3M

EAN code

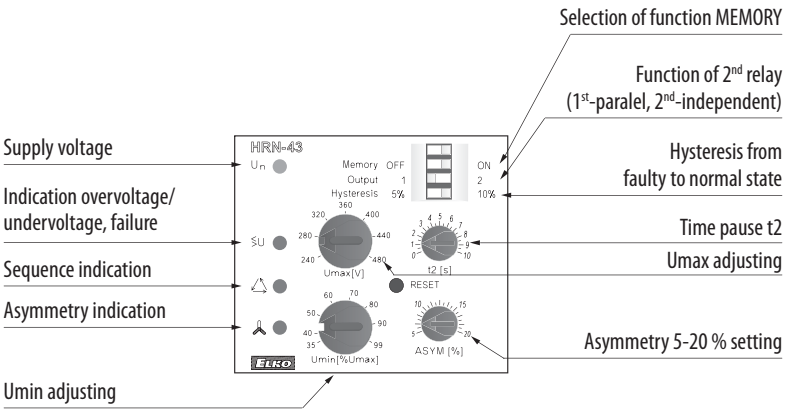
HRN-43 /230V	8594030337660
HRN-43 /400V	8595188121316
HRN-43 /24V	8594030338087
HRN-43N /230V	8594030338216
HRN-43N /400V	8595188120258
HRN-43N /24V	8594030338094

- Monitoring 3-phase mains:
  - voltage in 2 levels (undervoltage and overvoltage) in range 138-276V or 280-480 V (3x400 V)
  - phase asymmetry
  - phase sequence
  - phase failure
- Function "MEMORY" - for return from the faulty into normal state press button „RESET" located on the front panel
- HRN-43 - for circuits 3x400 V (without neutral)
- HRN-43N - for circuits 3x400/230 V (with neutral)
- 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 400 V, AC 230 V, AC/DC 24 V
- Output contact: 2x changeover/ DPDT 16 A / 250 V AC1
- 3-MODULE, DIN rail mounting

Technical parameters

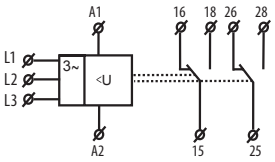
Technical parameters	HRN-43	HRN-43N
Supply		
Supply terminals:	A1 - A2	
Voltage range:	AC 230 V, AC 400 V, AC/DC 24 V / (AC 50-60Hz)	
Burden:	max. 4.5 VA	
Supply voltage tolerance:	-15 %; +10 %	
Measuring circuit		
Nominal voltage:	3x400V / 50Hz	3x400V / 230V / 50Hz
Terminals:	L1. L2. L3	L1. L2. L3, N
Upper level Umax:	240–480V	138–276V
Bottom level Umin:	35 - 99 % Umax	
Max. permanent overload:	3x480 V	
Hysteresis:	adjustable 5 % or 10 % of set value	
Asymmetry:	5 - 20 %	
Peak overload <1ms:	600 < 1ms	350V < 1ms
Time delay t1:	fixed, max. 200 ms	
Time delay t2:	adjustable 0-10 s	
Accuracy		
Set. accuracy (mechanical):	5 %	
Repeat accuracy:	<1 %	
Temperature dependance:	< 0.1 % / °C	
Limit values tolerance:	5 %	
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:	239 g (8.4 oz.)	
Standards:	EN 60255-6, EN 61010-1	

Description

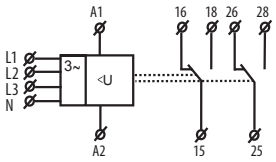


Symbol

HRN-43

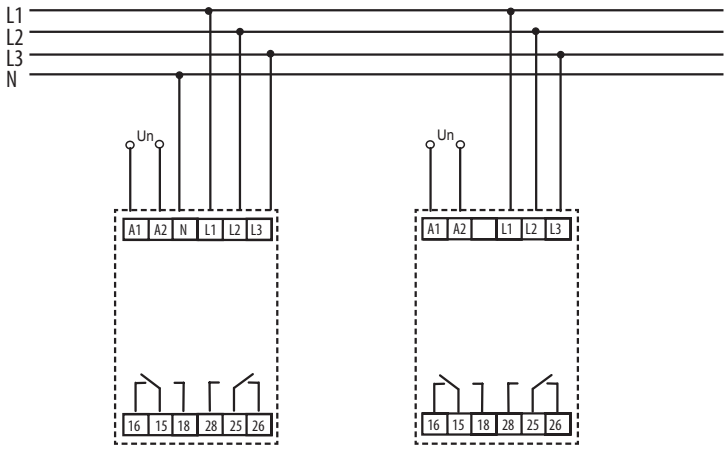


HRN-43N



Connection

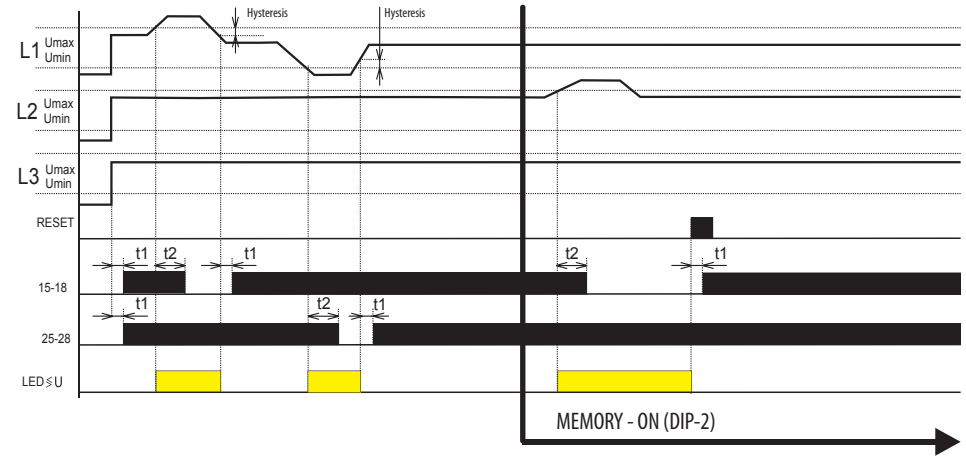
HRN-43N



HRN-43

Function

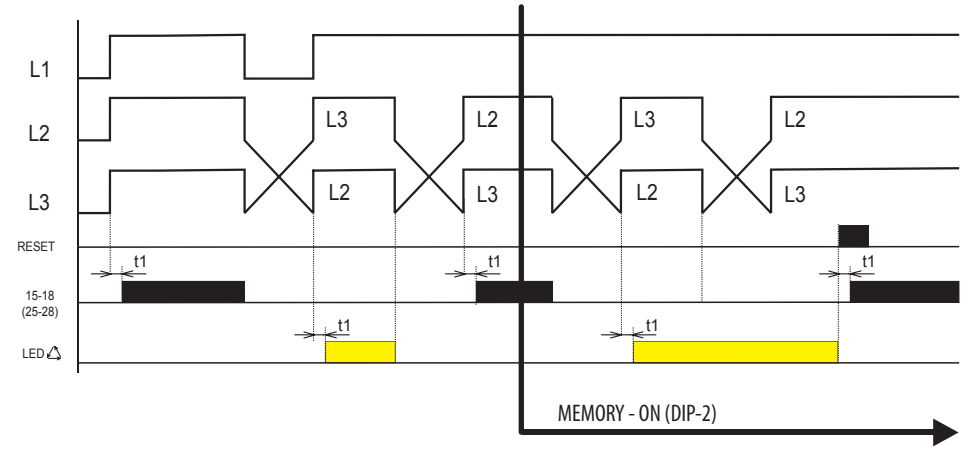
Overvoltage - undervoltage



Legend:
L1, L2, L3 - 3-phase voltage
RESET - press of the button on frontal panel
t1 - time delay, fixed
t2 - time delay, adjustable 0-10 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.

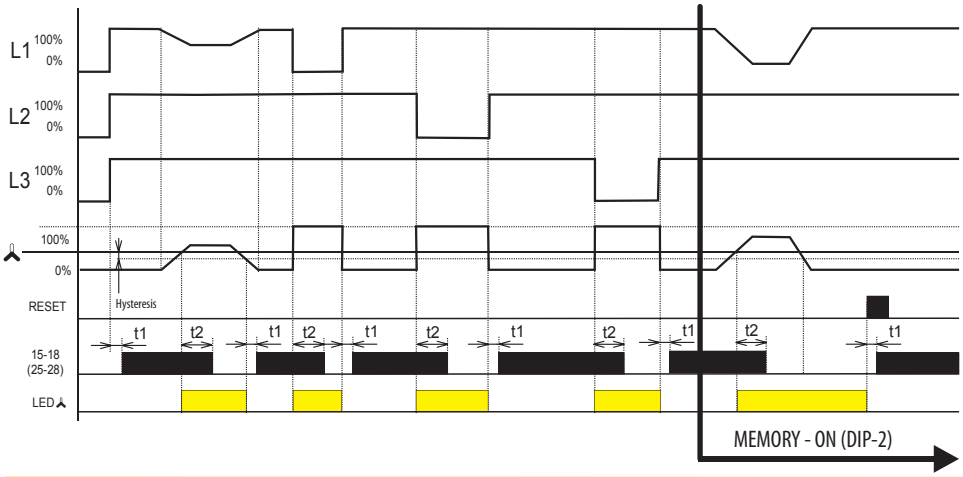
Phase sequence



Legend:
L1, L2, L3 - 3-phase voltage
RESET - press of the button on frontal panel
t1 - time delay, fixed
t2 - time delay, adjustable 0-10 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 pause, fixed
t2 - time pause, adjustable 0-10 sec
⅄ - adjustable asymmetry 5-20%
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, type HRN-43 controls interphase voltage. 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 138-276 V (or 240 - 480 V for HRN-43) and lower level Umin in range 35-99% Umax. 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 5-20%. 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.