# Data Sheet

## Rish Relay-I

Current Protection Relay

RISH RELAY-I

RELAY-1   RELAY-2

L1
L2   **1000.** k A
L3

RESET   TEST   ENTER

RISH RELAY-I
DIGITAL PROTECTION RELAY
SR NO: 2207051220
INPUT: 3PH, 1 : 5A AC, 40-70Hz
AUXILIARY : 60...300V AC/DC, 4VA
RELAY CONTACTS:1CO+1CO, 250V AC 5A

RoHS   CE

Measure   Control   Record   Analyze   Optimize

# Data Sheet

## Rish Relay-I

## Applications:

- ‣ Over current
- ‣ Under current
- ‣ Load detection
- ‣ Monitoring of electric heating system
- ‣ General application- for any electrical load, monitoring for under load and over load conditions
- ‣ Motors- monitoring for conditions such as overload, locked rotor and short circuit
- ‣ Genset- to ensure load current is within generator capacity
- ‣ Machinery-detecting broken drive belt on machinery

## Product Features:

- ‣ **Over current protection with IDMT curve**

- ‣ **Under current protection**

- ‣ **Current loss protection**

- ‣ **Current unbalance protection**

- ‣ **4 Digits ultra bright Seven segment LED Display**

- ‣ **Trip relay cum DPM with Class 0.5**

- ‣ **True RMS measurement**
  The instrument measures distorted waveform up to 15$^{th}$ Harmonic.

- ‣ **Previous fault Storage**
  Instrument memorizes the last 15 fault occurred.

- ‣ **LED indications**
  - LED indication for Relay-1 and Relay-2 status .
  - Trip indication are displayed on 4 Digit display.
  - Dual color LED for per phase indication green color for normal condition and Red color for faulty condition.

- ‣ **AND function**
  User can use ANDing function to set trip on any two fault condition.

- ‣ **Configuration via USB-based PRKAB**
  User can configure the Meter using USB-based PRKAB.

- ‣ **Auto / Manual reset**
  In auto mode instrument automatically clears itself. If the device set into manual mode , the device must be manually reset by push button through display if it goes into fault.

- ‣ **User selectable 3 phase 3W or 4W**
  User can on site program the network connection as either 1P2W / 3P4W / 3P3W network using front panel keys

- ‣ **Adjustable set point for**
  - Over current
  - Under current
  - Current loss
  - Current Unbalance
- ‣ **Adjustable time delay for**
  - Over current
  - Under current
  - Current loss
  - Current Unbalance

- ‣ **Trip or Buzzer mode**
  Relay can be used to protect the system or simply to control the buzzer. Trip mode is for protection purpose and Buzz mode is for buzzer control.

- ‣ **User Selectable CT Secondary**
  The input rated current can be programmed on site as 1A to 5A using front panel keys.

- ‣ **Compliance to International Safety standards**
  Compliance to International Safety standard IEC 61010-1-2010

Measure    Control    Record    Analyze    Optimize

## Rish Relay-I

- **User selectable CT primary**
  The Primary of Current Transformer can be programmed on site from 1 A to 999 kA for Current protection relay.

- **EMC Compatibility**
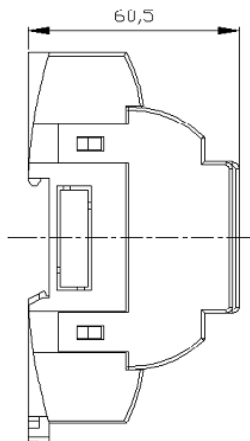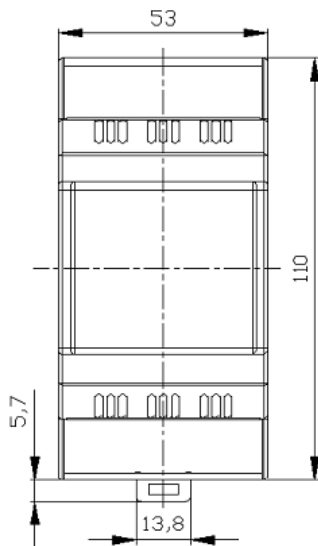  Compliance to International standard IEC 61326 - 1.

- **Onsite selection of Auto scroll / Fixed Screen**
  User can set the display in auto scrolling mode or fixed screen mode using front panel keys.

## ANSI Numbers:

| ANSI NO. | Acronyms |
|----------|----------|
| 37 | Under current relay |
| 51 | Over current relay |
| 46 | Current unbalance relay |

## Dimensions Details:



## Technical Specifications:

**Input Current**

| | |
|---|---|
| Nominal Input Current (AC RMS) | 5 A |
| Max Continuous Input Current | 145% of CT Secondary |
| System CT Secondary Values | 1 A to 5 A programmable on site |
| System CT Primary Values | 1 A to 999 kA programmable on site |

**Auxiliary Supply**

| | |
|---|---|
| Auxiliary Supply Voltage | 60 V – 300V AC-DC |
| Higher Aux Nominal value | 230 V AC/DC 50/60 Hz for AC Aux |
| | OR |
| External Lower Aux | 20 V – 60 VDC / 20 V – 40 VAC |
| Lower Aux Nominal value | 48 VDC / 24 VAC 50/60 Hz for AC Aux |
| Aux Supply Frequency | 45 to 66 Hz range |

**Overload Withstand**

| | |
|---|---|
| Current | 20 x for 1 second, repeated 5 times at 5 min |

**Operating Measuring Ranges**

| | |
|---|---|
| Current Range | 5...140% of CT Secondary |
| Frequency | 40...70Hz |

**VA Burden**

| | |
|---|---|
| Input Current Burden | < 0.25 VA approx. per phase |
| Auxiliary Supply Burden | < 4 VA approx. |

**Reference condition for Accuracy**

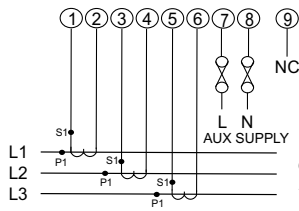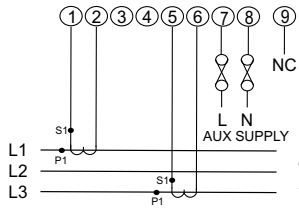| | |
|---|---|
| Reference Condition | 23°C +/- 2°C |
| Input waveform | Sinusoidal (distortion factor 0.005) |
| Input Frequency | 50 or 60 Hz ±2% |
| Auxiliary supply voltage | Nominal Value ±1% |
| Auxiliary supply frequency | Nominal Value ±1% |

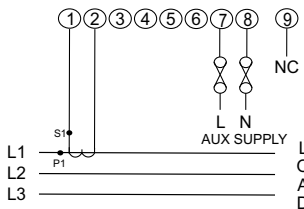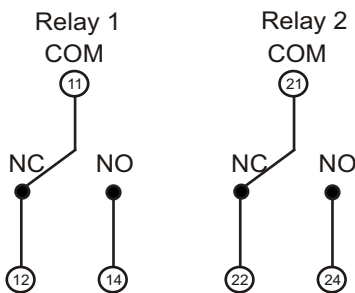Measure    Control    Record    Analyze    Optimize
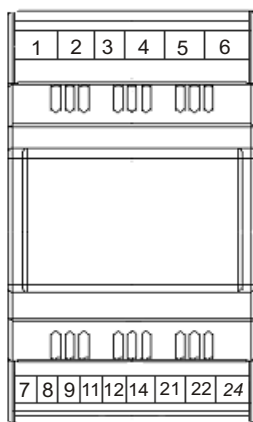
## Electrical Connection:



**3 Phase 4 wire Unbalanced load**



**3 Phase 3 wire Unbalanced load**



**1 Phase 2 Wire**



Note- Relay Contacts are shown in power off condition



## Technical Specifications:

| Accuracy | |
|---|---|
| Input Current | ±0.5% of nominal value |
| Frequency | ±0.2 Hz |
| Trip, Reset Delays, Power ON | ±140 msec or ±5% of Set Delay, Whichever is Greater (WIG) |

| Influence of Variations | |
|---|---|
| Temperature coefficient : | 0.05%/°C for current |

| Applicable Standards | |
|---|---|
| EMC | IEC 61326-1:2012, Table 2 |
| Immunity | IEC 61000-4-3. 10V/m min – Level 3 industrial Low level |
| Safety use | IEC 61010-1-2010 , Permanently connected |
| IP for water & dust | IEC60529 |
| Pollution degree: | 2 |
| Installation category: | 300V CAT III / 600V CAT II |
| High Voltage Test | 2.2 KV AC, 50Hz for 1 minute between all Electrical circuits. |

| Environmental | |
|---|---|
| Operating temperature | -10 to +55°C |
| Storage temperature | -25 to +70°C |
| Relative humidity | 0... 90% non condensing |
| Shock | 15g in 3 planes |
| Vibration | 10... 55 Hz, 0.15mm amplitude |
| Enclosure | IP20 (front face only) |

| Relay Contacts | |
|---|---|
| Types of output | 1CO,  2CO, 1CO+1CO |
| Contact Ratings (Res. Load) | 5A/250VAC/30VDC |
| Mechanical Endurance | 1x10^7 OPS |
| Electrical  Endurance | NO- 3x10^4 OPS    NC- 1x10^4 OPS   for 1CO / 1CO+1CO relay   1x10^5 OPS    for 2CO relay |

| Mechanical Attributes | |
|---|---|
| Weight | 300g Approx. |

**Measure**   **Control**   **Record**   **Analyze**   **Optimize**

## Definite Time Characteristics:

### Over (OC) and Under (UC) Current



- Over set (%)
- L1  I rated
- Under set (%)
- I off
- Over set (%)
- L2  I rated
- Under set (%)
- I off
- Over set (%)
- L3  I rated
- Under set (%)
- I off
- Differential (Hysteresis)
- Pd  Td  Rd  Td  Rd
- Relay 1- OC: 11-14 (Energized)
- Relay 2- UC: 21-24 (De-Energized)
- Phase L1-LED
- Phase L2-LED
- Phase L3-LED
- Relay-1 LED (OC)
- Relay-2 LED (UC)
- Aux Supply
- Time
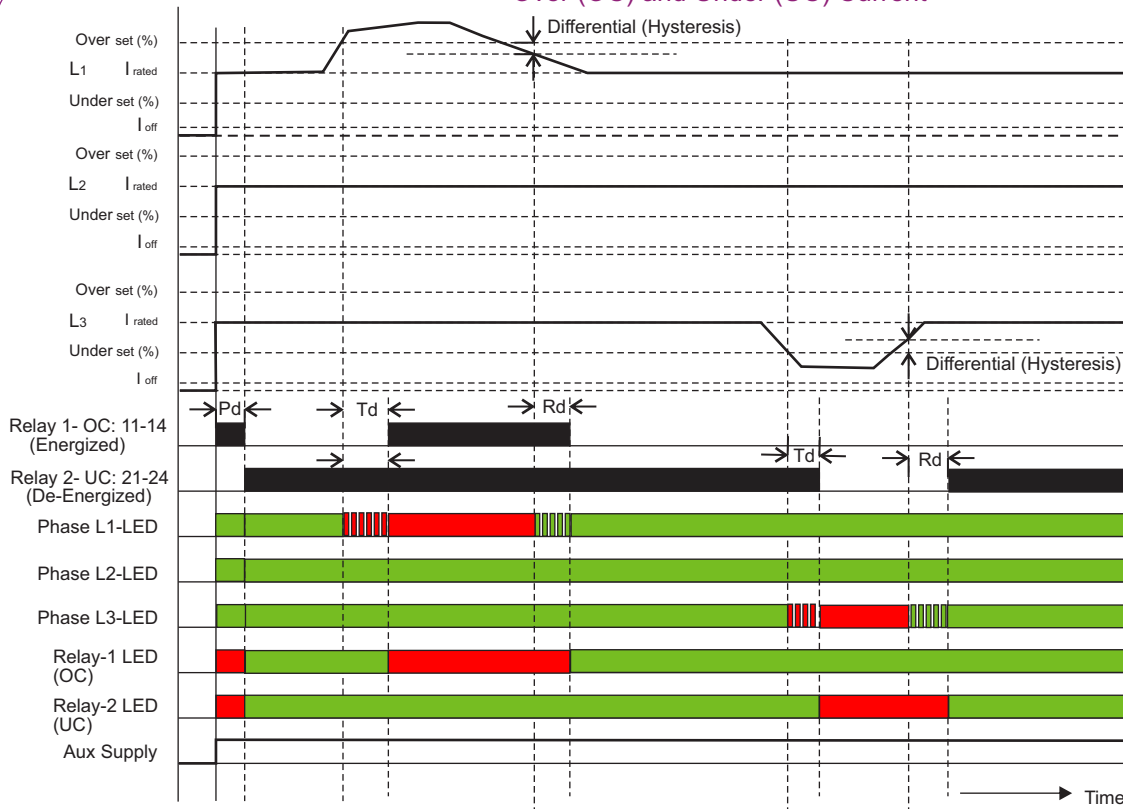
### Current Loss (C.LoS) and Current Unbalance (C.un)



- L1  I rated
- Phase Fail set (%)
- I off
- Differential (Hysteresis)
- L2  I rated
- Phase Fail set (%)
- I off
- Unbalance
- Differential (Hysteresis)
- L3  I rated
- Phase Fail set (%)
- I off
- Unbalance
- Pd  Td  Rd  Td  Rd
- Relay 1 - C.LoS : 11-14 (Energized)
- Relay 2 - C.Un: 21-24 (De-Energized)
- Phase L1-LED
- Phase L2-LED
- Phase L3-LED
- Relay-1 LED (C.LoS)
- Relay-2 LED (C.Un)
- Aux Supply
- Time

**Relay States -**

- Energized
- De-Energized

**Phase LED Indications -**

- Red blinking - Trip Delay (only Phase LEDs)
- Green blinking - Reset Delay (only Phase LEDs)
- RED ON - fault condition
- Green ON - healthy condition
- Input Absent

**Relay LED Indications -**

- RED ON - fault condition
- Green ON - healthy condition

**Note:**
1] Pd- Power ON delay
2] Td- Trip delay
3] Rd- Reset delay
4] Both relay can be configured to energize or de-energize mode
5] Any relay can be assigned to any fault condition

Measure    Control    Record    Analyze    Optimize

## Rish Relay-I

## Operating elements:

1 - L1- LED : Indicates status of I1 . It Lights green when input current is healthy, red in fault condition, red blinking in trip delay and green blinking in reset delay.

2 - L2-LED : Indicates status of I2. It Lights green when input current is healthy, red in fault condition, red blinking in trip delay and green blinking in reset delay.

3 - L3- LED : Indicates status of I3. It Lights green when input current is healthy, red in fault condition, red blinking in trip delay and green blinking in reset delay.

4/5 - Relay-1 and Relay-2 status LED : Indicates status of relay-1 and relay-2 respectively. It lights green for relay in healthy condition and red for relay in trip condition.

6 - 4 Digit ultra bright 7 seg LED Display.

7 - K LED : It is used to show value in kA.

8 - Enter Key : Confirms changes of parameter setting. When on the measurement screen, holding for 3 sec enters in setup menu.

9- Test Key : Increments setting value, move upwards in the menu or change parameter. It is also used to test operation of relay. Continuous holding of test key changes relay position and when release it resets the relay position (Only in healthy condition).

10- Reset Key : Decrements setting value, move downwards in the menu or change parameter. It is also used to reset relay when manual reset mode is selected.

11- Configuration via USB-based PRKAB.
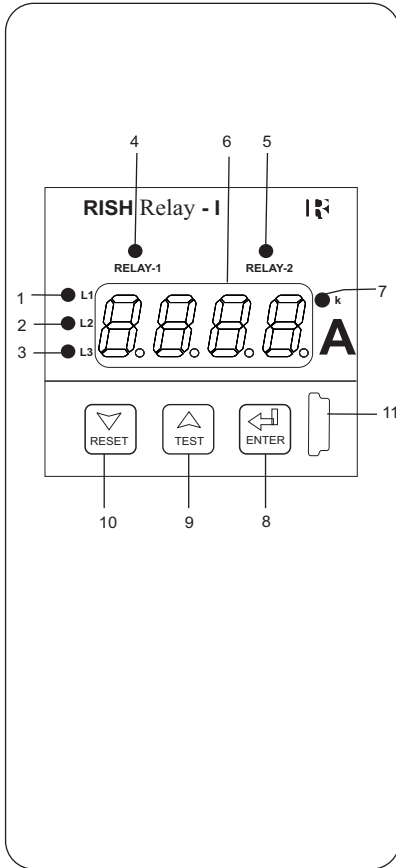
## Parameter Settings:

| Parameters | RISH Relay-I |
|---|---|
| Trip setting for Current loss | 5 - 99% |
| Trip setting for Current Unbalance | 2 - 20% |
| Trip setting for over current (IDMT Disabled) | 30 - 140% |
| Trip setting for over current (IDMT Enabled) | 30 - 125% |
| Trip setting for under current | 10 - 99% |
| Setting for Differential / hysteresis | 1 - 15%* |
| Time Multiplier Setting (TMS) | 0.1 - 1 |
| Individual Faults can be deactivated as per system requirement | YES |
| Relay control mode | De-energize / Energize |
| Reset Delay | 0.2 - 30s |
| Programmable Delay for over current | 0 - 30s |
| Programmable Delay for under current | 0 - 30s |
| Programmable Delay for Current loss | 0 - 30s |
| Programmable Delay for current unbalance | 0 - 30s |
| Power ON Delay | 0.5 - 30s |
| CT primary current | 1 A - 999 kA |
| Rated current | 1 to 5 A |
| Reset option | Auto / Manual |

**Note** * Differential setting range for current unbalance is limited as per its setting of trip point.

Measure    Control    Record    Analyze    Optimize

## Hysteresis Calculation Method:

**Example: -**
For "OC" (Over Current)
CT Secondary = 5 A
Trip point = 101% of CT Secondary = 5.05 A
Hysteresis = 2% of CT Secondary = 0.1 A
Relay Reset point = Trip point - Hysteresis
　　　　　　　　 = 5.05 - 0.1
　　　　　　　　 = 4.95 A

**Example: -**
For "C.un" (Current Unbalance)
CT Secondary = 5 A
Trip point = 10% of CT Secondary = 0.5 A
Hysteresis = 2% of CT Secondary = 0.1 A
Relay Reset point = Trip point - Hysteresis
　　　　　　　　 = 0.5 - 0.1
　　　　　　　　 = 0.4 A

## Inverse Characteristics Curve [Over Current IDMT]:

| Relay Characteristics type | $\alpha$ | C |
|---|---|---|
| Standard Inverse | 0.02 | 0.14 |
| Very Inverse | 1 | 13.5 |
| Extremely Inverse | 2 | 80 |
| Long Inverse | 1 | 120 |

To Calculate Relay Operating Time when IDMT is enabled, use the following formula

$$T = \frac{C}{\left(\frac{I}{Is}\right)^{\alpha} - 1} \times TMS$$

Where,
T = Time in Sec (Operating time of relay).
I = Input Current.
Is = Secondary Current.
TMS = Time Multiplier Setting.
C = Constant for relay characteristics.
$\alpha$ = Constant representing inverse time type
　　($\alpha > 0$)

## Ordering Information:

| Ordering information | Ordering Code<br>**RISH** Relay **I** |
|---|---|
| **System Type** | |
| Single Phase | 1 |
| Three Phase (On-site programmable to 1P2W / 3P4W / 3P3W) | 3 |
| | |
| **Relay type of outputs** | |
| 1CO+1CO | 2001 |
| 1CO | 2000 |
| 2CO | 2002 |
| | |
| **Auxiliary Supply Voltage** | |
| 60 - 300 V AC/DC | HA |
| 20 - 60 VDC / 20 - 40 VAC | LA |

**Order Code Example:**

**1. RISH Relay I - 1 - 2001 - HA:**
　　RISH Current Protection Relay, Single Phase, Relay contact 1CO+1CO, External Aux 60-300 V AC/DC.

**2. RISH Relay I - 3 - 2002 - LA:**
　　RISH Current Protection Relay, Three Phase, Relay contact 2CO, External Aux 20-60 VDC / 20-40 VAC.

Measure　　Control　　Record　　Analyze　　Optimize

# RISHABH

Measure  Control  Record  Analyze  Optimize

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