Full Installation Instructions Multifunction voltage monitoring relay

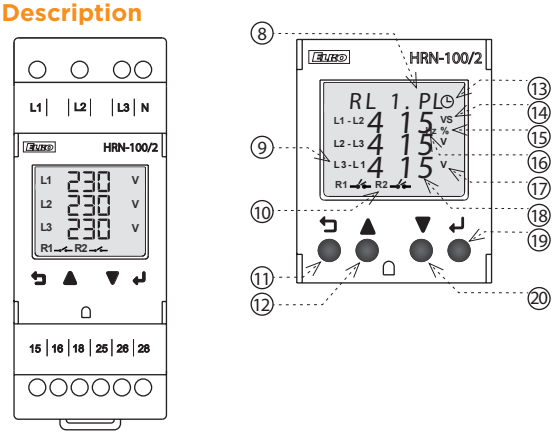
in 3P with LCD display



Characteristics

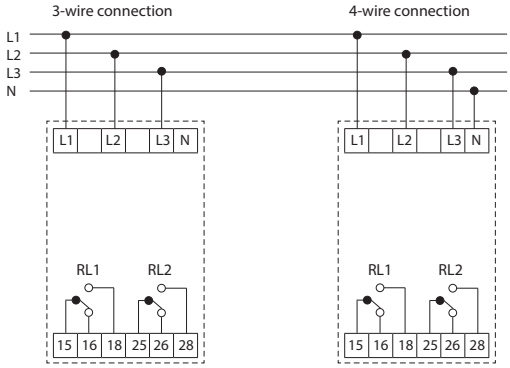
- 3-wire or 4-wire connection (with or without neutral).
- Monitors upper and lower voltage and frequency limits in three-phase circuits.
- Monitors phase sequence, phase failure and phase asymmetry, including neutral failure when used in a 4-wire connection.
- The device is supplied from monitored voltage.
- Both output contacts can be set individually.
- Measures the true RMS value of the AC voltage.
- Adjustable output delay for transitions to and from a fault state, with an additional power-on delay following connection of the supply.
- Possibility of automatic or manual transition from fault state (memory).
- Optional closing or opening of the output contact when measuring a fault state
- (Fail-Safe / Non-Fail-Safe).
- Password protection against unauthorized changes to settings.
- Digital backlit display with the possibility of monitoring the current state of the network, incl. possible failures.
- The last five fault states are stored in a history that can be viewed retrospectively.
- Sealable transparent cover for display and controls.

Description



1. Backlit display
2. Place for sealing
3. Output contact RL1 (15-16-18)
4. Supply/monitored voltage terminals (L1-L2-L3-N)
5. Transparent opening cover
6. Control buttons
7. Output contact RL2 (25-26-28)
8. Fault status window and function menu in settings
9. Indication of phase or line voltage
10. Status of output contacts RL1 and RL2
11. ESCAPE button - ↰
12. UP button - ▲
13. Indication of a running delay
14. Delay in seconds
15. Asymmetry in percent
16. Frequency in hertz
17. Voltage in volts
18. Current state of voltage or other configurable parameter
19. ENTER button - ↵
20. DOWN button - ▼

Connection



Technical parameters

Power supply	PSM-X
Supply and measuring terminals:	L1, L2, L3, (N)
Supply and monitored voltage:	U_{LN} = 3 ~ 90 - 288 V, (AC 45-65 Hz) U_{LL} = 3 ~ 155 - 500 V, (AC 45-65 Hz)
Power consumption (max.):	5 VA

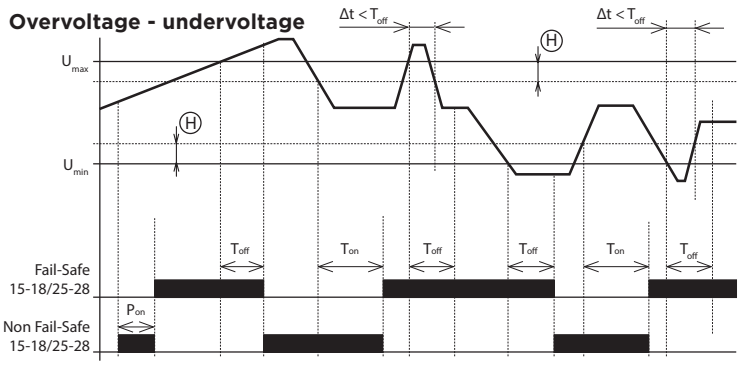
Measuring circuit	
Selection of the measured circuit:	Phase voltage - three-phase, 4-wire Line voltage - three-phase, 3-wire
Adjustable upper (OV) and lower (UV) voltage levels:	Phase voltage: 90 - 288 VAC Line voltage: 155 - 500 VAC
Upper (HC) / lower (LC) limit voltage:	Phase voltage: 310 VAC / 85 VAC Line voltage: 535 VAC / 150 VAC
Adjustable upper (OF) and lower (UF) frequency level:	45 - 65 Hz
Adjustable asymmetry:	Absolute: 5 - 99 VAC Percentage: 2 - 50%
Adjustable voltage and frequency hysteresis level:	3 - 20 VAC (OV,UV, HC, LC) 0.5 - 2 Hz (OF, UF)
Adjustable hysteresis asymmetry:	Absolute: 3 - 99 VAC Percentage: 2 - 15%
Accuracy of measured voltage:	+/- 5V
Accuracy of measured frequency:	+/- 0.3 Hz
Adjustable delay after supply connection P_{on}:	0 - 999 s (HW initialization 250 ms)
Adjustable delay T_{on}:	0.5 - 999 s
Adjustable delay T_{off}:	0.1 - 999 s
Fixed delay:	<100 ms (phase sequence, failure) <200 ms (HC, LC), <500 ms (neutral failure)

Output	
Output contact:	2x changeover ($AgSnO_2$)
Rated current:	5A / AC1
Switching power:	1200VA / AC1, 150W / DC1
Switching voltage:	240V AC / 30V DC
Max. output power dissipation:	5W
Mechanical life:	10,000,000 operations
Electrical life (AC1):	100,000 operations

Other information	
Operating temperature:	-10°C to +60 °C (14 °F to 140 °F)
Storage temperature:	-20 to +70 °C (-4 °F to 158 °F)
Dielectric strength:	4kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP20 cover and terminals / IP40 front panel with cover
Overvoltage category:	III.
Degree of pollution:	2
Cable size (mm^2):	max. 1x 2.5, max. 2x 1.5 / with sleeve max. 1x 2.5 (AWG 24-12)
Dimensions:	90 x 36 x 66.5 mm
Weight:	132 g
Standards:	EN 61812-1, EN IEC 63044

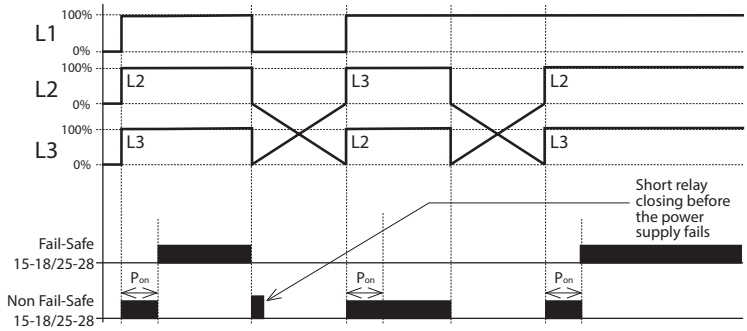
Function

Overvoltage - undervoltage



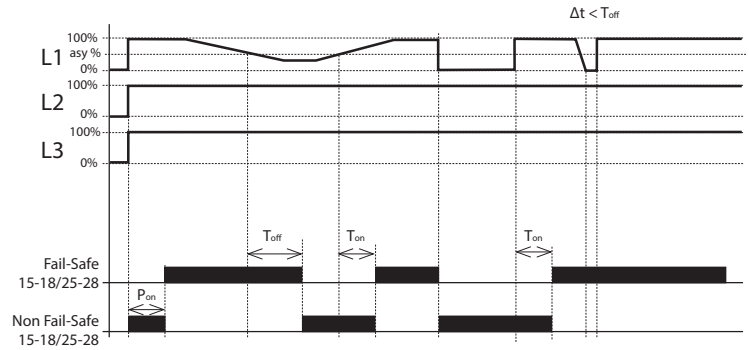
- After the supply/monitored voltage is connected, the delay P_{on} starts timing - during the timing the output contact is in a fault state - in the FAIL-SAFE mode it is open. After the delay, if the monitored voltage is in the range U_{min} ... U_{max}, the output contact closes.
- If the monitored voltage exceeds the set value Umax, the OFF delay (Toff) starts. After the delay, the output contact opens.
- If the monitored voltage falls below the U_{max} value reduced by the set hysteresis, the time delay to the OK state starts (T_{on}). After the delay, the output contact closes.
- If the duration of the fault state (Δt) is shorter than the set value T_{off}, the status of the output contact does not change.
- If the monitored voltage falls below the value U_{min}, the time delay to the fault state (T_{off}) starts. After the delay, the output contact opens.
- If the monitored voltage exceeds the value U_{min} increased by the set hysteresis, the time delay to the OK state starts (T_{on}). After the delay, the output contact closes.
- If the duration of the fault state (Δt) is shorter than the set value (T_{off}), the status of the output contact does not change.

Phase sequence



- After the supply/monitored voltage is connected, the delay (P_{on}) starts timing - during the timing the output contact is in a fault state - in FAIL -SAFE mode it is open. After the delay, if the phase sequence is correct, the output contact closes.
- If the phase sequence is incorrect after the (P_{on}) delay, the output contact remains open (fault state)

Asymmetry, phase failure



- After the supply/monitored voltage is connected, the delay (P_{on}) starts timing - during the timing the output contact is in a fault state - in the
- FAIL-SAFE mode it is open. After the delay, if the phase asymmetry is lower than the set value

  (absolute or percentage - see technical parameters), the output contact closes.
- If the phase asymmetry exceeds the set value, the time delay to the fault state (T_{off}) starts. After the delay, the output contact opens.
- If the phase asymmetry falls below the set value, the time delay to the OK state starts the ON delay (T_{on}) starts. After the delay, the output contact closes.
- If the duration of the fault state (Δt) is shorter than the set value T_{off}, the status of the output contact does not change.
- If a phase failure occurs, the OFF delay (Toff) starts. After the delay, the output contact opens.
- IIf the phase asymmetry falls below the set value, the ON delay (Ton) starts. After the delay, the output contact closes.After the delay, the output contact closes.
- If the duration of the fault state (Δt) is shorter than the set value T_{off}, the status of the output contact does not change.

Graph legend:

P_{on} - Power ON delay (delay after power supply connection)
P_{on} - 0-999 s (min. 250 ms hardware initialisation)
T_{on} - ON delay (delay to OK state)
T_{on} - 0,5-999 s
T_{off} - OFF delay (delay to fault state)

T_{off} - 0,1 - 999 s
T_{off} - Adjustable for OV, UV, OF, UF & asymmetry faults
T_{off} - Phase sequence, failure <100 ms; Neutral failure <500 ms
Δt - Duration of the fault state
- Hysteresis

Description of controls and signalling

Output contact mode

Mode	OK state	Fault state
Fail-Safe	15 & 25 (Pole) — 18 & 28 (NO)	15 & 25 (Pole) — 18 & 28 (NO)
Non-Fail-Safe	15 & 25 (Pole) — 18 & 28 (NO)	15 & 25 (Pole) — 18 & 28 (NO)

Fault status window

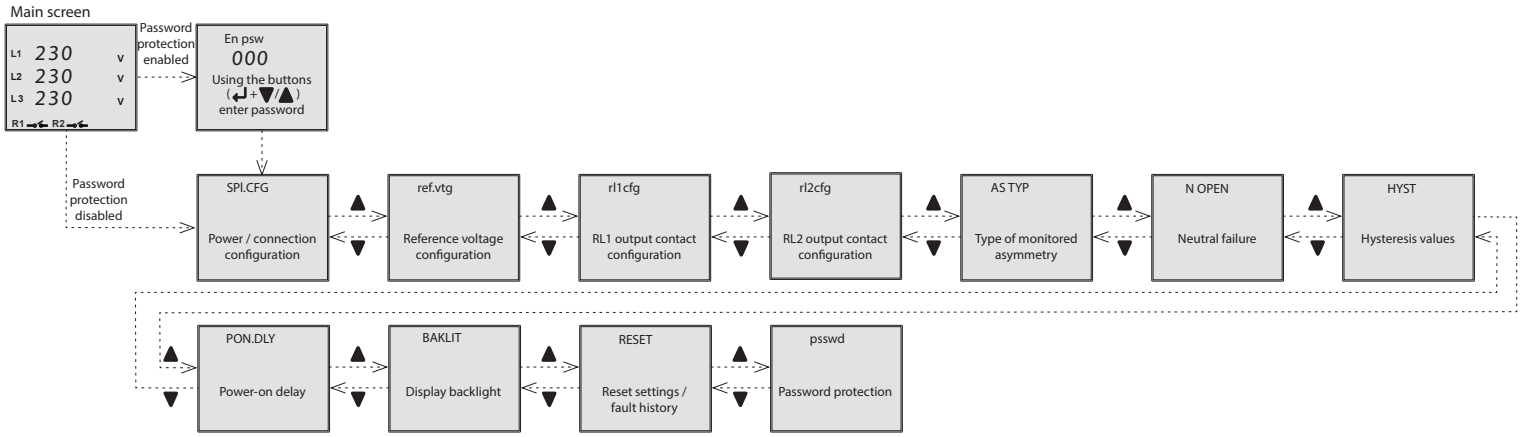
Short-cut	Meaning
"FLT.NF"	Neutral failure
"FLT.LC"	Lower threshold voltage
"FLT.HC"	Upper threshold voltage
"RLx.PL"	Phase failure
"RLx.PR"	Phase sequence
"RLx.ASY"	Phase asymmetry
"RLx.OF"	Overfrequency
"RLx.UF"	Underfrequency
"RLx.OV"	Overvoltage
"RLx.UV"	Undervoltage
Note: RLx indicates RL1 & RL2	

Control buttons

ESCAPE ↩	Enter the settings menu (long press >1 s). Return to the main screen or previous menu in edit or display mode. Step back when changing a value or parameter.
UP ▲	Moves up through the parameters. Change/increase the value of a parameter in edit mode. Selects the parameter displayed on the main screen: voltage, frequency or asymmetry(pressing the button <500 ms).
DOWN ▼	Moves down through the parameters. Change/decrease the value of a parameter in edit mode. Display history of fault states (pressing the button <500 ms).
ENTER ↵	Select and save a parameter value in edit mode. Resets the device when memory mode is active (long press >1 s).
ESCAPE ↩ ENTER ↵	Press a key combination to display the read-only settings menu (long press >1s).

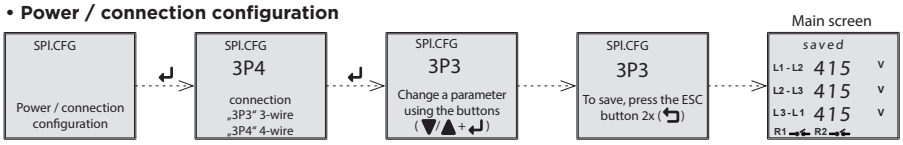
Programming menu structure

- to enter the programming menu, press and hold the ESCAPE button for >1s (⮌)
- possibility of changing a parameter / value is signalled by its flashing on the display

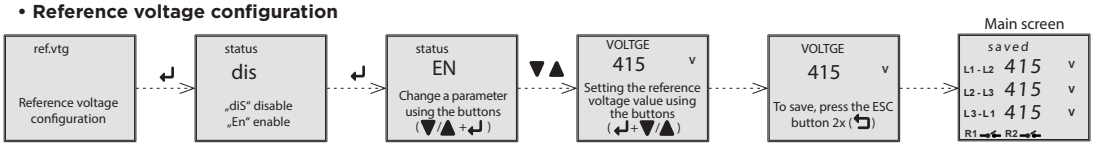


Individual settings of items in the submenu

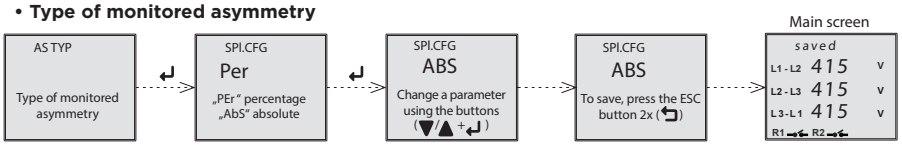
• Power / connection configuration



• Reference voltage configuration

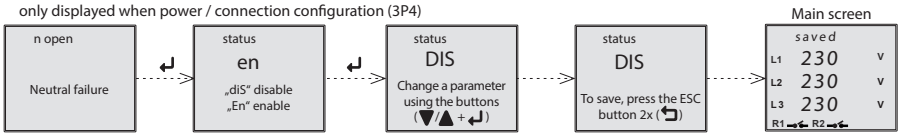


• Type of monitored asymmetry

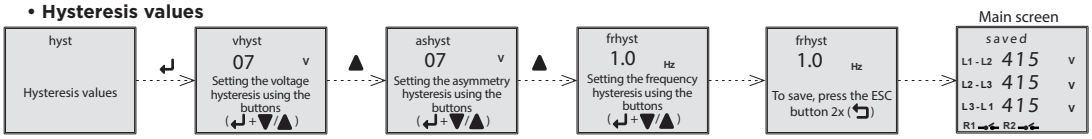


• Neutral failure

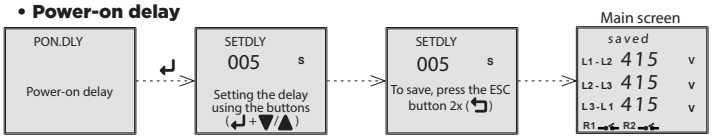
only displayed when power / connection configuration (3P4)



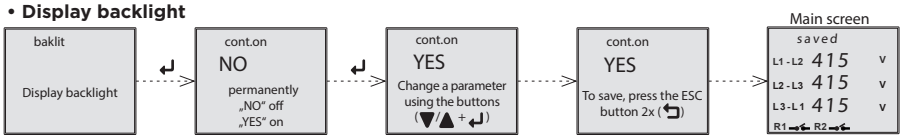
• Hysteresis values



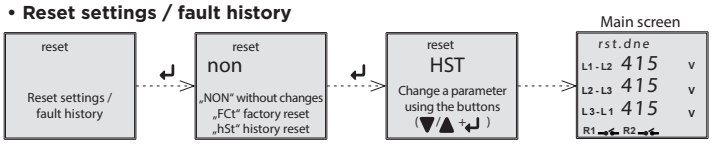
• Power-on delay



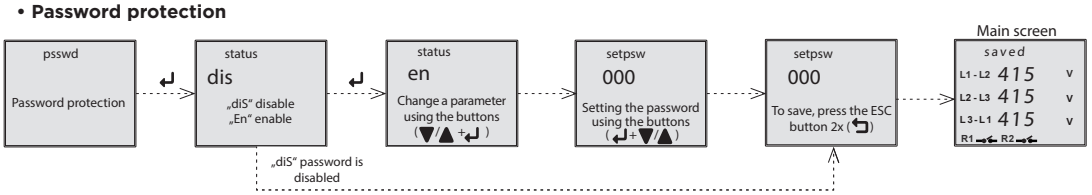
• Display backlight

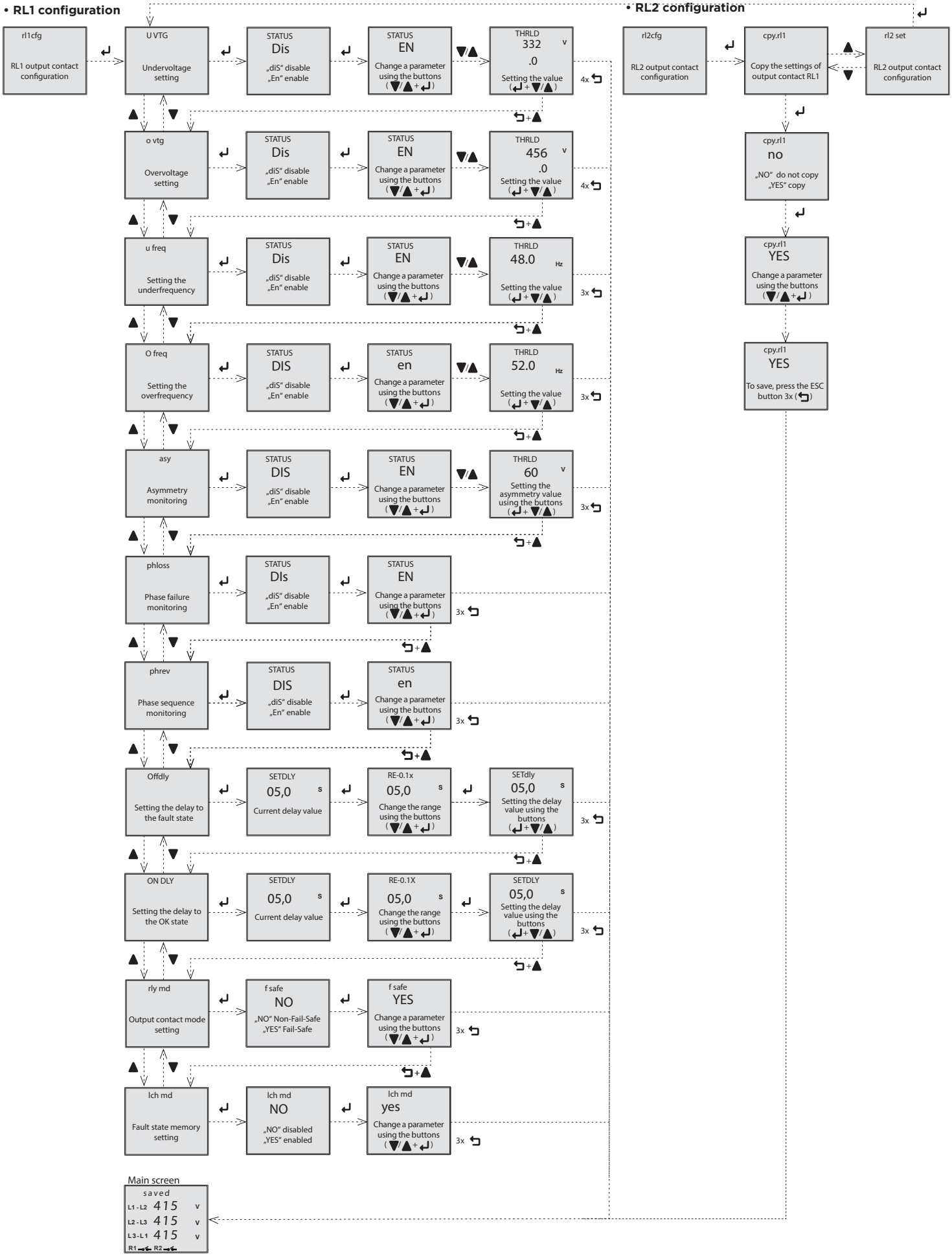


• Reset settings / fault history



• Password protection




• RL1 configuration
rl1cfg
RL1 output contact configuration
U VTG
Undervoltage setting
STATUS
Dis
„diS" disable
„En" enable
STATUS
EN
Change a parameter using the buttons
THRLD
332
.0
V
Setting the value
4x
o vtg
Overvoltage setting
456
u freq
Setting the underfrequency
48.0
Hz
3x
O freq
Setting the overfrequency
DIS
en
52.0
asy
Asymmetry monitoring
60
Setting the asymmetry value using the buttons
phloss
Phase failure monitoring
DIs
phrev
Phase sequence monitoring
Offdly
Setting the delay to the fault state
SETDLY
05,0
s
Current delay value
RE-0.1x
Change the range using the buttons
SETdly
Setting the delay value using the buttons
ON DLY
Setting the delay to the OK state
RE-0.1X
rly md
Output contact mode setting
f safe
NO
„NO" Non-Fail-Safe
„YES" Fail-Safe
YES
lch md
Fault state memory setting
„NO" disabled
„YES" enabled
Main screen
saved
L1 - L2 415 V
L2 - L3 415 V
L3 - L1 415 V
R1 R2
• RL2 configuration
rl2cfg
RL2 output contact configuration
cpy.rl1
Copy the settings of output contact RL1
rl2 set
RL2 output contact configuration
no
„NO" do not copy
„YES" copy
To save, press the ESC button 3x

Warning

This device is designed for connection to a three-phase mains supply and must be installed in accordance with the applicable regulations and standards in the country of use. Installation, connection, configuration and servicing must be carried out only by a qualified electrician who has read and understood these instructions and is familiar with the operation of the device.
The device incorporates protection against overvoltage peaks and disturbances in the power supply. To ensure this protection operates correctly, suitable upstream surge protection must be provided in accordance with the applicable standards.
Before installation, ensure that the mains supply is switched OFF and that the device is de-energised. Do not install the device near sources of excessive electromagnetic interference.
Ensure adequate ventilation around the device. During continuous operation, particularly at higher ambient temperatures, the maximum specified operating temperature must not be exceeded.
Use a screwdriver of approximately 2 mm for installation and adjustment. This is a fully electronic device and must be installed and handled accordingly. Reliable operation also depends on appropriate transportation, storage and handling.
Do not install or use the device if there are any signs of damage, deformation, malfunction or missing parts. In such cases, contact your supplier.
At the end of its service life, the device should be disposed of or recycled in accordance with applicable local regulations.

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