RISH *Master 3428* Digital Multifunction Instrument

Application:

Rish *Master* 3428 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 RS485 output.

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:

Meter has three independent energy counter
Active energy (kWh), Reactive energy (kVArh) and
Apparent energy (kVAh).
Active energy (kWh) will increment in Active energy (kWh) counter irrespective of Import or Export Mode connection.
Reactive energy (kVArh)) will increment in Reactive energy (kVArh) counter irrespective of Import or Export Mode connection.

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

Number of parameters measured: up to 32

The instrument measures 32 electrical parameters of 3 Phase network.

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.

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.

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.

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 (for kW) & 7 to 9 (for MW) , after which the energy will roll back to zero. The above feature is applicable to all types of energy.

Optional MODBUS (RS485) Output

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

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 63.5 / 133 / 239.6 / 254VL-N Line-Line 110 / 230 / 415 / 440 VL-L
Max continuous input voltage	120% of rated value

Input Current:

Nominal input current	1 or 5A AC RMS (1A on-site selectable with accuracy specified at maximum range of 5A.)
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%
DC Auxiliary Supply	12 – 48 V 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	0.8Lag ... 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	Cos phi / Sin phi =1 for Active / Reactive Power Energy 10... 100% of Nominal Current & 50... 100% of Nominal Voltage.
Power Factor	40... 100% of Nominal Current & 50... 100% of Nominal Voltage.
Voltage	50... 100% of Nominal value.
Current	10... 100% of Nominal value.

Accuracy:

	Standard (CL 1.0)	Optional (CL 0.5) (on request)
Voltage	±0.5% of Nominal Value	±0.5% of Nominal Value
Current	±0.5% of Nominal Value	±0.5% of Nominal Value
Active Power	±0.5% of Nominal Value	±0.5% of Nominal Value
Re-Active Power	±0.5% of Nominal Value	±0.5% of Nominal Value
Apparent Power	±0.5% of Nominal Value	±0.5% of Nominal Value
Active energy (kWh) (IEC 62053-21)	1%	0.5%
Re Active energy (kVArh)	1%	0.5%
Apparent energy (kVAh)	1%	0.5%
Power Factor	1% of unity	1% of unity
Frequency	0.15% of mid frequency	

Measurement error is normally much less than errors specified in the 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
Enclosure	IP54 (front face only)

PT Secondary Ranges for various input ranges

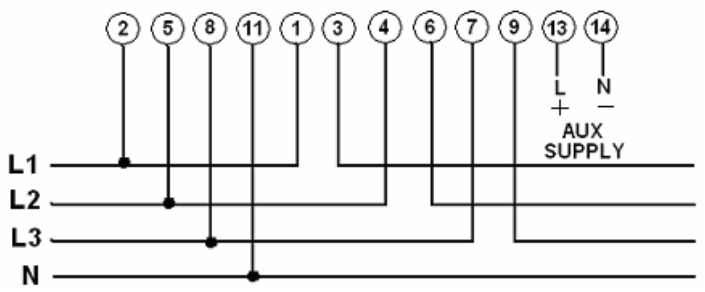
Input Voltage	PT Secondary Settable range
110V L-L (63.5V L-N)	100V – 120V L-L (57V – 69V L-N)
230V L-L (133V L-N)	121V – 239V L-L (70V – 139V L-N)
415V L-L (239.6V L-N)	240V – 480V L-L (140V – 277V L-N)

DISPLAYED PARAMETERS :

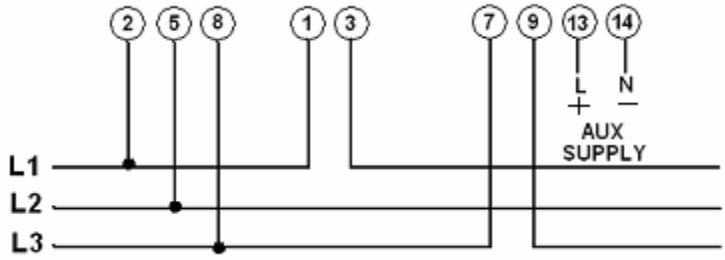
Sr.No.	Measured Parameters	3PH 4W	3PH 3W	1PH 2 W
1.	System Volts	✓	✓	✓
2.	System Current	✓	✓	✓
3.	Volts L1 – N	✓	×	×
4.	Volts L2 – N	✓	×	×
5.	Volts L3 – N	✓	×	×
6.	Volts L1 – L2	✓	✓	×
7.	Volts L2 – L3	✓	✓	×
8.	Volts L3 – L1	✓	✓	×
9.	Current L1	✓	✓	×
10.	Current L2	✓	✓	×
11.	Current L3	✓	✓	×
12.	Neutral 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.	kWh (8 digit resolution)	✓	✓	✓
31.	kVArh (8 digit resolution)	✓	✓	✓
32.	kVAh (8 digit resolution)	✓	✓	✓

Electrical Connections:

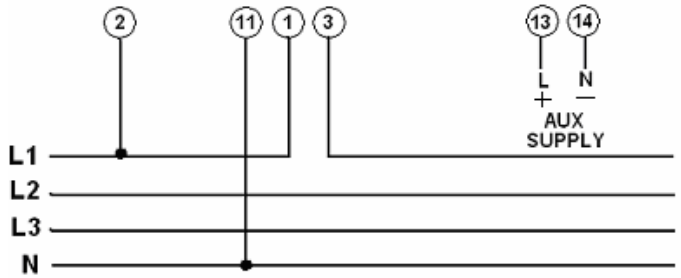
For 3 Phase 4 Wire Unbalanced Load



For 3 Phase 3 Wire Unbalanced Load

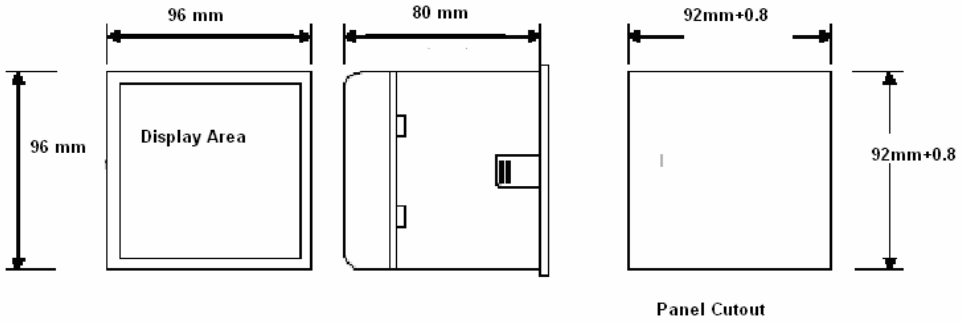


For Single Phase



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: <= 4.0 mm^2 single wire or 2 × 2.5 mm^2 fine wire.

Dimensions:



Order Code:

Ordering information	Ordering Code
	Rish Master 3428
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 Supply Voltage #	
110 V AC -15% / +20%	L
230 V AC -15% / +20%	M
380 VAC-15% / +20 %	H
AC/DC Auxiliary Supply Voltage **	
100 – 250V AC/Dc +/- 10%	AD
12 – 48V DC +/- 10%	D
Optional:	
MODBUS (RS485) output	R
MODBUS Option not used	Z
Optional:	
Class 1.0	CL 1.0
Class 0.5	CL 0.5

Order Code Example:

Rish Master 3428 – 3 – 415 – AD – R – CL 1.0

Rish Master 3428, 3 phase(programmable onsite as 4 wire or 3 Wire), 415L-L nominal voltage, 100-250V AC/DC Auxiliary supply, with ModBus (RS485), CL 1 (Class 1.0).
(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.	12 – 48 V DC Aux.
3428	✓	✓	✓
3428 + RS485	✓	✓	✓

RISHABH INSTRUMENTS PVT.LTD.
F-31, MIDC, Satpur,
Nashik-422 007, India
Tel: +91 253 2202202, 2202162 Fax: +91 253 2202361
E-mail: service@rishabh.co.in
Web: www.rishabh.co.in