



**FEATURES**

- Over voltage, Under voltage, Over frequency, Under frequency, Phase Asymmetry, Phase failure Phase sequence and Neutral loss monitoring in system etc.
- True RMS measurement
- Power ON delay, Trip time delay and Recovery time delay.
- Adjustable switching hysteresis
- Two separate relays operation.

**SPECIFICATIONS**

**DISPLAY**

3 Digits, Liquid Crystal Display

**ELECTRICAL CONNECTION**

3Ø-3 wire, 3Ø-4 wire & 1Ø-2 wire

**AUXILIARY SUPPLY**

Self powered

**OPERATING RANGE**

3Ø-3 wire (L-L): 280 – 600V AC  
3Ø-4 wire (L-N): 160 – 300V AC  
1Ø-2 wire (L1-N1): 160 – 300V AC

**FREQUENCY RANGE**

45 - 65 Hz

**VA RATING**

< 50VA

**TRIP SETTINGS**

Under Voltage : 280 to 600V AC (L-L)  
[for 3Ø-3 wire]  
160 to 300V AC (L-N)  
[for 3Ø-4 wire]  
160 to 300V AC (L1-N1)  
[for 1Ø-2 wire]  
Over Voltage : 280 to 600V AC (L-L)  
[for 3Ø-3 wire]  
160 to 300V AC (L-N)  
[for 3Ø-4 wire]  
160 to 300V AC (L1-N1)  
[for 1Ø-2 wire]

Under Frequency : 45 – 65Hz  
Over Frequency : 45 – 65Hz  
Phase Asymmetry : 5 - 99%

**ASYMMETRY CALCULATION FORMULA**

Asymmetry % :  $\frac{\text{Max. voltage} - \text{Avg. voltage}}{\text{Avg. voltage}} \times 100$

**TIME SETTINGS**

Power ON Delay : 0 - 999 sec  
Trip time delay : 0 - 999 sec  
Recovery time : 0 - 999 sec  
Response Time  
Under Voltage : <120ms  
Over Voltage : <120ms  
Phase Asymmetry : <120ms  
Phase loss : <250ms  
Phase Sequence : <250ms

**HYSTERESIS**

Voltage : 1.0V – 99.9V  
Frequency : 0.2 – 2.0Hz  
Asymmetry : 2.0 - 20%

**RESOLUTION**

Voltage : 1V  
Frequency : 0.1Hz

**ACCURACY**

Voltage : ±1% of full range  
Frequency : ±0.3Hz  
Time : ±5% of setting ± 250ms

(Recovery Time, Trip time Delay, Power ON Delay, Response time Delay)

**OUTPUT SPECIFICATIONS**

2 Relays : Relay1 : 1C/O (SPDT)  
Relay2 : 1C/O (SPDT)

**RELAY RATING**

NO (5A, 250V AC)  
NC (3A, 250V AC)

**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°C 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.  
**Product standard** : IEC60255-1

**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**

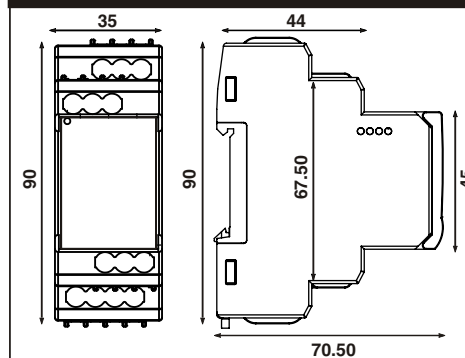
**WARNING**

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**

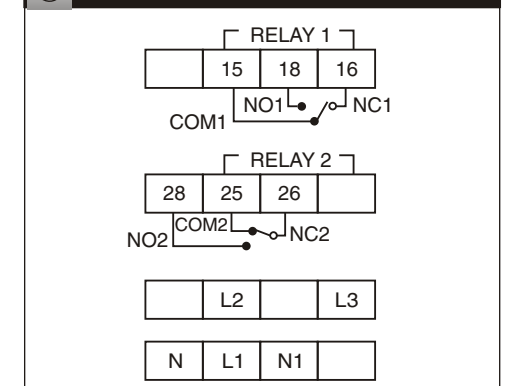
| Various Conditions                   | Power LED | 'R1' LED | 'R2' LED |
|--------------------------------------|-----------|----------|----------|
| No fault                             | ON        | OFF      | OFF      |
| Trip (Relay 1)                       | ON        | ON       | OFF      |
|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

**DISPLAY INDICATION CHART**

| Fault Display | Description     |
|---------------|-----------------|
| t.OV          | Over Voltage    |
| t.UV          | Under Voltage   |
| t.OF          | Over Frequency  |
| t.UF          | Under Frequency |
| t.AS          | Phase Asymmetry |
| t.SQ          | Phase Sequence  |
| t.PL          | Phase Loss      |
| t.NL          | Neutral Loss    |

**Note:** During fault, average value & type of fault will display alternately for 1 sec.

**TERMINAL CONNECTIONS**



**ORDER CODE INFORMATION**

| Product           | Supply   | Certification |              |
|-------------------|----------|---------------|--------------|
|                   |          | CE            | cULus LISTED |
| 900VPR-2-280/600V | 280-600V | ■             | -            |

# 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)

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

OV 5.0V UV SUV OF S.OF UF S.UF

Phase Asymmetry Setting Phase sequence Phase failure Power ON Delay Mode Mode Latch Neutral Loss

AS PAS P.S9 P.FL P.dM MOD LCH NL

Trip time delay Recovery time Power ON delay

ERP REC PON

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

RLY OV 5.0V UV SUV OF S.OF UF S.UF

Phase Asymmetry Setting Phase sequence Phase failure Power ON Delay Mode Mode Latch Neutral Loss

AS PAS P.S9 P.FL P.dM MOD LCH NL

Trip time delay Recovery time

ERP 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           | 1P2 / 3P3 / 3P4 | On selection of 3 phase 4 wire network, neutral loss page will be display for RLY1 & RLY2 section. |

## 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  |   |
| 5.0V               | Set Over Voltage    | 288           | 280 to 520V AC (Default value : 498V) [for 3Ø-3 wire]<br>160 to 300V AC (Default value : 288V) [for 3Ø-4 wire]<br>160 to 300V AC (Default value : 288V) [for 1Ø-2 wire] | This option will be prompted only when OV option is made ON |
| UV                 | Under voltage       | OFF           | ON / OFF  |   |
| 5.0V               | Set under voltage   | 192           | 280 to 520V AC (Default value : 332V) [for 3Ø-3 wire]<br>160 to 300V AC (Default value : 192V) [for 3Ø-4 wire]<br>160 to 300V AC (Default value : 192V) [for 1Ø-2 wire] | This option will be prompted only when UV option is made ON |
| OF                 | Over frequency      | OFF           | ON / OFF  |   |
| 5.0F               | 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  |   |
| 5.0F               | 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  |   |

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   |
|--------------------|-------------------------|---------------------------|-----------|---|
| PAS                | Phase Asymmetry Setting | 100 <sup>As</sup><br>R1 % | 5.0 - 99% | This option will be prompted only when AS option is made ON   |
| P59                | Phase sequence          | ON<br>R1                  | ON / OFF  |   |
| PFL                | Phase failure           | ON<br>R1                  | ON / OFF  |   |
| PdM                | Power 'ON' Delay Mode   | OFF<br>R1                 | ON / OFF  | ON : NO<br>OFF : NC   |
| MOd                | MOD                     | ON<br>R1                  | ON / OFF  | ON : NC(During trip)<br>OFF : NO(During trip)   |
| LCH                | Latch                   | OFF<br>R1                 | ON / OFF  | If Latch is ON, user has to reset the unit manually when fault is removed                                 |
| NL                 | Neutral loss            | ON<br>R1                  | ON / OFF  | If 3 phase 4 wire network is selected then neutral loss function is displayed in RLY1 & RLY2 config menu. |

**Time Setting for Relay 1 (TM1)** 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 | 30 <sup>s</sup><br>R1 t      | 0 - 999sec |                                  |
| REC                | Recovery time   | 0.5 <sup>s</sup><br>R1 t off | 0 - 999sec |                                  |
| P.ON               | Power ON delay  | 0.5 <sup>s</sup><br>R1 ton   | 0 - 999sec | Applicable for Relay 1 & Relay 2 |

**Relay 2 (RL2)** 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<br>R2                  | 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 <sup>&gt;V</sup><br>R2  | ON / OFF   |   |
| SOV                | Set Over voltage | 288 <sup>&gt;V</sup><br>R2 | 280 to 600V AC (Default value : 323V)<br>[for 3Ø-3 wire]<br>160 to 300V AC (Default value : 184V)<br>[for 3Ø-4 wire]<br>160 to 300V AC (Default value : 184V)<br>[for 1Ø-2 wire] | This option will be prompted only when OV option is made ON   |

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

| DISPLAY (For 1sec) | DESCRIPTION             | DEFAULT VALUE                | RANGE  | CONDITION   |
|--------------------|-------------------------|------------------------------|--|---|
| UV                 | Under voltage           | OFF <sup>&lt;V</sup><br>R2   | ON / OFF   |   |
| SUV                | Set under voltage       | 192 <sup>&lt;V</sup><br>R2   | 280 to 520V AC (Default value : 332V)<br>[for 3Ø-3 wire]<br>160 to 300V AC (Default value : 192V)<br>[for 3Ø-4 wire]<br>160 to 300V AC (Default value : 192V)<br>[for 1Ø-2 wire] | This option will be prompted only when UV option is made ON   |
| OF                 | Over frequency          | OFF <sup>&gt;</sup><br>R2 Hz | ON / OFF   |   |
| SOF                | Set over frequency      | 55 <sup>&gt;</sup><br>R2 Hz  | 45.0 - 65.0Hz  | This option will be prompted only when OF option is made ON   |
| UF                 | Under frequency         | OFF <sup>&lt;</sup><br>R2 Hz | ON / OFF   |   |
| SUF                | Set under frequency     | 45 <sup>&lt;</sup><br>R2 Hz  | 45.0 - 65.0Hz  | This option will be prompted only when UF option is made ON   |
| AS                 | Asymmetry               | ON <sup>As</sup><br>R2       | ON / OFF   |   |
| PAS                | Phase Asymmetry Setting | 100 <sup>As</sup><br>R2 %    | 5.0 - 99.9%  | This option will be prompted only when AS option is made ON   |
| P59                | Phase sequence          | ON<br>R2                     | ON / OFF   |   |
| PFL                | Phase failure           | ON<br>R2                     | ON / OFF   |   |
| PdM                | Power 'ON' Delay Mode   | OFF<br>R2                    | ON / OFF   | ON : NO<br>OFF : NC   |
| MOd                | MOD                     | OFF<br>R2                    | ON / OFF   | ON : NC(During trip)<br>OFF : NO(During trip)   |
| LCH                | Latch                   | OFF<br>R2                    | ON / OFF   | If Latch is ON, user has to reset the unit manually when fault is removed                                 |
| NL                 | Neutral loss            | ON<br>R2                     | ON / OFF   | If 3 phase 4 wire network is selected then neutral loss function is displayed in RLY1 & RLY2 config menu. |

Note : In 3P4W, when neutral is absent all L-N voltage are zero.

**Time Setting for Relay 2 (TM2)** 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 |
|--------------------|-----------------|---------------|------------|-----------|
|                    | Trip time delay |               | 0 - 999sec |           |
|                    | Recovery time   |               | 0 - 999sec |           |

### Hysteresis (HYS)

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 |
|--------------------|--------------------------|---------------|-------------|-----------|
|                    | Hysteresis for voltage   |               | 1.0 - 99.9V |           |
|                    | Hysteresis for frequency |               | 0.2 - 2Hz   |           |
|                    | Hysteresis for Asymmetry |               | 2 - 20%     |           |

### Password (PW)

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   |
|--------------------|--------------|---------------|-----------|---|
|                    | Password     |               | ENB / DIS | Enable / Disable password protection option           |
|                    | Set password |               | 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)

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 |
|--------------------|---------------------|---------------|----------|-----------|
|                    | Reset (Factory set) |               | YES / NO |           |

### TRIP VALUE SETTING

Press ▲ key for 3 sec. to enter or exit Trip Value Setting menu :

Press ▲ or ▼ to scroll through main menu

Press ● + ▲ or ● + ▼ to change parameter value

| DISPLAY (For 1sec) | DESCRIPTION                  | DEFAULT VALUE | RANGE  | CONDITION |
|--------------------|------------------------------|---------------|--|-----------|
|                    | Set over voltage for Relay 1 |               | 280 to 520V AC (Default value : 498V)<br>[for 3Ø-3 wire]<br>160 to 300V AC (Default value : 288V)<br>[for 3Ø-4 wire]<br>160 to 300V AC (Default value : 288V)<br>[for 1Ø-2 wire] |           |

| Press ▲ or ▼ to scroll through main menu |                               | Press ● + ▲ or ● + ▼ to change parameter value |  |           |
|--|-------------------------------|--|--|-----------|
| DISPLAY (For 1sec)                       | DESCRIPTION                   | DEFAULT VALUE                                  | RANGE  | CONDITION |
|  | Set under voltage for Relay 1 |  | 280 to 520V AC (Default value : 332V)<br>[for 3Ø-3 wire]<br>160 to 300V AC (Default value : 192V)<br>[for 3Ø-4 wire]<br>160 to 300V AC (Default value : 192V)<br>[for 1Ø-2 wire] |           |
|  | Set over voltage for Relay 2  |  | 280 to 520V AC (Default value : 498V)<br>[for 3Ø-3 wire]<br>160 to 300V AC (Default value : 288V)<br>[for 3Ø-4 wire]<br>160 to 300V AC (Default value : 288V)<br>[for 1Ø-2 wire] |           |
|  | Set under voltage for Relay 2 |  | 280 to 520V AC (Default value : 332V)<br>[for 3Ø-3 wire]<br>160 to 300V AC (Default value : 192V)<br>[for 3Ø-4 wire]<br>160 to 300V AC (Default value : 192V)<br>[for 1Ø-2 wire] |           |
|  | Trip time delay for Relay1    |  | 0 - 999s   |           |
|  | Trip time delay for Relay2    |  | 0 - 999s   |           |

**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.

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

| 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 %     |

In configuration menu, if no key pressed for 30 sec. Then unit resumes online mode.

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

\***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.  
For 1P2W system, L1-N1 voltages is shown.

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

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