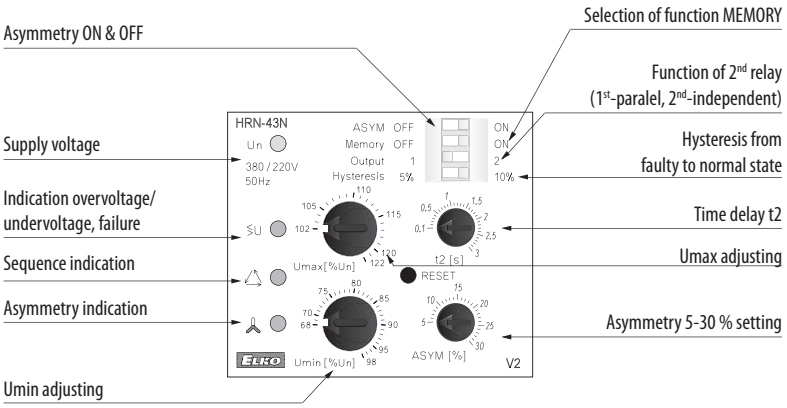
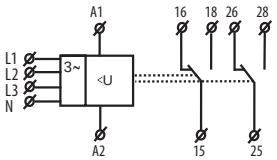
- Monitoring of 3-phase mains (AC 380/220 V):
  - voltage in 2 levels (undervoltage and overvoltage)
  - phase asymmetry
  - phase sequence
  - phase failure
- Function "MEMORY" - for return from the faulty into normal state press button „RESET" located on the front panel
- 2 output relays, selectable function of 2nd relay (independent / parallel)
- Fixed (t1) and adjustable (t2) delay to eliminate short voltage drops and peaks
- Galvanically separated supply voltage AC/DC 24 V
- Output contact: 2x changeover/ DPDT 16 A / 250 V AC1
- 3-MODULE, DIN rail mounting

Technical parameters	HRN-43N
Supply	
Supply terminals:	A1 - A2
Voltage range:	AC/DC 24 V / (AC 50-60Hz)
Burden:	max. 4.5 VA
Supply voltage tolerance:	-15 %; +10 %
Measuring circuit	
Nominal voltage:	3x380/220 V / 50Hz
Terminals:	L1, L2, L3, N
Upper level Umax:	102-122% (224-268V)
Bottom level Umin:	68-98 % (150-215V)
Max. permanent overload:	3x480/277 V
Hysteresis:	adjustable 5 % or 10 % of set value
Asymmetry:	5 - 30 %
Peak overload <1ms:	3 x 600/350V<1ms
Time delay t1:	fixed, max. 200 ms
Time delay t2:	adjustable 0.1-3 sec
Accuracy	
t2 accuracy 0.1-0.5s:	± 15 %
> 0.5s:	± 3 %
Output	
Number of contacts:	2x changeover/ SPDT (AgNi / Silver Alloy)
Current rating:	16 A / AC1
Breaking capacity:	4000 VA / AC1, 384 W / DC
Inrush current:	30 A / < 3 s
Switching voltage:	250 V AC1 / 24 V DC
Min. breaking capacity DC:	500 mW
Mechanical life:	$3x10^7$
Electrical life (AC1):	$0.7x10^5$
Other information	
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
Electrical strength:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 20 terminals
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm^2):	solid wire max.1x 2.5 or 2x1.5/ with sleeve max. 1x1.5 (AWG 12)
Dimensions:	90 x 52 x 65 mm (3.5˝ x 2˝ x 2.6˝)
Weight:	145 g (5,1 oz.)
Standards:	IEC60255-6, IEC61010-1

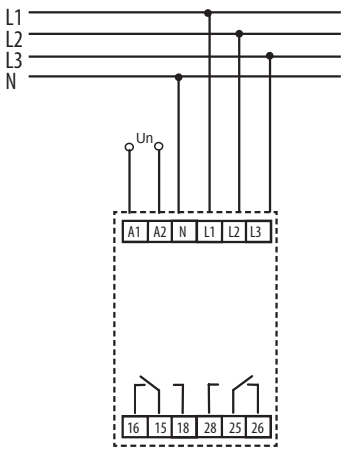
Description



Symbol

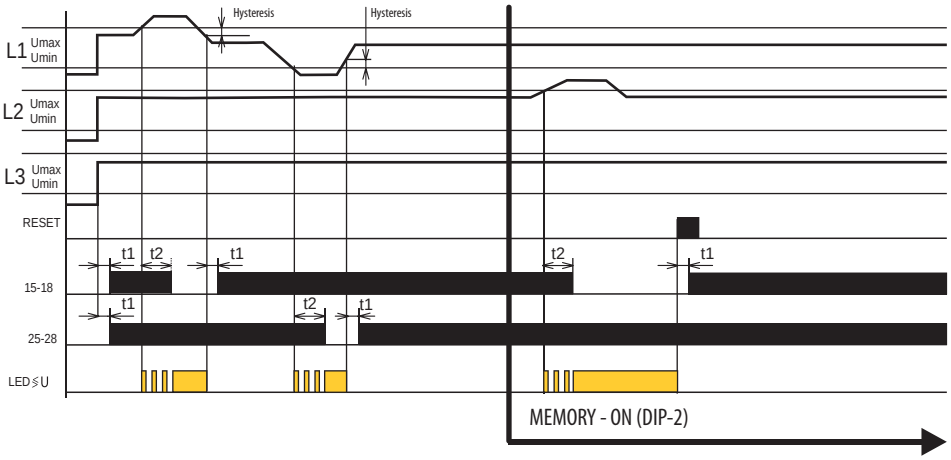


Connection



Function

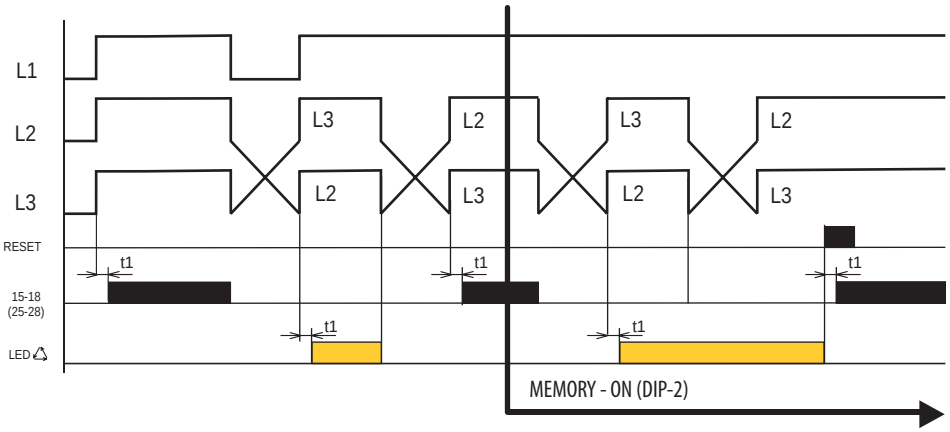
Overvoltage - undervoltage



Legend:
L1, L2, L3 - 3-phase voltage
RESET - press of the button on frontal panel
t1 - time delay, fixed
t2 - time delay, adjustable 0.1-3 sec
15-18 output relay 1
25-28 output relay 2
LED ≶U - indication overvoltage / undervoltage

Selection of 2nd the relay function:
In order to monitor 2 levels of voltage, it is possible to select if output relay will respond to each level individually (see the diagram) or both relays will switch in parallel way (see diagram "phase sequence").
Selection via DIP switch.

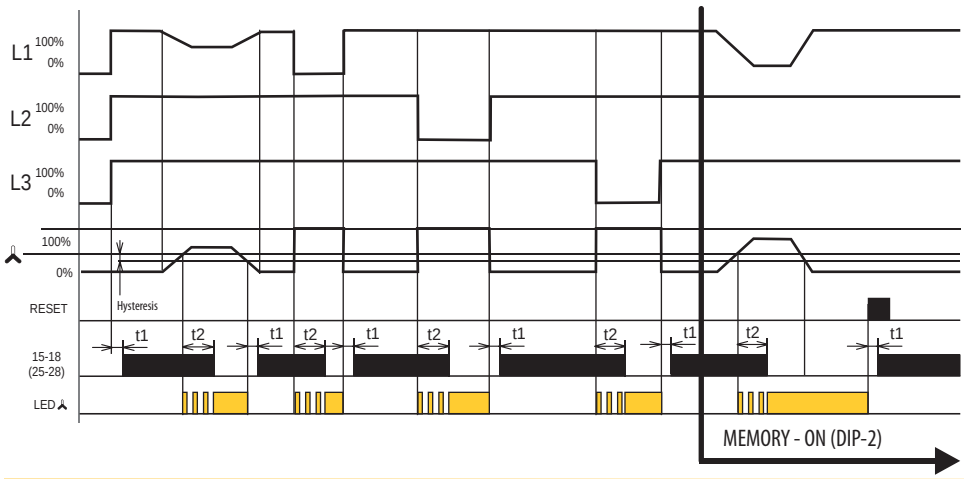
Phase sequence



Legend:
L1, L2, L3 - 3-phase voltage
RESET - press of the button on frontal panel
t1 - time delay, fixed
t2 - time delay, adjustable 0.1-3 sec
15-18 output relay 1
25-28 output relay 2
LED ⧋ indication of phase sequence

Selection of 2nd relay function:
The function is not implied in the monitoring phase sequence, the relays are switched in parallel way.
DIP switch no. 3 is ignored.

Asymmetry - phase failure



Legend:
L1, L2, L3 - 3-phase voltage
RESET - press of the button on frontal panel
t1 - time delay, fixed
t2 - time delay, adjustable 0.1-3 sec
⧋ - adjustable asymmetry 5-30%
15-18 output contact of relay 1
25-28 output contact of relay 2
LED ⧋ - asymmetry indicator

Selection of 2nd relay function:
The function is not implied in the monitoring phase sequence, the relays are switched in parallel way.
DIP switch no. 3 is ignored.

Function description

Relay is designated to monitor 3-phase circuits. Type HRN-43N controls voltage towards neutral wire. Relay can monitor voltage in two levels (overvoltage/ undervoltage), phase assymetry , sequence and failure. Each faulty state is indicated by individual LED. By DIP switch (No.3) it is possible to define function of the other relay – independent function (1x for overvoltage, 1x for undervoltage) or in parallel. Time delays t1(fixed) – when changing from faulty to normal state or when de-energized and t2 (adjustable) when changing from normal to faulty state. These delays prevent incorrect conduct and oscillation of output device during short voltage peaks in the main or during gradual voltage decline into normal.

Voltage control

Set upper level Umax in range 102-122% (224-268V) and lower level Umin in range 68-98% (150-215V). In case any phase passes this range, after a delay which eliminated short voltage peaks, contact opens. Output contact again switches after returning back into monitored voltage range and exceeding fixed hysteresis (which is adjustable in two values by DIP switch).

Phase sequence

Monitors correctness of phase sequence. In case of unwanted change output contact breaks. In case of energization of a device with incorrect phase sequence, contact stays opened.

Asymmetry

Rate of assymetry between individual phases is set in a range of 5-30%. In case set asymmetry is exceeded, output relay breaks and LED indicating asymmetry shines. Delays t1, t2 and hysteretic are applicable when returning to normal state.