	P
23.	Apparent Power L1 (kVA)	P	O	O
24.	Apparent Power L2 (kVA)	P	O	O
25.	Apparent Power L3 (kVA)	P	O	O
26.	System Power Factor	P	P	P
27.	Power Factor L1	P	O	O
28.	Power Factor L2	P	O	O
29.	Power Factor L3	P	O	O
30.	Phase Angle L1	P	O	P
31.	Phase Angle L2	P	O	O
32.	Phase Angle L3	P	O	O
33.	Import kWh (8 digit resolution)	P	P	P
34.	Export kWh (8 digit resolution)	P	P	P
35.	Import kVArh (8 digit resolution)	P	P	P
36.	Export kVArh (8 digit resolution)	P	P	P
37.	kVAh (8 digit resolution)	P	P	P
38.	KAh (8 digit resolution)	P	P	P
39.	Current Demand	P	P	P
40.	KVA Demand	P	P	P
41.	KW Import Demand	P	P	P
42.	KW Export Demand	P	P	P
43.	Max Current Demand	P	P	P
44.	Max KVA Demand	P	P	P
45.	Max KW Import Demand	P	P	P
46.	Max KW Export Demand	P	P	P
47.	Run Hour	P	P	P
48.	On Hour	P	P	P
49.	Number of Interruptions	P	P	P
50.	Phase Reversal Indication	P	P	O

Electrical Connections:

For 3 Phase 4 Wire Unbalanced Load

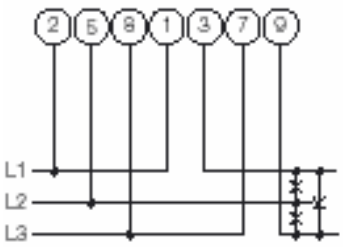


for Direct operated meter

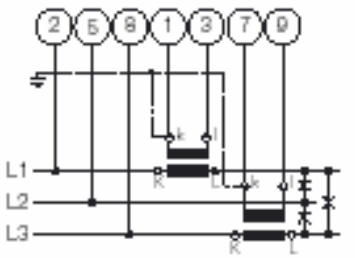


for CT operated meter

For 3 Phase 3 Wire Unbalanced Load

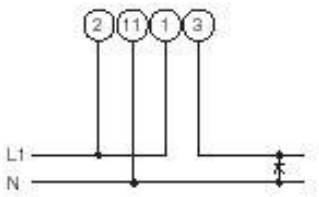


for Direct operated meter

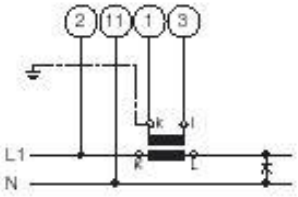


for CT operated meter

For Single Phase



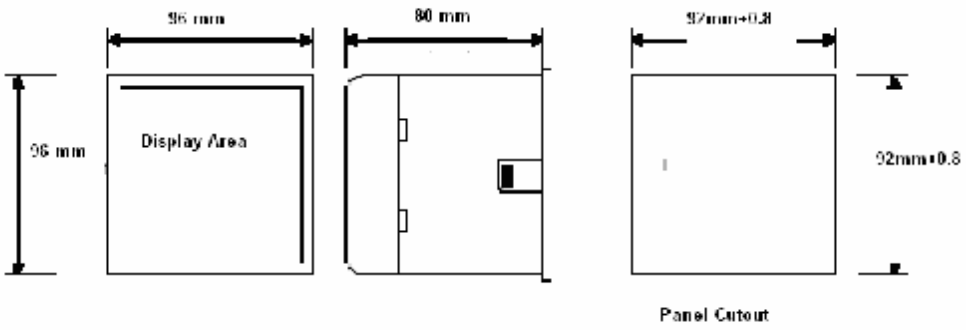
for Direct operated meter



for CT operated meter

It is recommended that the wires used for connections to the instrument should have lugs soldered at the end. That is, theconnections 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: <= 4.0 mm^2 single wire or 2 × 2.5 mm^2 fine wire.

Dimensions:



Ordering information	Ordering Code
	Rish Master 3440
System Type (Connection network)	
3 Phase (programmable as 4 Wire or 3 Wire on site)	3
1 Phase	1
Input Voltage	
110V L-L (63.5V L-N)	110
230V L-L (133V L-N)	230
415V L-L (239.6V L-N)	415
440V L-L (254V L-N)	440
AC Auxiliary Voltage	
110 V AC -15% / +20%	L
230 V AC -15% / +20%	M
380 VAC-15% / +20 %	H
100V... 250 V AC DC -10% / +10 %	A
12V... 48V DC -10% / +10 %	D
Optional:	
MODBUS (RS485) output	R
MODBUS Option not used	Z
Optional: Pulse Output for energy measurement /Limit Switch	
1 Pulse output (1 Limit Switch)	S
2 Pulse output (2 Limit Switch)	D
Pulse Output option not used	Z
Optional: Analog Outputs	
2 outputs (0-1mA DC each)	1
2 outputs (4-20 mA DC each)	2
Analog Outputs option not used	Z

Order Code Example

Rish Master 3440 – 3 – 415 –M – R –D–2

Rish Master 3440, 3 phase(programmable onsite as 4 wire or 3 Wire), 415L-L nominal voltage, 230 AC Auxiliary supply, with MODBUS (RS485),with 2 pulse output and 2 Analog Outputs. (No need to specify CT secondary as 5 A or 1 A is programmable on site.)

Types	AC Aux (110V,230,380VAC)	100…250VACDC Aux	12…48VDC Aux
3440	P	P	P
3440 + 1pulse (1 Limit)	P	P	P
3440 + 2pulse (2 Limit)	P	P	P
3440 + RS485	P	P	P
3440 + 2 Analog Output	P	P	P
3440 + 1pulse (1 Limit) +RS485	O	P	P
3440 + 1pulse (1 Limit)+ 2 Analog Output	O	P	P
3440 + 2pulse (2 Limit)+ RS485	O	P	P
3440 + RS485+ 2 Analog Output	O	P	P
3440 + RS485+1pulse (1 Limit))+ 2 Analog Output	O	P	P

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