

HRN-43 HRN-43N



EN

Relay for complete monitoring of 3-phase mains

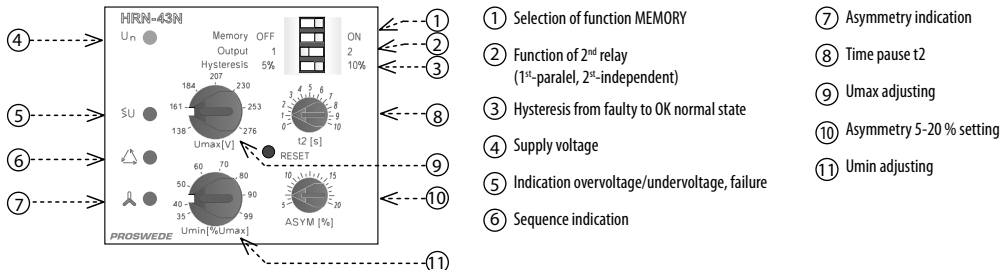
766/808/231/-308/821/889/205/213-02V/0-06 Rev.: 3/14

Warning!

The device is constructed to be connected into 1-phase main and must be installed in accordance with regulations and norms applicable in a particular country. Installation, connection and setting can be done only by a person with an adequate electro-technical qualification which has read and understood this instruction manual and product functions. The device contains protections against over-voltage peaks and disturbing elements in the supply main. To ensure correct function of these protection elements it is necessary to front-end other protective elements of higher degree (A,B,C) and screening of disturbances of switched devices (contactors, motors, inductive load etc.) as it is stated in a standard. Before you start with installation, make sure that the device is not energized and that the main switch is OFF. Do not install the device to the sources of excessive electromagnetic disturbances. By correct installation, ensure good air circulation so the maximal allowed operational temperature is not exceeded in case of permanent operation and higher ambient temperature. While installing the device use screwdriver with approx. 2 mm. Keep in mind that this device is fully electronic while installing. Correct function of the device is also depended on transportation, storing and handling. In case you notice any signs of damage, deformation, malfunction or missing piece, do not install this device and claim it at the seller. After operational life treat the product as electronic waste.

Description

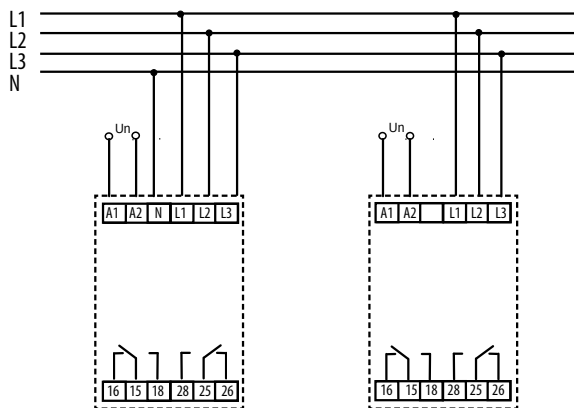
Technical parameters	HRN-43	HRN-43N
Supply		
Supply terminals:	A1 - A2	
Supply voltage:	AC 230 V, AC 400 V, AC/DC 24 V (AC 50-60Hz)	
Consumption:	max. 4.5 VA	
Supply voltage tolerance:	-15 %; +10 %	
Measuring		
Voltage set:	3 x 400 V / 50 Hz	3 x 400 / 230 V / 50 Hz
Monitored terminals:	L1, L2, L3	L1, L2, L3, N
Upper voltage level:	240 - 480 V	138 - 276 V
Bottom voltage level:	35 - 99 % Umax	
Max. permanent overload:	3 x 480V	
Hysteresis:	adjustab. 5 % or 10 % of set value	
Asymmetry:	5 - 20 %	
Peak overload < 1ms:	600 V < 1ms	350 V < 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 (AgNi)	
Rated current:	16 A / AC1	
Switching capacity:	4000 VA / AC1, 384 W / DC	
Inrush current:	30 A / < 3s	
Switching voltage:	250 V AC1 / 24 V DC	
Min. switching capacity DC:	500 mW	
Mechanical life:	3x10 ⁷	
Electrical life (AC1):	0.7x10 ⁵	
Other information		
Operating temperature:	-20 ... +55 °C	
Storage temperature:	-30 ... +70 °C	
Electrical strength:	4 kV (supply - output)	
Operating position:	any	
Mounting:	DIN rail EN 60715	
Protection degree:	IP40 from front panel / IP20 terminals	
Overvoltage category:	III.	
Pollution degree:	2	
Max. cable size (mm ²):	max. 1x 2.5, max. 2x 1.5/ with sleeve max. 1x 1.5	
Dimensions:	90 x 52 x 65 mm	
Weight:	239 g	
Standards:	EN 60255-6, EN 61010-1	



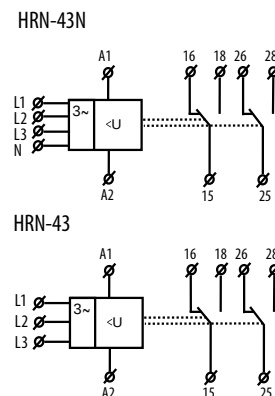
Characteristic

- monitoring of 3-phase mains:
 - voltage in two levels (over-voltage and under-voltage) in range 138-276V or 240-480V
 - 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 3x400V (without neutral)
- HRN-43N - for circuits 3x400/230V (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 16 A / 250 V AC1
- 3-MODULE, DIN rail mounting

Connection



Symbol



Functions

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 asymmetry, 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

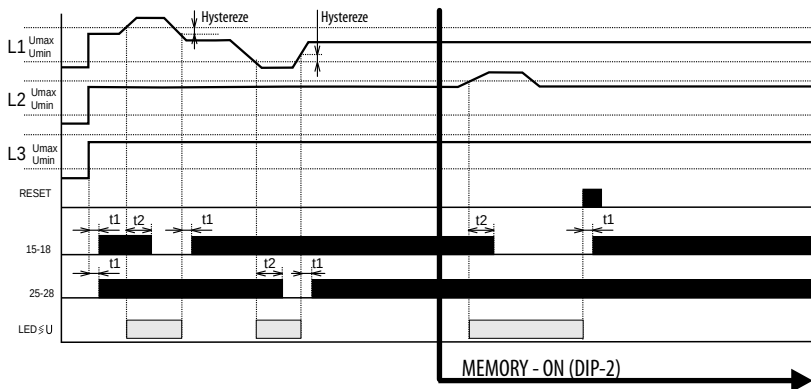
Monitors correctness of phase sequence. In case of unwanted change output contact breaks. In case of energization of a device with incorrect phase sequence, contact stays opened.

Asymmetry

Rate of asymmetry 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 hysteric are applicable when returning to normal state.

Type of load	AC1	AC2	AC3	ACS uncompensated	ACS compensated	AC5b	AC6a	AC7b	AC12
mat. contacts AgNi, contact 16A	250V / 16A	250V / 5A	250V / 3A	230V / 3A (690VA)	x	800W	x	250V / 3A	250V / 10A
Type of load	AC13	AC14	AC15	DC1	DC3	DC5	DC12	DC13	DC14
mat. contacts AgNi, contact 16A	250V / 6A	250V / 6A	250V / 6A	24V / 16A	24V / 6A	24V / 4A	24V / 16A	24V / 2A	24V / 2A

Overvoltage - undervoltage



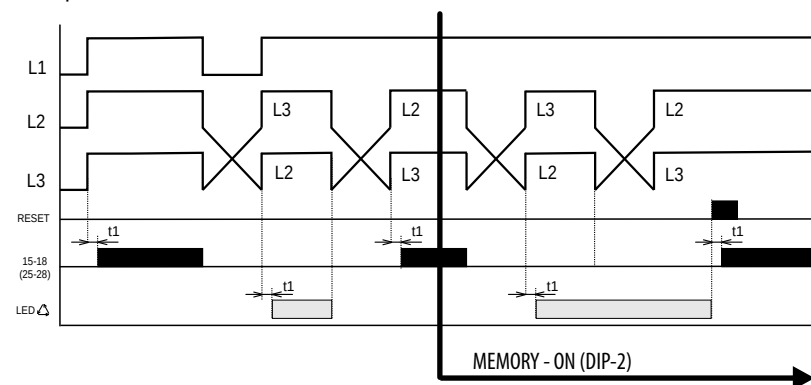
Legend:

L1, L2, L3 - 3-phase voltage
 RESET - press of the button on frontal pannel
 t1 - time delay, fixed
 t2 - time delay, adjustable 0-10 sec
 15-18 - output relay 1
 25-28 - output relay 2
 LED $\leq U$ - indication overvoltage / undervoltage

Selection of 2nd relay function:

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

Phase sequence



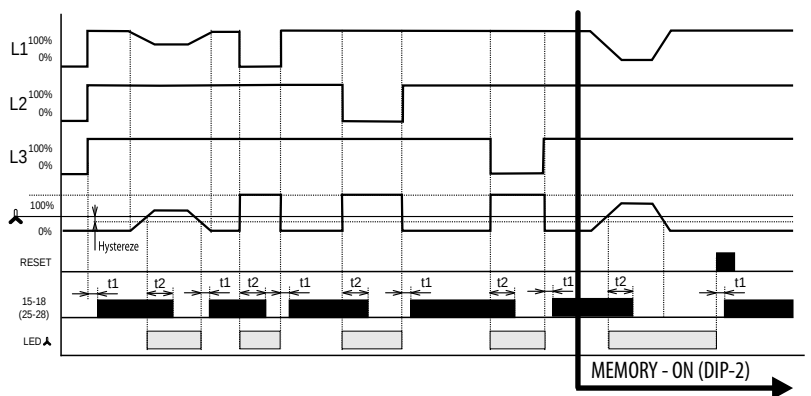
Legend:

L1, L2, L3 - 3-phase voltage
 RESET - press of the button on frontal pannel
 t1 - time delay, fixed
 t2 - time delay, adjustable 0-10 sec
 15-18 - output relay 1
 25-28 - output relay 2
 LED Δ - indication of phase sequence

Selection of 2nd relay function:

The function is not implied when monitoring phase sequence, the relays are switched in parallel way.

Asymmetry - phase failure



Legend:

L1, L2, L3 - 3-phase voltage
 RESET - press of the button on frontal pannel
 t1 - time delay, fixed
 t2 - time delay, adjustable 0-10 sec
 Δ - adjustable asymmetry 5-20%
 15-18 - output contact of relay 1
 25-28 - output contact of relay 2
 LED Δ - asymmetry indicator

Selection of 2nd relay function:

The function is not implied when monitoring phase sequence, the relays are switched in parallel way. DIP switch is ignored.