



## 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

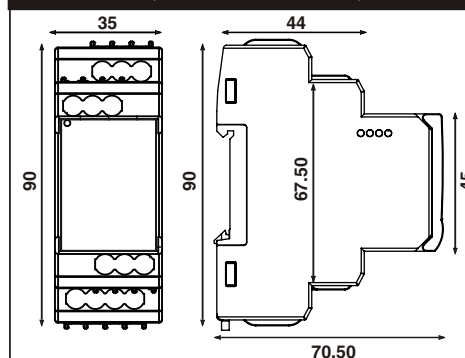
1. To prevent the risk of electric shock power supply to the equipment must be kept OFF while doing the wiring arrangement.

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

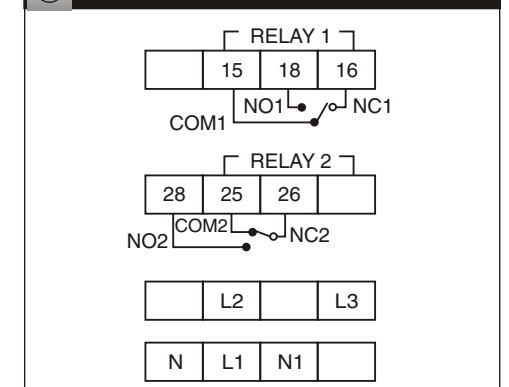
Various Conditions	Power LED	'R1' LED	'R2' LED
No fault	ON	OFF	OFF
Trip (Relay 1)	ON	ON	OFF
Trip (Relay 2)	ON	OFF	ON
Trip (If programmed for both relays)	ON	ON	ON

## 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

TRP 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

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	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] 160 to 300V AC (Default value : 288V) [for 3Ø-4 wire] 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] 160 to 300V AC (Default value : 192V) [for 3Ø-4 wire] 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
P.AS	Phase Asymmetry Setting	100 <sup>As</sup> R1 %	5.0 - 99%	This option will be prompted only when AS option is made ON
P.S9	Phase sequence	ON R1	ON / OFF	
P.FL	Phase failure	ON R1	ON / OFF	
P.dM	Power 'ON' Delay Mode	OFF R1	ON / OFF	ON : NO OFF : NC
MOd	MOD	ON R1	ON / OFF	ON : NC(During trip) OFF : NO(During trip)
LCH	Latch	OFF R1	ON / OFF	If Latch is ON, user has to reset the unit manually when fault is removed
NL	Neutral loss	ON 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> R1 t	0 - 999sec	
REC	Recovery time	0.5 <sup>s</sup> R1 t off	0 - 999sec	
P.ON	Power ON delay	0.5 <sup>s</sup> 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 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> R2	ON / OFF	
SOV	Set Over voltage	288 <sup>&gt;v</sup> R2	280 to 600V AC (Default value : 323V) [for 3Ø-3 wire] 160 to 300V AC (Default value : 184V) [for 3Ø-4 wire] 160 to 300V AC (Default value : 184V) [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> R2	ON / OFF	
SUV	Set under voltage	192 <sup>&lt;v</sup> R2	280 to 520V AC (Default value : 332V) [for 3Ø-3 wire] 160 to 300V AC (Default value : 192V) [for 3Ø-4 wire] 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 <sup>&gt;</sup> R2 Hz	ON / OFF	
SOF	Set over frequency	55 <sup>&gt;</sup> 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> R2 Hz	ON / OFF	
SUF	Set under frequency	45 <sup>&lt;</sup> R2 Hz	45.0 - 65.0Hz	This option will be prompted only when UF option is made ON
AS	Asymmetry	ON <sup>As</sup> R2	ON / OFF	
P.AS	Phase Asymmetry Setting	100 <sup>As</sup> R2 %	5.0 - 99.9%	This option will be prompted only when AS option is made ON
P.S9	Phase sequence	ON R2	ON / OFF	
P.FL	Phase failure	ON R2	ON / OFF	
P.dM	Power 'ON' Delay Mode	OFF R2	ON / OFF	ON : NO OFF : NC
MOd	MOD	OFF R2	ON / OFF	ON : NC(During trip) OFF : NO(During trip)
LCH	Latch	OFF R2	ON / OFF	If Latch is ON, user has to reset the unit manually when fault is removed
NL	Neutral loss	ON 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) [for 3Ø-3 wire] 160 to 300V AC (Default value : 288V) [for 3Ø-4 wire] 160 to 300V AC (Default value : 288V) [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) [for 3Ø-3 wire] 160 to 300V AC (Default value : 192V) [for 3Ø-4 wire] 160 to 300V AC (Default value : 192V) [for 1Ø-2 wire]	
	Set over voltage for Relay 2		280 to 520V AC (Default value : 498V) [for 3Ø-3 wire] 160 to 300V AC (Default value : 288V) [for 3Ø-4 wire] 160 to 300V AC (Default value : 288V) [for 1Ø-2 wire]	
	Set under voltage for Relay 2		280 to 520V AC (Default value : 332V) [for 3Ø-3 wire] 160 to 300V AC (Default value : 192V) [for 3Ø-4 wire] 160 to 300V AC (Default value : 192V) [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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