



**FEATURES**

- Under voltage, over voltage, under frequency, over frequency, asymmetry, phase failure and phase sequence monitoring in 3Ø system
- RMS measurement
- Power ON delay, Trip time delay and Delay on release
- Adjustable switching hysteresis
- Two separate alarm relays operation

**SPECIFICATIONS**

**DISPLAY**

3 Digits, Liquid Crystal Display

**ELECTRICAL CONNECTION**

3Ø-3 wire, 3Ø-4 wire

**AUXILIARY SUPPLY**

Self powered

**OPERATING RANGE**

280 – 520V AC (L-L)

160 – 300V AC (L-N)

**FREQUENCY RANGE**

45 - 65Hz

**VA RATING**

30VA max

**TRIP SETTINGS**

Under Voltage : 280 to 520V AC (L-L)

[for 3Ø-3 wire]

160 to 300V AC (L-N)

[for 3Ø-4 wire]

Over Voltage : 280 to 520V AC (L-L)

[for 3Ø-3 wire]

160 to 300V AC (L-N)

[for 3Ø-4 wire]

Under Frequency : 45 – 65Hz

Over Frequency : 45 – 65Hz

Phase Asymmetry : 5.0 – 99.9%

**TIME SETTINGS**

Power ON Delay : 2.0 - 99.9sec

Response Delay : 0 - 99.9sec

(Trip time delay)

Delay ON Release : 0 - 99.9sec

Response Time : <200ms

**HYSTERESIS**

Voltage : 1.0 – 99.9V

Frequency : 0.2 – 2Hz

Asymmetry : 2.0 – 20.0%

**RESOLUTION**

Voltage : 1V

Frequency : 0.1Hz

**ACCURACY**

Voltage : ±1% of set value

Frequency : ±0.3Hz

Time : ±5% of setting + 200ms

(Recovery Time, Trip Delay, Power ON Delay)

**OUTPUT SPECIFICATIONS**

2 Relays : Relay1 : 1C/O (SPDT)

Relay2 : 1C/O (SPDT)

**RELAY RATING**

NO (5A, 250V AC / 30V DC)

NC (3A, 250V AC / 30V DC)

**LED INDICATION**

LED1 (Green) : Power ON

LED2 (Red) : Relay1

(Continuously ON after trip)

LED3 (Red) : Relay2

(Continuously ON after trip)

**ENVIRONMENTAL SPECIFICATIONS**

- Indoor use

- Altitude of up to 2000 meters

- Pollution degree II

Temperature : Operating : 0 to 55°C

Storage : -20 to 70°C

Humidity : Up to 95% RH, non-condensing

**MECHANICAL SPECIFICATIONS**

No. of Push Buttons : 3

Size : 35mm width

Mounting : 35mm Din Rail Mount

Wire Size (max) : 4 sq.mm

Screw tightening torque : 0.5 N-M

**WEIGHT**

135 gms.

**SAFETY PRECAUTIONS**

All safety related codifications, symbols and instructions that appear in this operating manual or on the equipment must be strictly followed to ensure the safety of the operating personnel as well as the instrument.

If the equipment is not used in a manner specified by the manufacturer it might impair the protection provided by the equipment.

If there is physical damage to the unit then do not use it.

Read complete instructions prior to installation and operation of the unit.

**WIRING GUIDELINES**

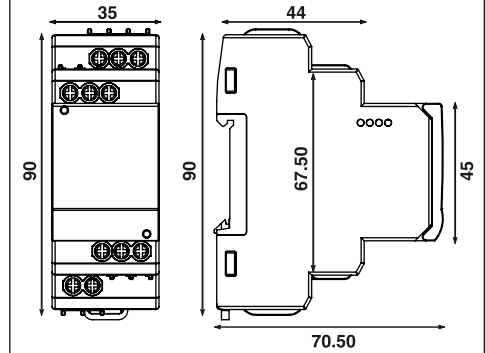
**WARNING**

1. To prevent the risk of electric shock power supply to the equipment must be kept OFF while doing the wiring arrangement.
2. Wiring shall be done strictly according to the terminal layout with shortest connections. Confirm that all connections are correct.

**CAUTION**

1. To ensure the safe operation of unit, check the wiring and connections.

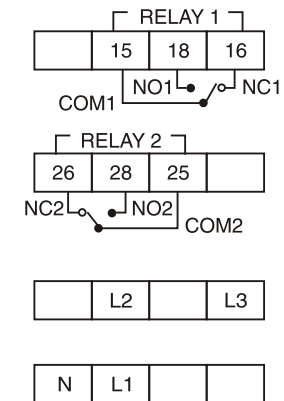
**DIMENSIONS ( All dimensions in mm )**



**LED INDICATION CHART**

| Various Conditions                   | Power LED | 'R1' LED | 'R2' LED |
|--------------------------------------|-----------|----------|----------|
| No fault                             | ON        | OFF      | OFF      |
| Trip (Relay 1)                       | ON        | ON       | OFF      |
| Trip (Relay 2)                       | ON        | OFF      | ON       |
| Trip (If programmed for both relays) | ON        | ON       | ON       |

**TERMINAL CONNECTIONS**



# CONFIGURATION MENU

Press ▲ + ▼ for 3sec. to enter or exit configuration menu.

## MAIN MENU

Network selection

NWK

Relay 1 settings

RL1

Time Setting for Relay 1

EM1

Relay 2 setting

RL2

Time Setting for Relay 2

EM2

Hysteresis

HYS

Password

PW

Factory set

RST

## SUB MENU

Press ▲ Key to go to Relay 1 setting (RL1) from network selection (NWK)  
Press ▼ Key to go to network selection (NWK) from Relay 1 setting (RL1)

Over voltage    Set Over Voltage    Under voltage    Set under voltage    Over frequency    Set over frequency    Under frequency

OV    SOV    UV    SUV    OF    SOF    UF

Set under frequency    Asymmetry    Phase Asymmetry Setting    Phase sequence    Phase failure    Latch

SUF    AS    PAS    PS9    PFL    LCH

Trip time delay    Recovery time    Power ON delay

TRP    REC    PON

Over voltage    Set Over voltage    Under voltage    Set under voltage    Over frequency    Set over frequency

RLY    OV    SOV    UV    SUV    OF    SOF

Under frequency    Set under frequency    Asymmetry    Phase Asymmetry Setting    Phase sequence    Phase failure    Latch

UF    SUF    AS    PAS    PS9    PFL    LCH

Trip time delay    Recovery time

TRP    REC

Voltage    Frequency    Asymmetry

VLT    FR9    ASY

Password Enable / Disble    Set password

PW    SPW

Factory set Yes / No

RST

# SUB MENU

## Network Selection (NWK) Press ▲ to enter sub menu from main menu

Press ▲ or ▼ to scroll through sub menu Press ● + ▲ or ● + ▼ to change parameter value

| DISPLAY (For 1sec) | DESCRIPTION       | DEFAULT VALUE | RANGE     | CONDITION |
|--------------------|-------------------|---------------|-----------|-----------|
| NWK                | Network selection | 3P4           | 3P3 / 3P4 |           |

## Relay 1 (RL1) settings Press ▲ to enter sub menu from main menu

Press ▲ or ▼ to scroll through sub menu Press ● + ▲ or ● + ▼ to change parameter value

| DISPLAY (For 1sec) | DESCRIPTION             | DEFAULT VALUE | RANGE  | CONDITION   |
|--------------------|-------------------------|---------------|--|---|
| OV                 | Over voltage            | ON            | ON / OFF   |   |
| SOV                | Set Over Voltage        | 288           | 280 - 520V(Default : 498)<br>[For 3P3W system]<br>160 - 300V(Default : 288)<br>[For 3P4W system] | This option will be prompted only when OV option is made ON |
| UV                 | Under voltage           | OFF           | ON / OFF   |   |
| SUV                | Set under voltage       | 192           | 280 - 520V(Default : 332)<br>[For 3P3W system]<br>160 - 300V(Default : 192)<br>[For 3P4W system] | This option will be prompted only when UV option is made ON |
| OF                 | Over frequency          | OFF           | ON / OFF   |   |
| SOF                | Set over frequency      | 55            | 45.0 - 65.0Hz  | This option will be prompted only when OF option is made ON |
| UF                 | Under frequency         | OFF           | ON / OFF   |   |
| SUF                | Set under frequency     | 45            | 45.0 - 65.0Hz  | This option will be prompted only when UF option is made ON |
| AS                 | Asymmetry               | ON            | ON / OFF   |   |
| PAS                | Phase Asymmetry Setting | 100           | 5.0 - 99.9%  | This option will be prompted only when AS option is made ON |

TO SCROLL THROUGH MAIN MENU PRESS ● + ▲ OR ● + ▼ KEYS

Note : Appearance of shaded menus dependant on selection of other parameters

| DISPLAY (For 1sec)   | DESCRIPTION       | DEFAULT VALUE                                  | RANGE  | CONDITION   |
|--|-------------------|--|--|---|
| P.S9   | Phase sequence    | ON <sub>R1</sub>                               | ON / OFF   |   |
| P.FL   | Phase failure     | ON <sub>R1</sub>                               | ON / OFF   |   |
| LCH  | Latch             | OFF <sub>R1</sub>                              | ON / OFF   | If Latch is ON, user has to reset the unit manually when fault is removed   |
| <b>Time Setting for Relay 1 (TM1)</b> Press ▲ to enter sub menu from main menu |                   |  |  |   |
| Press ▲ or ▼ to scroll through sub menu  |                   | Press ● + ▲ or ● + ▼ to change parameter value |  |   |
| DISPLAY (For 1sec)   | DESCRIPTION       | DEFAULT VALUE                                  | RANGE  | CONDITION   |
| TRP  | Trip time delay   | 3.0 <sub>R1 t</sub>                            | 0.0 - 99.9s  |   |
| REC  | Recovery time     | 0.5 <sub>R1 t off</sub>                        | 0.0 - 99.9s  |   |
| P.ON   | Power ON delay    | 5.0 <sub>R1 ton</sub>                          | 2.0 - 99.9s  | Applicable for Relay 1 & Relay 2  |
| <b>Relay 2 (RL2)</b> Press ▲ to enter sub menu from main menu                  |                   |  |  |   |
| Press ▲ or ▼ to scroll through sub menu  |                   | Press ● + ▲ or ● + ▼ to change parameter value |  |   |
| DISPLAY (For 1sec)   | DESCRIPTION       | DEFAULT VALUE                                  | RANGE  | CONDITION   |
| RLY  | Relay             | RL1 <sub>R2</sub>                              | RL1 / RL2  | If RL1 is selected, all the settings done for RL1 & TM1 will be automatically set for RL2 and no other parameter of RL2 & TM2 will be prompted. |
| OV   | Over voltage      | ON <sub>R2</sub>                               | ON / OFF   |   |
| SOV  | Set Over voltage  | 288 <sub>R2</sub>                              | 280 - 520V(Default : 498)<br>[For 3P3W system]<br>160 - 300V(Default : 288)<br>[For 3P4W system] | This option will be prompted only when OV option is made ON   |
| UV   | Under voltage     | OFF <sub>R2</sub>                              | ON / OFF   |   |
| SUV  | Set under voltage | 192 <sub>R2</sub>                              | 280 - 520V(Default : 332)<br>[For 3P3W system]<br>160 - 300V(Default : 192)<br>[For 3P4W system] | This option will be prompted only when UV option is made ON   |

| DISPLAY (For 1sec) | DESCRIPTION             | DEFAULT VALUE        | RANGE         | CONDITION   |
|--------------------|-------------------------|----------------------|---------------|---|
| OF                 | Over frequency          | OFF <sub>R2 Hz</sub> | ON / OFF      |   |
| SOF                | Set over frequency      | 55 <sub>R2 Hz</sub>  | 45.0 - 65.0Hz |   |
| UF                 | Under frequency         | OFF <sub>R2 Hz</sub> | ON / OFF      |   |
| SUF                | Set under frequency     | 45 <sub>R2 Hz</sub>  | 45.0 - 65.0Hz | This option will be prompted only when UF option is made ON               |
| AS                 | Asymmetry               | ON <sub>R2 As</sub>  | ON / OFF      |   |
| PAS                | Phase Asymmetry Setting | 100 <sub>R2 %</sub>  | 5.0 - 99.9%   | This option will be prompted only when AS option is made ON               |
| P.S9               | Phase sequence          | ON <sub>R2</sub>     | ON / OFF      |   |
| P.FL               | Phase failure           | ON <sub>R2</sub>     | ON / OFF      |   |
| LCH                | Latch                   | OFF <sub>R2</sub>    | ON / OFF      | If Latch is ON, user has to reset the unit manually when fault is removed |

| <b>Time Setting for Relay 2 (TM2)</b> Press ▲ to enter sub menu from main menu |                 |  |             |           |
|--|-----------------|--|-------------|-----------|
| Press ▲ or ▼ to scroll through sub menu  |                 | Press ● + ▲ or ● + ▼ to change parameter value |             |           |
| DISPLAY (For 1sec)   | DESCRIPTION     | DEFAULT VALUE                                  | RANGE       | CONDITION |
| TRP  | Trip time delay | 3.0 <sub>R2 t</sub>                            | 0.0 - 99.9s |           |
| REC  | Recovery time   | 0.5 <sub>R2 t off</sub>                        | 0.0 - 99.9s |           |

Note : Relay 2 (RL2) Default values shown are applicable when Relay 2 (RL2) selected as Relay 1 (RL1)

| Hysteresis (HYS) <span style="float:right">Press ▲ to enter sub menu from main menu</span> |                          |  |             |           |
|--|--------------------------|--|-------------|-----------|
| Press ▲ or ▼ to scroll through sub menu  |                          | Press ● + ▲ or ● + ▼ to change parameter value |             |           |
| DISPLAY (For 1sec)   | DESCRIPTION              | DEFAULT VALUE                                  | RANGE       | CONDITION |
| VLL  | Hysteresis for voltage   | 10 <sup>V</sup> <sub>H</sub>                   | 1.0 - 99.9V |           |
| FR9  | Hysteresis for frequency | 0.2 <sub>H</sub>                               | 0.2 - 2Hz   |           |
| AS4  | Hysteresis for Asymmetry | 2.0 <sup>As</sup> <sub>H %</sub>               | 2 - 20%     |           |

| Password (PW) <span style="float:right">Press ▲ to enter sub menu from main menu</span> |              |  |           |   |
|---|--------------|--|-----------|---|
| Press ▲ or ▼ to scroll through sub menu   |              | Press ● + ▲ or ● + ▼ to change parameter value |           |   |
| DISPLAY (For 1sec)  | DESCRIPTION  | DEFAULT VALUE                                  | RANGE     | CONDITION   |
| PW  | Password     | d15  | ENB / DIS | Enable / Disable password protection option           |
| SPW   | Set password | 000  | 000-999   | Will be prompted only when Password option is enabled |

**NOTE :** PW option will be asked when the user enter the config. menu if PW option is enabled in the config menu and the user has to enter the password which he has set in the S.PW (set password) option.

| Factory set (RST) <span style="float:right">Press ▲ to enter sub menu from main menu</span> |                     |  |          |           |
|---|---------------------|--|----------|-----------|
| Press ▲ or ▼ to scroll through sub menu   |                     | Press ● + ▲ or ● + ▼ to change parameter value |          |           |
| DISPLAY (For 1sec)  | DESCRIPTION         | DEFAULT VALUE                                  | RANGE    | CONDITION |
| RST   | Reset (Factory set) | NO   | YES / NO |           |

| TRIP VALUE SETTING <span style="float:right">Press ▲ key for 3 sec. to enter or exit Trip Value Setting menu :</span> |             |  |          |   |
|---|-------------|--|----------|---|
| Press ▲ or ▼ to scroll through main menu  |             | Press ● + ▲ or ● + ▼ to change parameter value |          |   |
| DISPLAY (For 1sec)  | DESCRIPTION | DEFAULT VALUE                                  | RANGE    | CONDITION   |
| LCK   | LOCK        | YES  | YES / NO | This option will prompted first when the user enters the trip setting menu. User has to set NO after which he can access the trip setting menu. |

| Press ▲ or ▼ to scroll through main menu |                               | Press ● + ▲ or ● + ▼ to change parameter value |  |           |
|--|-------------------------------|--|--|-----------|
| DISPLAY (For 1sec)                       | DESCRIPTION                   | DEFAULT VALUE                                  | RANGE  | CONDITION |
| 5.0V <sub>R1</sub>                       | Set over voltage for Relay 1  | 288 <sup>&gt;V</sup> <sub>R1</sub>             | 280 - 520V(Default : 498)<br>[For 3P3W system]<br>160 - 300V(Default : 288)<br>[For 3P4W system]   |           |
| 5.0V <sub>R1</sub>                       | Set under voltage for Relay 1 | 192 <sup>&lt;V</sup> <sub>R1</sub>             | 280 - 520V(Default : 332)<br>[For 3P3W system]<br>160 - 300V(Default : 192)<br>[For 3P4W system]   |           |
| 5.0V <sub>R2</sub>                       | Set over voltage for Relay 2  | 288 <sup>&gt;V</sup> <sub>R2</sub>             | 280 - 520V(Default : 498)<br>[For 3P3W system]<br>160 - 300V(Default : 288)<br>[For 3P4W system]   |           |
| 5.0V <sub>R2</sub>                       | Set under voltage for Relay 2 | 192 <sup>&lt;V</sup> <sub>R2</sub>             | 280 - 520V(Default : 332)<br>[For 3P3W system]<br>160 - 300V(Default : 192)<br>[For 3P4W system]   |           |
| TRP                                      | Trip time delay for Relay1    | 30 <sup>s</sup> <sub>R1 t</sub>                | 0.0 - 99.9s  |           |
| TRP                                      | Trip time delay for Relay2    | 30 <sup>s</sup> <sub>R2 t</sub>                | 0.0 - 99.9s  |           |
| LCK                                      | LOCK                          | NO   | YES / NO,<br>(In this option if YES is selected by the user, then whenever the user enters the Trip Value Setting, initially LOCK option will be prompted. The user will have to set NO after which he can access the trip setting menu. If the user wants to disable LOCK option, he can set NO when LOCK option is prompted after TR2 option.) |           |

**NOTE :** If Values are changed, the same setting in config menu will also changed and vice versa, also if RL1 is selected for RL2 in config menu no parameter of Relay 2 will be prompted in the above trip value setting.

| PARAMETER             | SYMBOL   |
|-----------------------|----------|
| * Average Voltage     | L1 L2 L3 |
| Voltage (L1-phase)    | L1       |
| Voltage (L2-phase)    | L2       |
| Voltage (L3-phase)    | L3       |
| Voltage (L1-L2 phase) | L1 L2    |
| Voltage (L2-L3 phase) | L2 L3    |
| Voltage (L1-L3 phase) | L1 L3    |
| Frequency             | Hz       |
| Phase Asymmetry       | As %     |

Individual parameters can be viewed with every press of ▼ keys.

\* **Default Page :** This page is displayed after 3 sec. from other online page.  
For 3P4W system average of L-N voltages is shown.  
For 3P3W system average of L-L voltages is shown.

|                              |   |
|------------------------------|---|
| <b>TRIP INDICATION</b>       | Trip Indication on press of ▲ key : Trip value will be displayed till the key is pressed. |
| <b>RESET</b>                 | Press ● key for 3sec. to reset manually   |
| <b>Master Password : 753</b> |   |

In Trip value setting & configuration menu, if no key pressed for 30 sec. then unit resumes online mode.

( Specifications are subject to change, since development is a continuous process )

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