



# Data Sheet

## *RISH* Master 3430



Measure



Control



Record



Analyze

### Application :

**RISH Master 3430** 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:

#### 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 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 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.

#### 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 (kVArhr) and Apparent energy (kVAhr). Any of the parameters can be freely assigned to 2 optional pulse outputs.

#### Energy Update Rate

This updates the energy values in the registers depending on the energy rate selected by the user. Energy update rate can be set from 1 min. to 60 min.

#### True RMS measurement

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

#### 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.

#### 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.

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

Simultaneous display of 3 Parameters



#### Total Harmonic Distortion (THD):

The instrument can measure per phase THD of voltage and THD of current.

#### 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 14 digits (for W), 7 to 12 digits (for kW) & 7 to 9 digits (for MW), after which the energy will roll back to zero. The above settings are applicable for all types of energy.

#### 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.

#### Optional MODBUS (RS485) Output (With Optical Isolation)

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):

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 - 346 V <sub>L-N</sub>
System PT primary values	Line-Line 100 - 600 V <sub>L-L</sub>
Max continuous input voltage	100VLL to 692kVLL programmable on site.
	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:**

Auxiliary Supply	60 - 300 V AC DC	OR	65 – 300 VAC /DC for Ethernet Option	OR
	12 - 60 V AC DC			

AC Auxiliary supply frequency range	45 to 66 Hz
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**VA Burden:**

Nominal input voltage burden	< 0.35 VA approx. per phase
Nominal input current burden	< 0.3 VA approx. per phase
Auxiliary Supply burden	< 5 VA approx

**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... 0.5 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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## 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

## 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

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

Relay contact	1 NO + 1 NC
Switching Voltage & Current for Relay	240 VDC ,5 A
Other Pulse rate divisors (applicable only when Energy on RS485 is in W)	
10	1 per 10 Wh (up to 3600W), 1 per 10kWh (up to 3600kW), 1 per 10MWh (above 3600 kW)
100	1 per 100Wh (up to 3600W), 1 per 100kWh (up to 3600kW), 1 per 100MWh (above 3600 kW)
1000	1 per 1000Wh (up to 3600W), 1 per 1000kWh (up to 3600kW), 1 per 1000MWh (above 3600 kW)

Pulse duration 60 ms, 100 ms or 200 ms

Above options are also applicable to Apparent & reactive Energy.



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## Parameter Measurement and Display:

Sr No	Parameter	3PH 4W	3PH 3W
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.	THD Volts L1-N	✓	✗
39.	THD Volts L2-N	✓	✗
40.	THD Volts L3-N	✓	✗
41.	THD Volts L1-L2	✗	✓
42.	THD Volts L2-L3	✗	✓
43.	THD Volts L3-L1	✗	✓
44.	THD Current L1	✓	✓
45.	THD Current L2	✓	✓
46.	THD Current L3	✓	✓
47.	THD Voltage Mean	✓	✓
48.	THD Current Mean	✓	✓



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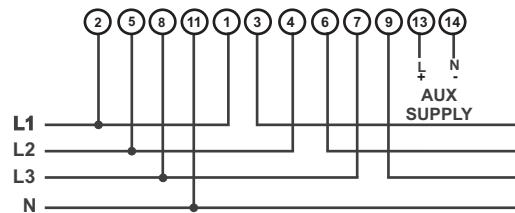
Record



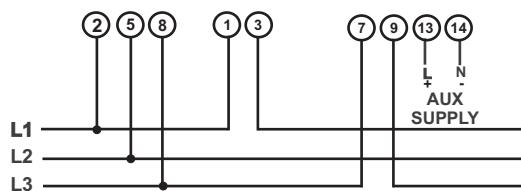
Analyze

## Electrical Connections:

## For 3 Phase 4 Wire Unbalanced Load

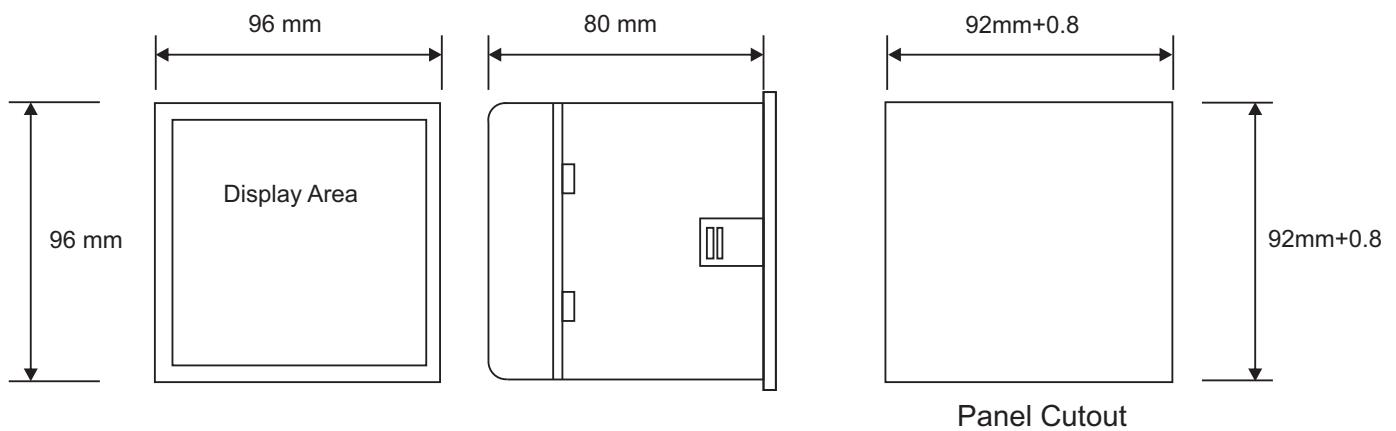


## For 3 Phase 3 Wire Unbalanced Load



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

## Dimensions



Panel Cutout



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## Order Code:

Ordering information		Ordering Code RISH Master 3430
<b>Accuracy Class</b>		
Accuracy 1.0% (Standard)		1.0
Accuracy 0.5% (on request)		0.5
Accuracy 0.2% (on request)		0.2
<b>Auxiliary Voltage</b>		
60-300V AC DC		H
12-60V AC DC		L
<b>Optional:</b>		
RS 485 + 2 Pulse output		1
RS 485 + 1 Pulse output + 2 Analog output		2
Ethernet		3
Option not used		Z

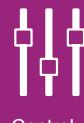
## Order Code Example:

RISH Master 3430 0.2 – H – 1

RISH Master 3430, Accuracy 0.2% , 60 - 300V AC DC Auxiliary supply, with MODBUS (RS485),with 2 pulse output.



Measure



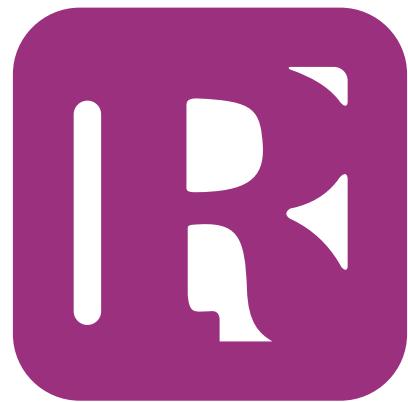
Control



Record



Analyze



RISHABH



Measure



Control



Record



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