



FEATURES

- Network selection 3Ø-4 wire / 1Ø-2 wire
- Monitoring Under Voltage / Over Voltage / Asymmetry / Phase reversal / Phase failure (Phase loss)
- Monitoring Over Frequency / Under Frequency
- Adjustable trip levels
- Separate selectable trip time delay for Voltage And Frequency
- Error indication on LCD display as well as by LEDS

SPECIFICATIONS

NOMINAL VOLTAGE (Vn)
240 VAC

NOMINAL FREQUENCY
50 Hz

SUPPLY VARIATION
70 - 130% of Vn

SUPPLY NETWORK SELECTION
1 Ø-2 wire / 3 Ø-4 wire

PHASE FAILURE TRIP
For L1 Phase: <70% of nominal voltage
For L2 & L3 phase: OFF / 70% of nominal Voltage
Min voltage measurable: 60V
(In OFF Condition)

VOLTAGE ADJUSTMENT
Under Voltage: OFF / 180 to 234V
(in one volt step)
Over Voltage: OFF / 246V to 300V
(in one Volt step)
Voltage Asymmetry: OFF / 0V to 99V (in 1V Step)

TRIP TIME DELAY FOR VOLTAGE (tr)
0.2 to 99 sec
(Actual delay=Adjustable delay + Response time)
Accuracy: ± 0.5% of F.S. or ±100ms
(whichever is greater)
Note: Settable in 100ms steps for range 0.2 to 1 sec
Settable in 1sec steps for range 1 to 99 sec

ADJUSTMENT OF HYSTERESIS FOR VOLTAGE
1 to 10% of trip level

FREQUENCY ADJUSTMENT
Under frequency: OFF / 40 - 49Hz (in 1 Hz step)
Over frequency: OFF / 51 - 60Hz (in 1 Hz step)

TRIP TIME DELAY FOR FREQUENCY (tf)
0.2 to 99 sec
(Actual delay=Adjustable delay + Response time)
Accuracy: ± 0.5% of F.S. or ±100ms
(whichever is greater)
Note: Settable in 100ms steps for range 0.2 to 1 sec
Settable in 1sec steps for range 1 to 99 sec

HYSTERESIS FOR FREQUENCY

UF & OF TRIP LEVEL SETTINGS	HYSTERESIS
40 to 45 Hz	+2Hz
55 to 60 Hz	-2Hz
46 Hz	+1.5Hz
54 Hz	-1.5Hz
47 & 48 Hz	+1Hz
49 Hz	+0.5Hz
51 Hz	-0.5Hz

ACCURACY
±0.5% @ constant conditions

RESPONSE TIME
150ms max

POWER ON DELAY (Td)
Approx 400ms

OPERATING TEMPERATURE
0 to +50°C

RESET
Auto reset on removal of fault condition

OUTPUT RATING
Fail safe relay SPDT: 7A@250 VAC/30 VDC,
Resistive

PAGE UPDATE TIME
2 sec

DISPLAY UPDATE TIME
1 sec

SAFETY PRECAUTIONS

SAFETY SUMMARY
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 equipments is not handled in a manner specified by the manufacturer it might impair the protection provided by the equipment.

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

WIRING GUIDELINES

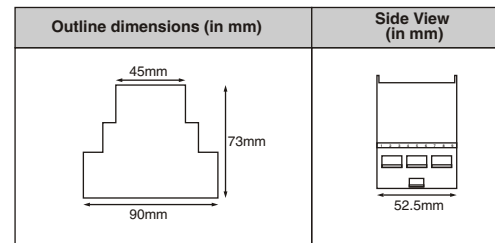
- Caution**
1. To prevent the risk of electric shock power supply to the equipment must be kept OFF while doing the wiring arrangement.
 2. Wiring shall be done strictly according to the terminal layout with shortest connection. Confirm that all connections are correct.

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

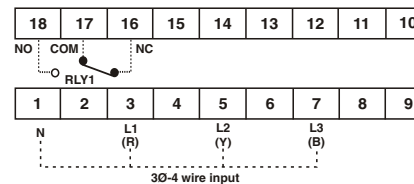
MAINTENANCE

1. The equipment should be cleaned regularly to avoid blockage of ventilating parts.
2. Clean the equipment with a clean soft cloth. Do not use isopropyl alcohol or any other cleaning agent.

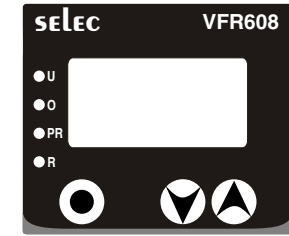
MECHANICAL DIMENSIONS



TERMINAL CONNECTIONS



FRONT PANEL DESCRIPTION



LED INDICATION CHART

Various Conditions	U LED	O LED	PR LED	R LED
Normal	OFF	OFF	OFF	ON
Under Voltage / Freq. Error During Timing	Flashing	OFF	OFF	ON
Under Voltage / Freq Error After Timing	ON	OFF	OFF	OFF
Over Voltage / Freq Error During Timing	OFF	Flashing	OFF	ON
Over Voltage / Freq Error After Timing	OFF	ON	OFF	OFF
Phase Asymmetry Error During Timing	Alternately Flashing	Alternately Flashing	OFF	ON
Phase Asymmetry Error After Timing	Alternately Flashing	Alternately Flashing	OFF	OFF
Phase Reversed Error	OFF	OFF	ON	OFF
Phase failure trip (for Y & B phase)	OFF	OFF	Flashing	OFF
Phase failure trip (for R phase)	OFF	OFF	OFF	OFF

ONLINE DISPLAY

Parameters	Description
Online	
L1	Phase 1 Voltage
L2	Phase 2 Voltage
L3	Phase 3 Voltage
Frequency	System Frequency

Note: To scroll through the online parameters faster press + /

Programming Mode	
Functions	Key Press
To enter / exit in configuration mode	▲ + ▼ for 3 seconds
To select next / previous parameter	▲ / ▼
To increase / decrease parameter settings	● + ▲ Increase ● + ▼ Decrease

CONFIGURATION SCHEME

Press ▲ + ▼ for 3 sec to enter into Programming
Key press Display Description

1. To select phase network Factory setting: <input type="text" value="3PH"/>		
(Display <input type="text" value="PHS"/> for 1 second)		
Press ● + ▼	<input type="text" value="3PH"/> <input type="text" value="1PH"/>	3 Ø-4 wire 1 Ø-2 wire
2. Press ▲ to select Under Voltage Factory setting: <input type="text" value="0N"/>		
(Display <input type="text" value="UU"/> for 1 second)		
Press ● + ▼	<input type="text" value="0N"/> <input type="text" value="OFF"/>	Under voltage enabled Under voltage disabled
3. Press ▲ to select Under Voltage Threshold Factory setting: <input type="text" value="180V"/>		
This parameter prompt only if under voltage is enabled		
(Display <input type="text" value="UF"/> for 1 second)		
	<input type="text" value="180V"/> <input type="text" value="234V"/>	Range: 180 to 234V
Note: Press ● + ▲ / ▼ to scroll the value between 180 to 234V		
4. Press ▲ to select Over Voltage Factory setting: <input type="text" value="0N"/>		
(Display <input type="text" value="OU"/> for 1 second)		
Press ● + ▼	<input type="text" value="0N"/> <input type="text" value="OFF"/>	Over voltage enabled Over voltage disabled
5. Press ▲ to select Over Voltage Threshold Factory setting: <input type="text" value="246V"/>		
This parameter prompt only if over voltage is enabled		
(Display <input type="text" value="OUV"/> for 1 second)		
	<input type="text" value="246V"/> <input type="text" value="300V"/>	Range: 246 to 300 V
Note: Press ● + ▲ / ▼ to scroll the value between 246 to 300V		

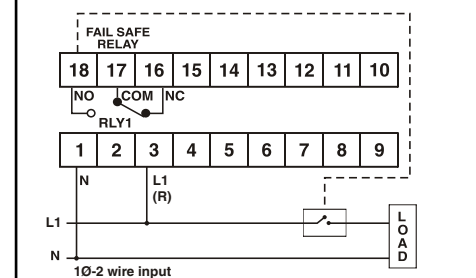
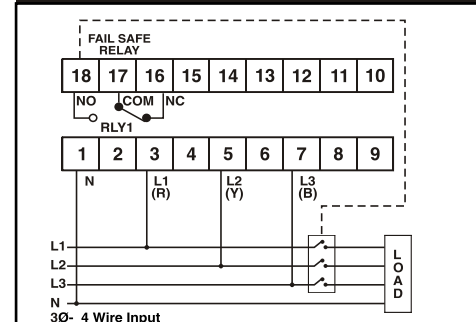
6. Press ▲ to select Voltage Asymmetry Factory setting: <input type="text" value="0N"/>		
This parameter prompt only if 3Ø-4 wire network is selected		
(Display <input type="text" value="UA"/> for 1 second)		
Press ● + ▼	<input type="text" value="0N"/> <input type="text" value="OFF"/>	Voltage Asymmetry enabled Voltage Asymmetry disabled
7. Press ▲ to select Voltage Asymmetry Threshold Factory setting: <input type="text" value="10V"/>		
This parameter prompt only if Voltage Asymmetry is enabled		
(Display <input type="text" value="UAR"/> for 1 second)		
	<input type="text" value="10V"/>	Range: 0 to 99 V
Note: Press ● + ▲ / ▼ to scroll the value between 0 to 99V		
8. Press ▲ to select Trip Time Delay for Voltage Factory setting: <input type="text" value="10"/>		
(Display <input type="text" value="UET"/> for 1 second)		
	<input type="text" value="10"/>	Range: 0.2 to 1 sec with 0.1 resolution 1 to 99 sec with 1 resolution
Note: Press ● + ▲ / ▼ to scroll the value between 0.2 to 99sec		
9. Press ▲ to select Hysteresis for Voltage Factory setting: <input type="text" value="2"/>		
(Display <input type="text" value="HS"/> for 1 second)		
	<input type="text" value="2"/>	Range: 1 to 10%
Note: Press ● + ▲ / ▼ to scroll the value between 1 to 10%		
10. Press ▲ to select Phase reversed Factory setting: <input type="text" value="0N"/>		
This parameter prompt only if 3Ø-4 wire network is selected		
(Display <input type="text" value="FEU"/> for 1 second)		
Press ● + ▼	<input type="text" value="0N"/> <input type="text" value="OFF"/>	Phase reversed enabled Phase reversed disabled
11. Press ▲ to select Phase failure trip Factory setting: <input type="text" value="0N"/>		
This parameter prompt only if 3Ø-4 wire network is selected		
(Display <input type="text" value="PAR"/> for 1 second)		
Press ● + ▼	<input type="text" value="0N"/> <input type="text" value="OFF"/>	Phase failure trip enabled Phase failure trip disabled

12. Press ▲ to select Under Frequency Factory setting: <input type="text" value="0N"/>		
(Display <input type="text" value="UF"/> for 1 second)		
Press ● + ▼	<input type="text" value="0N"/> <input type="text" value="OFF"/>	Under frequency enabled Under frequency disabled
13. Press ▲ to select Under Frequency Threshold Factory setting: <input type="text" value="49Hz"/>		
This parameter prompt only if Under Frequency enabled		
(Display <input type="text" value="UFF"/> for 1 second)		
	<input type="text" value="49Hz"/>	Range: 40 to 49 Hz
Note: Press ● + ▲ / ▼ to scroll the value between 40 to 49 Hz		
14. Press ▲ to select Over Frequency Factory setting: <input type="text" value="0N"/>		
(Display <input type="text" value="OF"/> for 1 second)		
Press ● + ▼	<input type="text" value="0N"/> <input type="text" value="OFF"/>	Over frequency enabled Over frequency disabled
15. Press ▲ to select Over Frequency Threshold Factory setting: <input type="text" value="51Hz"/>		
This parameter prompt only if Over Frequency enabled		
(Display <input type="text" value="OFF"/> for 1 second)		
	<input type="text" value="51Hz"/>	Range: 51 to 60 Hz
Note: Press ● + ▲ / ▼ to scroll the value between 51 to 60 Hz		
16. Press ▲ to select Trip Time Delay for Frequency Factory setting: <input type="text" value="10"/>		
(Display <input type="text" value="FET"/> for 1 second)		
	<input type="text" value="10"/>	Range: 0.2 to 1 sec with 0.1 resolution 1 to 99 sec with 1 resolution
Note: Press ● + ▲ / ▼ to scroll the value between 0.2 to 99 sec		
17. Reset the unit to factory set values		
(Display <input type="text" value="FSE"/> for 1 second)		
Press ● + ▲	<input type="text" value="1"/>	No Reset
Press ● + ▲	<input type="text" value="2"/>	No Reset
Press ● + ▲	<input type="text" value="3"/>	No Reset
Press ● + ▲	<input type="text" value="4"/>	No Reset
Press ● + ▲	<input type="text" value="5"/>	All reset

NOTE:
1. The unit will auto exit from program mode after 1 minute of inactivity.
2. Continuous operation of ● + ▼ / ▲ makes update speed faster in 3 stage after 7 seconds.

Error indications	
Errors	Display
Under Voltage-phase 1	<input type="text" value="U-1"/>
phase 2	<input type="text" value="U-2"/>
phase 3	<input type="text" value="U-3"/>
Over Voltage-phase 1	<input type="text" value="O-1"/>
phase 2	<input type="text" value="O-2"/>
phase 3	<input type="text" value="O-3"/>
Voltage Asymmetry	<input type="text" value="ASY"/>
Phase reverse	<input type="text" value="FEU"/>
Phase failure trip	<input type="text" value="PAR"/>
Under frequency	<input type="text" value="UFE"/>
Over frequency	<input type="text" value="OFF"/>

TYPICAL WIRING DIAGRAM



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