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HRN-43 HRN-43N

Voltage monitoring relay for complete control
in 3P incl. asymmetry

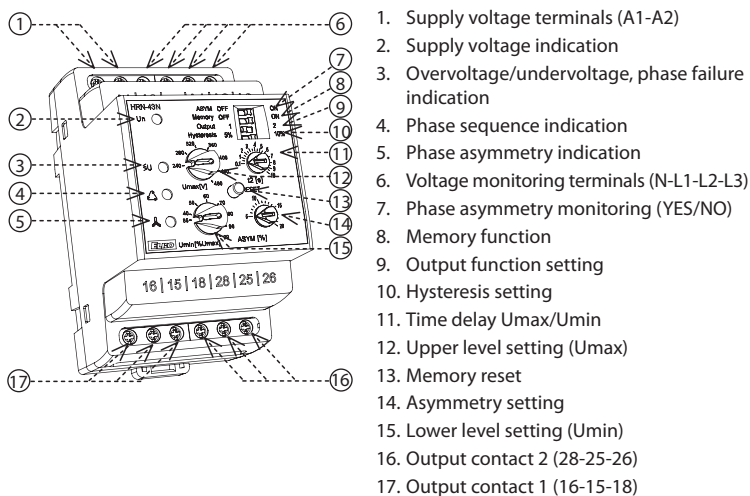


Characteristics

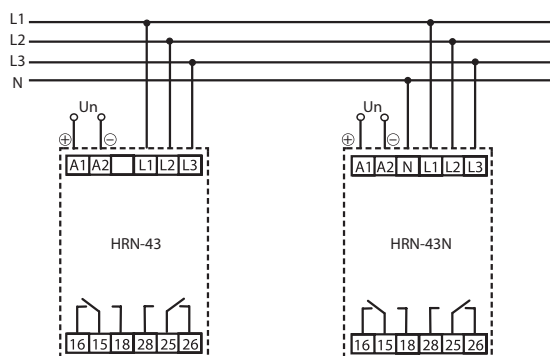
- Relay is designed to monitor voltage in 3-phase networks:
HRN-43: delta connection 3× 400 V (without neutral)
HRN-43N: star connection 3× 400/230 V (with neutral)
- Monitors level of voltage in two independent levels (U_{max}, U_{min})
overvoltage and undervoltage: system 3× 400 V: range 240 – 480 V
system 3× 400/230 V: range 138 – 276 V
- Other monitored parameters:
phase failure, sequence, asymmetry (adjustable, can be switched off)
- Setting the monitored lower level (U_{min}) in % of the set upper level U_{max}.
- Adjustable time delay (eliminating short-term drops and spikes).
- Selectable function of output contacts (independently/in parallel).
- Galvanically isolated supply voltage AC/DC 24 – 240 V, AC 400 V.
- Output contact for each monitored voltage level.

Description

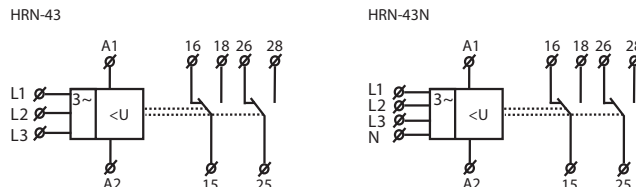
HRN-43N



Connection



Symbol



Technical parameters

Supply	HRN-43	HRN-43N
Supply terminals:	A1-A2	
Supply voltage:	UNI	AC/DC 24 – 240 V (AC 50-60 Hz)
Consumption (max.):		3 VA/1 W
Supply voltage:	400V	AC 400 V (50-60 Hz)
Consumption (max.):		5 VA/2.5 W
Supply voltage tolerance:	-15 %; +10 %	

Measuring circuit

Monitored terminals:	L1-L2-L3	L1-L2-L3-N
Voltage system:	3× 400 V (50-60 Hz)	3× 400 V/230 V (50-60 Hz)
Upper level setting (U _{max}):	240 – 480 V	138 – 276 V
Lower level setting (U _{min}):	35 – 99 %U _{max}	
Max. permanent voltage:	3× 480 V	
Asymmetry:	adjustable, 5 – 20 % + OFF	
Peak overload (1 s):	600 V	350 V
Time delay (t ₁):	fixed, max. 200 ms	
Time delay U _{max} /U _{min} (t ₂):	adjustable, 0.1 – 10 s	

Accuracy

Setting accuracy (mech.):	5 %
Repeat accuracy:	< 1 %
Temperature dependance:	< 0.1 %/°C (°F)
Limit values tolerance:	5 %
Hysteresis (fault to OK):	selectable, 5 %/10 % from the upper range value

Output

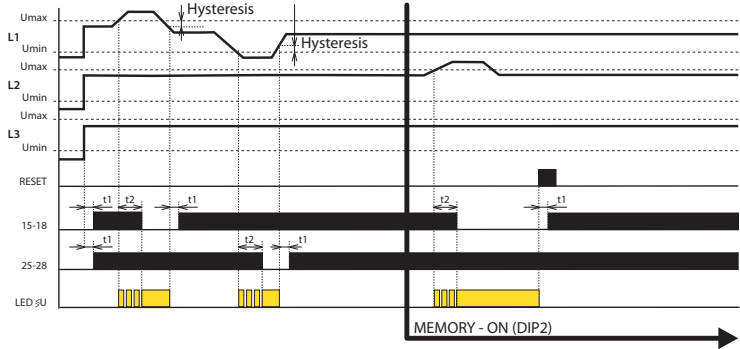
Contact type:	2× changeover/SPDT (AgNi)
Current rating:	16 A/AC1
Breaking capacity:	4000 VA/AC1, 384 W/DC1
Inrush current:	30 A/< 3 s
Switching voltage:	250 V AC/24 V DC
Power dissipation (max.):	2.4 W
Mechanical life:	10.000.000 ops.
Electrical life (AC1):	100.000 ops.

Other information

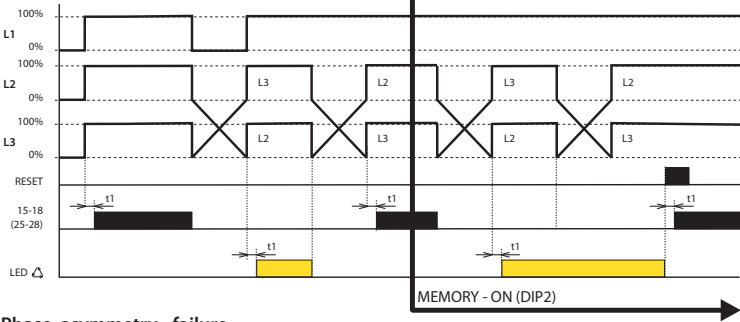
Operating temperature:	-20 .. 55 °C (-4 .. 131 °F)
Storage temperature:	-30 .. 70 °C (-22 .. 158 °F)
Dielectric strength:	supply – output output 1 – output 2
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP40 front panel / IP20 terminals
Overvoltage category:	III.
Pollution degree:	2
Cross-wire section – solid/ stranded with ferrule (mm2):	max. 1× 2.5, 2× 1.5/ max. 1× 2.5 (AWG 14)
Dimensions:	90 × 52 × 65 mm (3.5" × 2" × 2.6")
Weight:	UNI – 148 g (5.2 oz), 400V – 248 g (8.7 oz)
Standards:	EN 60255-1, EN 60255-26, EN 60255-27

Function

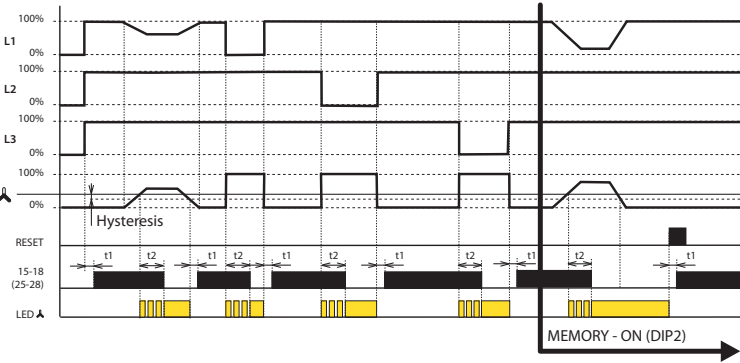
Overvoltage - undervoltage



Phase sequence



Phase asymmetry - failure



Warning

This device is constructed for connection in 3-phase network AC 3× 400 V or AC 3× 400/230 V (according to the type) and must be installed according to norms valid in the state of an application. Installation, connection, setting and servicing must be carried out by qualified electrician staff only, which have perfectly understood the instructions and functions of the device. This device contains protection against overvoltage peaks and disturbing impulses in the power supply network. For the correct function of the protection of this device, there must be suitable protections of higher degrees (A,B,C) installed in front of them and according to the standards, interference of switching devices must be securely eliminated (contactors, motors, inductive loads, etc.). Before installation, make sure that the device is de-energized and the main switch is in the “OFF” position. Don’t install the device to sources of excessive electromagnetic interference. Ensure correct installation by perfect air circulation so that during continuous operation and a higher ambient temperature, the device does not exceed the maximum allowed operating temperature. For installation and setting use a screwdriver with a width of approx 2 mm. Keep in mind that this is a fully electronic device and approach accordingly with the installation. Non-problematic function of the device is also dependent on the previous method of transportation, storage, and handling. In case of any signs of damage, deformation, malfunction, or missing parts, don’t install this device and claim it at the dealer. The product must be treated as electronic waste at the end of its life.

Function of output contacts:

In order to monitor two levels of voltage, it is possible to select if output contact will respond to each level individually (see the diagram) or both contacts will switch in parallel (see diagram “phase sequence”). Selection via DIP switch „Output“.

Graphs legend:
L1, L2, L3 = 3-phase voltage
RESET = memory reset
t1 = time delay, fixed
t2 = time delay Umax/Umin, adjustable
15-18 = output contact 1
25-28 = output contact 2
LED $\geq$ U = overvoltage/undervoltage indication

Function of output contacts:

The function is not applicable in the phase sequence monitoring, the contacts are switched in parallel. DIP switch „Output“ is ignored.

Graphs legend:
L1, L2, L3 = 3-phase voltage
RESET = memory reset
t1 = time delay, fixed
t2 = time delay Umax/Umin, adjustable
15-18 = output contact 1
25-28 = output contact 2
LED Δ = phase sequence indication

Function of output contacts:

The function is not applicable in the phase asymmetry and failure monitoring, the contacts are switched in parallel way. DIP switch „Output“ is ignored.

Graphs legend:
L1, L2, L3 = 3-phase voltage
RESET = memory reset
t1 = time delay, fixed
t2 = time delay Umax/Umin, adjustable
 Δ - adjustable asymmetry level
15-18 = output contact 1
25-28 = output contact 2
LED Δ = asymmetry indication

Relay is designated to monitor 3-phase circuits. Type HRN-43 controls the interphase voltage, type HRN-43N controls voltage towards the neutral wire. Relay can monitor: voltage in two levels (overvoltage/undervoltage), phase sequence/failure and asymmetry. Each fault state is indicated by an individual LED. By DIP switch „Output“ it is possible to select the function of output contacts: independent function (1× for overvoltage, 1× for undervoltage) or in parallel. Fixed time delay (t1) is applied when changing from fault to OK state or when de-energized. Adjustable time delay (t2) is applied, when changing from OK to fault state. This delay prevents incorrect behavior and oscillation of the output device during short-term voltage drops and peaks.

Voltage monitoring

The upper level Umax is set in the range 138 – 276 V (resp. 240 – 480 V for HRN-43) and the lower level Umin in the range of 35 – 99 %Umax. In case any phase deviates from this set band, after a set delay, output contact opens. Output contact again closes after returning back into the monitored band and exceeding fixed hysteresis (selectable by DIP switch „Hysteresis“). In the event of an outage in two or three phases, the output contacts will open immediately, regardless of the set delay t2.

Phase sequence

Monitors correctness of phase sequence. In case of unwanted change, output contacts open. In case of energization of a relay with incorrect phase sequence, contacts stay open.

Asymmetry

The level of asymmetry between individual phases is set in the range of 5 – 20 %. In case set asymmetry is exceeded, output contacts open and LED indicating asymmetry shines. Time delays t1, t2 and hysteresis are applied when returning to OK state. Monitoring asymmetry can be switched off by the DIP switch „ASYM“.

Type of load	 cos $\varphi \geq 0.95$ AC1	 AC2	 AC3	 AC5a uncompensated	 AC5a compensated	 AC5b	 AC6a	 AC7b	 AC12
Contact material AgNi, 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
Contact material AgNi, 16A	250V / 6A	250V / 6A	250V / 6A	24V / 16A	24V / 6A	24V / 4A	24V / 16A	24V / 2A	24V / 2A