

# Digital Multifunction Instrument - Rish Master 3430

## Application

Rish Master 3430 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, Power, Energy (Active /Reactive/Apparent ). 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 via front panel keys by entering into Programming mode.

### User selectable CT Secondary 5A/1A

The secondary of external Current Transformer (CT) can be programmed on site to either 5A or 1A using front panel keys.

### User selectable 3 phase 3W or 4W

User can program on site the network connection as either 3 Phase 3 Wire or 4 Wire using front panel keys. 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 using front panel keys.

### Energy measurement (Import and Export):

Active energy (kWhr), Reactive energy (kVAhr) and Apparent energy( kVAhr). Any of the parameters can be freely assigned to 2 optional pulse outputs.

### True RMS measurement

The instrument measures distorted waveform up to 15<sup>th</sup> Harmonic.

### High brightness 3 line 4 digits LED display:

Simultaneous display of 3 Parameters

### Number of parameters measured: up to 37

The instrument measures 37 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.

### 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 40sec minimum and maximum readings are updated.

### Optional MODBUS (RS485) Output

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

### Optional Pulse Output ( 1 or 2 Relay 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.

### 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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## 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
AC Auxiliary supply frequency range	45 to 66 Hz
AC /DC Auxiliary Supply	100 – 250 VAC /DC +/- 10%

### 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%

### 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% (IEC 62053-21)
Accuracy of Analog Output	1 % of Output end value
Power Factor	1% of range
Angle	1% of range

### 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)
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### Display update rate:

Response time to step input	1 sec approx.
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### Applicable Standards:

EMC	IEC 61326
Immunity	IEC 61000-4-3. 10V/m min – Level 3 industrial low level

### Safety

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



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## 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 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		

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

## Displayed Parameters:

Sr.No.	Power measurement	3PH 4W	3PH 3W	1PH 2 W
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)	☞	☞	☞

☞ - Available ☞ - Not available



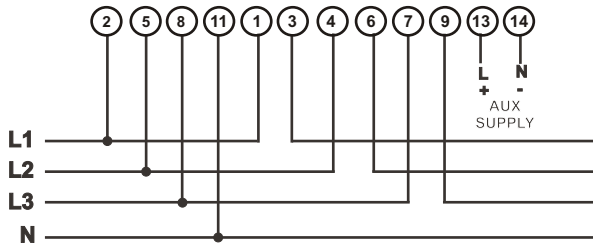
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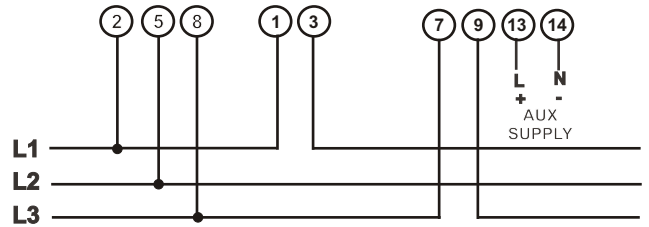
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## Electrical Connections

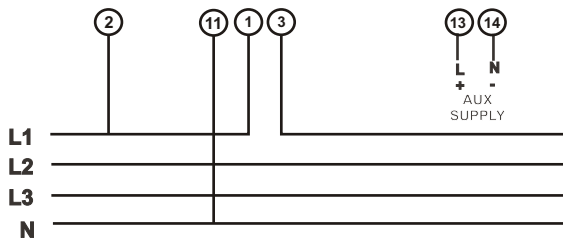
For 3 Phase 4 Wire Unbalanced Load



For 3 Phase 3 Wire Unbalanced Load

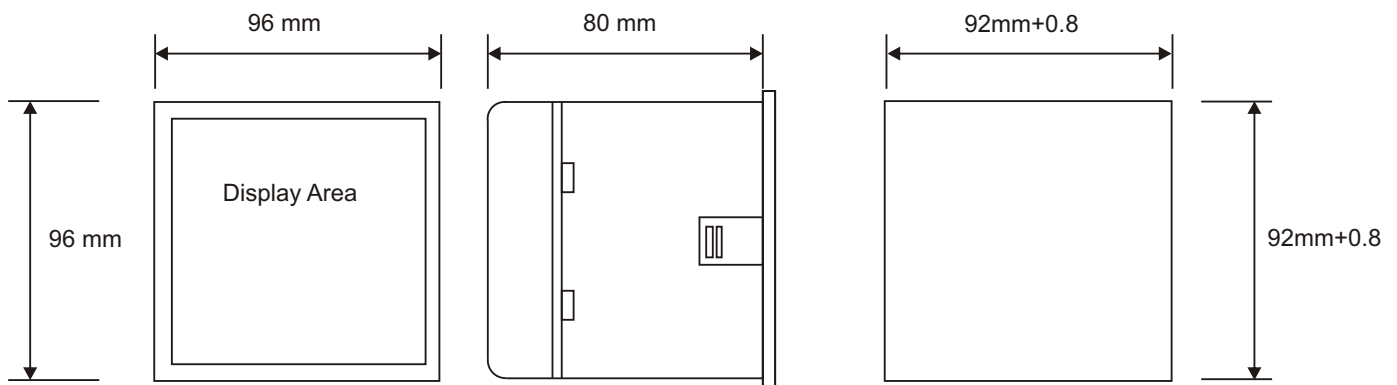


For Single Phase



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:  $\leq 4.0 \text{ mm}^2$  single wire or  $2 \times 2.5 \text{ mm}^2$  fine wire

## Dimensions



Panel Cutout



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## Ordering Information

Ordering information	Ordering Code
	<b>Rish Master 3430</b>
<b>System Type (Connection network)</b>	
<b>3 Phase (programmable as 4 Wire or 3 Wire on site)</b>	<b>3</b>
<b>1 Phase</b>	<b>1</b>
<b>Input Voltage</b>	
<b>110V L-L (63.5V L-N)</b>	<b>110</b>
<b>230V L-L (133V L-N)</b>	<b>230</b>
<b>415V L-L (239.6V L-N)</b>	<b>415</b>
<b>440V L-L (254V L-N)</b>	<b>440</b>
<b>AC Auxiliary Supply Voltage #</b>	
<b>110 V AC -15% / +20%</b>	<b>L</b>
<b>230 V AC -15% / +20%</b>	<b>M</b>
<b>380 VAC -15% / +20 %</b>	<b>H</b>
<b>AC/DC Auxiliary Supply Voltage **</b>	
<b>100 – 250V AC/Dc +/- 10%</b>	<b>AD</b>
<b>Optional:</b>	
<b>MODBUS (RS485) output</b>	<b>R</b>
<b>MODBUS Option not used</b>	<b>Z</b>
<b>Optional: Pulse Output for energy measurement</b>	
<b>1 Pulse output</b>	<b>S</b>
<b>2 Pulse output</b>	<b>D</b>
<b>Pulse Output option not used</b>	<b>Z</b>
<b>Optional: Analog Outputs</b>	
<b>2 outputs ( 0 – 1mA )</b>	<b>1</b>
<b>2 outputs ( 4 – 20 mA )</b>	<b>2</b>
<b>Analog Outputs option not used</b>	<b>Z</b>

## Order Code Example

### Rish Master 3430 – 3 – 415 –AD – R –S–2

Rish Master 3430, 3 phase( programmable onsite as 4 wire or 3 Wire), 415L-L nominal voltage, 100-250V AC/DC Auxiliary supply, with ModBus (RS485),with 1 pulse output and 2 Analog Outputs ( 4 -20 mA ) . (No need to specify CT secondary as 5 A or 1 A is programmable on site.)

Types	AC Aux (110V, 230V, 380VAC)	100...250 VAC/DC Aux
3430	☺	☺
3430 + 1 pulse	☺	☺
3430 + 2 pulse	☺	☺
3430 + RS485	☺	☺
3430 + 2 Analog Output	☺	☺
3430 + 1 pulse + RS485	☺	☺
3430 + 1 pulse + 2 Analog Output	☺	☺
3430 + 2 pulse + RS485	☺	☺
3430 + RS485 + 2 Analog Output	☺	☺
3430 + RS485 + 1 pulse + 2 Analog Output	☺	☺



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