

# Digital Multifunction Instrument - Rish Master 3420

## Application

Rish Master 3420 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*. 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.

### 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.

### Onsite Adjustable display update time

User can program onsite the display from min 1 sec to 5 sec using front panel keys.

### Phase reversal indication

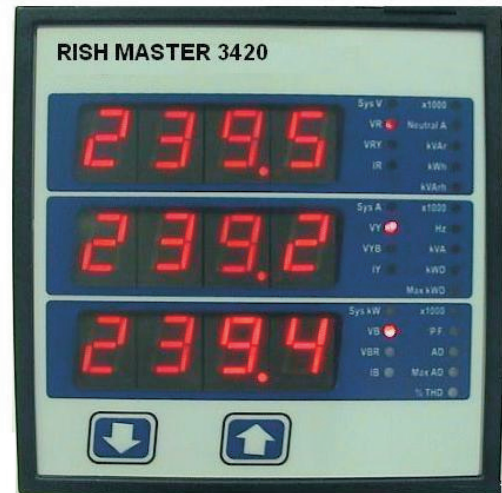
The instrument can detect wrong phase sequence or failure of one of the input voltages. It displays "phase reversal" error message when phase sequence of 3 Phase Voltages is not correct or when one or two phases out of the three phases fail. The instrument will not display any measured values until the correct phase sequence is restored. (When all the 3 input voltages are absent, the "Phase reversal" error message is not displayed and instrument shows measured values)

### Active Energy measurement (kWhr Import /kWhr Export):

The instrument has 2 Active energy counters, one for import and another for export.

### True RMS measurement

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



### Number of parameters measured: up to 14

The instrument measures 14 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 40 sec minimum maximum readings are updated.

### 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.

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

Simultaneous display of 3 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



Rishabh Instruments

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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 V AC -15% / +20

AC Auxiliary supply frequency range 45 to 66 Hz

### 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 energy (kWh) 1% (IEC 62053-21) Active P.F. 0.866 lag... 1...0.866 lead

### 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 min 1 sec approx. (can be programmed up to 5 sec)

### 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)



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## Active Energy Pulsed Output Option (can be programmed for Import & export energy 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

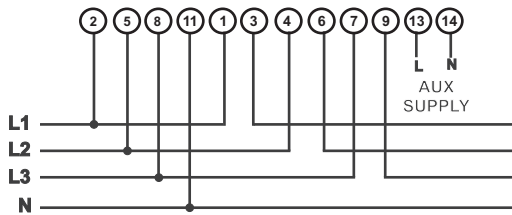
## Parameter measurement and Display :

| Sr No | Parameter                       | Single phase<br>2 Wire | 3 Phase<br>3 Wire | 3 Phase<br>4 Wire |
|-------|---------------------------------|------------------------|-------------------|-------------------|
| 1     | System Volts                    | ✓                      | ✓                 | ✓                 |
| 2     | System Current                  | ✓                      | ✓                 | ✓                 |
| 3     | Frequency                       | ✓                      | ✓                 | ✓                 |
| 4     | Volts L1 – N                    | ✓                      | ✓                 | ✓                 |
| 5     | Volts L2 – N                    | ✓                      | ✓                 | ✓                 |
| 6     | Volts L3 – N                    | ✓                      | ✓                 | ✓                 |
| 7     | Volts L1 – L2                   | ✓                      | ✓                 | ✓                 |
| 8     | Volts L2 – L3                   | ✓                      | ✓                 | ✓                 |
| 9     | Volts L3 – L1                   | ✓                      | ✓                 | ✓                 |
| 10    | Current L1                      | ✓                      | ✓                 | ✓                 |
| 11    | Current L2                      | ✓                      | ✓                 | ✓                 |
| 12    | Current L3                      | ✓                      | ✓                 | ✓                 |
| 13    | Import kWh (8 digit resolution) | ✓                      | ✓                 | ✓                 |
| 14    | Export kWh (8 digit resolution) | ✓                      | ✓                 | ✓                 |

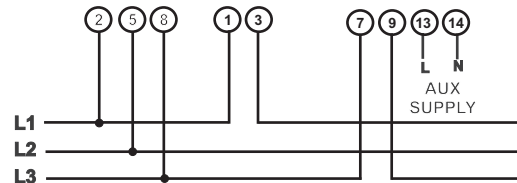
✓- Available ✓-Not available

## Electrical Connections

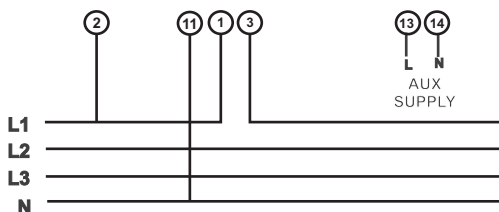
For 3 Phase 4 Wire Unbalanced Load



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

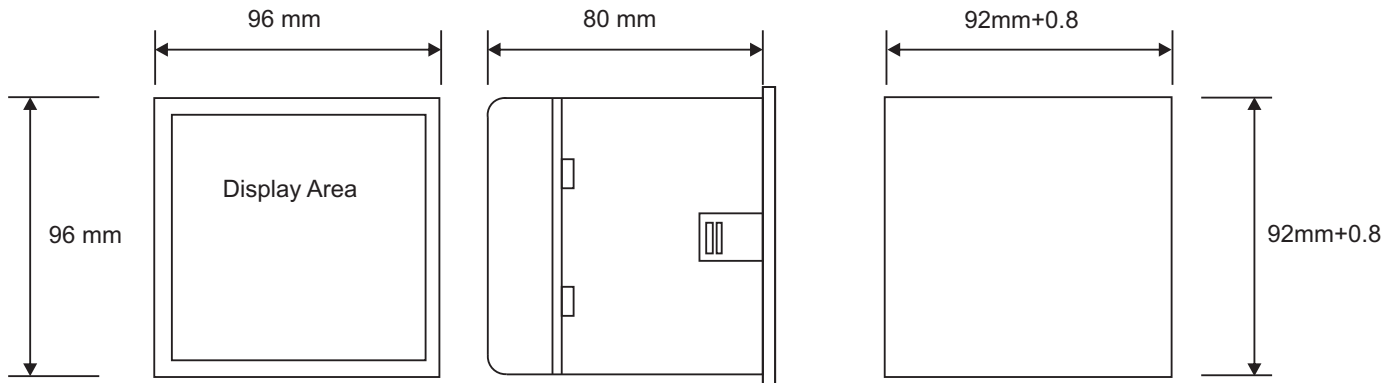


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## Dimensions



Panel Cutout

## Ordering Information

| Ordering information                                 | Ordering Code    |
|--|------------------|
|  | Rish Master 3420 |
| <b>System Type (Connection network)</b>              |                  |
| 3 Phase (programmable as 4 Wire or 3 Wire on site)   | 3                |
| 1 Phase  | 1                |
| <b>Input Voltage</b>                                 |                  |
| 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              |
| <b>AC Auxiliary Voltage</b>                          |                  |
| 110 V AC -15% / +20%                                 | L                |
| 230 V AC -15% / +20%                                 | M                |
| 380 V AC -15% / +20 %                                | H                |
| <b>Optional: Pulse Output for energy measurement</b> |                  |
| 1 Pulse output                                       | S                |
| 2 Pulse output                                       | D                |
| Pulse Output option not used                         | Z                |

**Order Code Example :**  
**Rish Master 3420-3- 230 - M-D**

Rish Master 3420, 3 phase (programmable onsite as 4 wire or 3 Wire), 230L -L nominal voltage, 230 V AC auxiliary supply. with 2 pulse output for energy (No need to specify CT secondary as 5A or 1A is programmable on site)



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