

## 1-phase

## AC

**HRN-33**

Supply and monitored voltage in range AC 48-276 V, 1x output for U<sub>max</sub> and U<sub>min</sub> adjustable level. page 90

**HRN-35**

As HRN-33 but individual output for each level (U<sub>max</sub>/U<sub>min</sub>). Adjustable time delay to eliminate voltage peaks. page 90

**HRN-37**

As HRN-33, but in voltage range AC 24-150 V. page 90

**HRN-63**

Supply and monitored voltage in range AC 48-276 V, 1x output for U<sub>max</sub> and U<sub>min</sub> adjustable level. page 90

**HRN-67**

as HRN-63, but in voltage range AC 24-150 V. page 90

## DC

**HRN-34**

as HRN-33 but in voltage range DC 6-30 V for monitoring battery circuits (6, 12, 24 V). page 90

**HRN-64**

as HRN-63 but in voltage range DC 6-30 V for monitoring battery circuits (6, 12, 24 V). page 90

## AC/DC

**HRN-41**

(Hysteresis) monitoring DC and AC voltage 10-500 V, divided into 3 inputs and 3 ranges, 2 independent outputs 16 A, 2x time delay. page 92

**HRN-42**

(Window) as HRN-41 but function WINDOW. Other functions (applicable for HRN-41): faulty state memory, hysteresis, galv. separated supply. page 92

## 3-phase

**HRN-55**

Supply from all phases. page 94

**HRN-55N**

Supply L1-N (monitors also disconnection of neutral wire). Time delay to eliminate peaks. page 94

**HRN-57**

Supply from all phases. page 95

**HRN-57N**

Supply L1-N (monitors also neutral wire disconnection). Adjustable voltage level. page 95

**HRN-54**

Supply from all phases. page 96

**HRN-54N**

Supply L1-N (monitors also disconnection of neutral wire). All parameters adjustable by potentiometers. page 96

**HRN-56/208**

Adjustable level U<sub>min</sub>. page 97

**HRN-56/240**

Adjustable level U<sub>min</sub>. page 97

**HRN-56/400**

Adjustable level U<sub>min</sub>. page 97

**HRN-56/480**

Adjustable level U<sub>min</sub>. page 97

**HRN-56/575**

Adjustable level U<sub>min</sub>. page 97

**HRN-43**

Galvanically separated supply AC 230 V, AC 400 or AC/DC 24 V, memory, adjustable hysteresis and delay, 2 x independent output. page 98

**HRN-43N**

Galvanically separated supply AC 230 V, AC 400 or AC/DC 24 V, memory, adjustable hysteresis and delay, 2 x independent output. page 98

**HRN-100**

Possibility of 3/4-wire connection, allows monitoring lower and upper level voltage and frequency, Optional also monitors outages, order, phase asymmetry incl. failure of neutral. page 100

## Optical signaling

**MPS-1**

Optical signaling of 3-phase network. page 103

## Power factor

**COS-2**

monitors and scores power factor (phase shift between current and voltage  $\cos \phi$ ) in 3-phase/1-phase circuits (motors, pumps etc.). page 104

## Frequency

**HRF-10**

for monitoring the frequency of AC voltage. The monitored frequency 50/60/400 Hz is selected by a switch. page 106

Type	Design	Voltage	Secure variables							Setting			Description	Page
			Phases	Range	$\wedge U$	$\vee U$	Failure	Phase - sequence	Asymmetry	Delay	Hysteresis	Memory Errors		
HRN-41/230 V HRN-41/400 V HRN-41/24 V	3-M	AC 230 V AC 400 V AC/DC 24 V	1	AC/DC 50 V AC/DC 160 V AC/DC 500 V	●	●	x	x	x	●	●	●	Second relay function (independent/parallel). Galvanically separated power supply from measuring inputs.	92
HRN-42/230 V HRN-42/24 V	3-M	AC 230 V AC/DC 24 V	1	AC/DC 50 V AC/DC 160 V AC/DC 500 V	●	●	x	x	x	●	●	●		
HRN-33	1-M	from monitored	1	AC 48 - 276 V	●	●	x	x	x	●	x	x	For all types, the delay is adjustable from 0 - 10 seconds (to eliminate short-term outages or peaks). The lower voltage level (Umin) is set in % of the upper level (Umax).	90
HRN-34	1-M	from monitored	1	DC 6 - 30 V	●	●	x	x	x	●	x	x		
HRN-35	1-M	from monitored	1	AC 48 - 276 V	●	●	x	x	x	●	x	x		
HRN-37	1-M	from monitored	1	AC 24 - 150 V	●	●	x	x	x	●	x	x		
HRN-63	1-M	from monitored	1	AC 48 - 276 V	●	●	x	x	x	●	x	x		
HRN-64	1-M	from monitored	1	DC 6 - 30 V	●	●	x	x	x	●	x	x		
HRN-67	1-M	from monitored	1	AC 24 - 150 V	●	●	x	x	x	●	x	x		
HRN-54	1-M	from monitored	3	AC 3 x 300 - 500 V	●	●	●	●	x	●	x	x	Power supply from all phases, i.e. the relay function is preserved even if one phase fails.	96
HRN-54N	1-M	from monitored	3	AC 3 x 172 - 287 V	●	●	●	●	x	●	x	x	Power supply L1-N, i.e. the relay also monitors the neutral wire interruption.	94
HRN-55	1-M	from monitored	3	AC 3 x 300 - 500 V	x	x	●	●	x	●	x	x	Power supply from all phases, i.e. the relay function is preserved even if one phase fails.	
HRN-55N	1-M	from monitored	3	AC 3 x 172 - 287 V	x	x	●	●	x	●	x	x	Power supply L1-N, i.e. the relay also monitors the neutral wire interruption.	95
HRN-57	1-M	from monitored	3	AC 3 x 300 - 500 V	●	●	●	x	x	●	x	x	Power supply from all phases, i.e. the relay function is preserved even if one phase fails.	
HRN-57N	1-M	from monitored	3	AC 3 x 172 - 287 V	●	●	●	x	x	●	x	x	Power supply L1-N, i.e. the relay also monitors the neutral wire interruption, replacement for HRN-52.	97
HRN-56/208 HRN-56/240 HRN-56/400	1-M	from monitored	3	AC 3 x 125 - 276 V AC 3 x 144 - 276 V AC 3 x 240 - 460 V	x	●	●	●	x	●	x	x	Thanks to the power supply from all three phases, the relay is operational even if one phase fails.	
HRN-56/480 HRN-56/575	3-M	from monitored	3	AC 3 x 228 - 550 V AC 3 x 345 - 660 V	x	●	●	●	x	●	x	x		
HRN-43/230 V HRN-43/400 V HRN-43/24 V	3-M	AC 230 V AC 400 V AC/DC 24 V	3	AC 3 x 84 - 480 V	●	●	●	●	●	●	●	●	2 output relays, functions of the second relay may be selected (independent/parallel). Galvanically separated power supply.	98
HRN-43N/230 V HRN-43N/400 V HRN-43N/24 V	3-M	AC 230 V AC 400 V AC/DC 24 V	3	AC 3 x 48 - 276 V	●	●	●	●	●	●	●	●		
HRN-100	2-M	from monitored	3	$U_{LN}=3 \sim 155 - 500 V$ $U_{LL}=3 \sim 90 - 288 V$	●	●	●	●	●	●	●	●	Optional 3-wire or 4-wire connection (with or without zero) allows the monitoring of the upper and lower level of voltage and frequency, further failure, sequence or asymmetry of phases incl. neutral break both output contacts can be configured individually.	100

Signal relays

MPS-1	1-M	from monitored	3	AC 3 x 50 - 253 V	x	●	●	●	x	x	x	x	Optical signaling of three-phase network.	103
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Relay for frequency (f) monitoring

Type	Design	Supply voltage	Secure variables				Setting				Description	Page	
			Phases	Frequency Range	Frequency $\wedge$	Frequency $\vee$	Delay	Hysteresis	Frequency $\wedge$	Frequency $\vee$			
HRF-10	3-M	AC 161 - 500 V	1	40 - 60 Hz 48 - 72 Hz 320 - 480 Hz	●	●	●	●	●	●	●	Switchable ranges of rated frequency .	106

Relay for power factor (cos-φ) monitoring

Type	Design	Supply voltage	Secure variables				Setting			Description	Page	
			Phases	cos φ range	$\wedge \cos \phi$	$\vee \cos \phi$	Delay	Hysteresis	Memory Errors			
COS-2/230 V COS-2/110 V COS-2/400 V COS-2/24 V	3-M	AC 230 V AC 110 V AC 400 V AC/DC 24 V	3	0.1 - 0.99	●	●	●	●	●	●	Two output relays, one independent relay for each level Galvanically separated power supply.	104



EAN code  
 HRN-55: 8595188137225  
 HRN-55N: 8595188137232

Technical parameters	HRN-55	HRN-55N
Monitoring terminals:	L1, L2, L3	L1, L2, L3, N
Supply terminals:	L1, L2, L3	L1, L2, L3, N
Voltage:	3x 400 V (50-60 Hz)	3x 400 V/230 V (50-60 Hz)
Burden:	max. 2 VA/1 W	
Max. dissipated power (Un + terminals):	1 W	
Level Umax:	125 % Un	
Level Umin:	75 % Un	
Hysteresis:	2 %	
Max. permanent:	AC 3x 460 V	AC 3x 265 V
Peak overload <1ms:	AC 3x 500 V	AC 3x 288 V
Time delay T1:	max. 500 ms	
Time delay T2:	adjustable 0.1 - 10 s	
<b>Output</b>		
Number of contacts:	1x changeover/SPDT (AgNi/Silver Alloy)	
Current rating:	8 A/AC1	
Breaking capacity:	2000 VA/AC1, 240 W/DC	
Inrush current:	10 A	
Switching voltage:	250 V AC/24 V DC	
Output indication:	red LED	
Mechanical life:	60.000.000 ops.	
Electrical life (AC1):	150.000 ops.	
<b>Other information</b>		
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:	IP40 from front panel/IP10 terminals	
Overvoltage category:	III.	
Pollution degree:	2	
Max. cable size (mm <sup>2</sup> ):	solid wire max. 2x 2.5 or 1x 4 with sleeve max. 1x 2.5 or 2x 1.5 (AWG 12)	
Dimensions:	90 x 17.6 x 64 mm (3.5" x 0.7" x 2.5")	
Weight:	61 g (2.15 oz.)	63 g (2.22 oz.)
Standards:	EN 60255-1, EN 60255-26, EN 60255-27	

### Function description

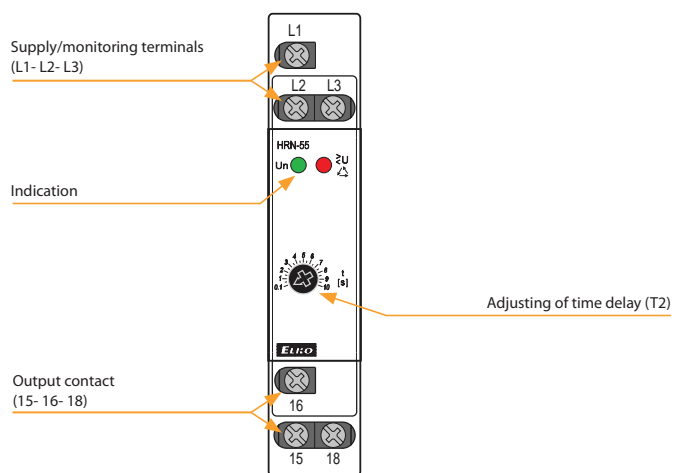
Relay in 3-phase main monitors correct phase sequence and failure of any phase. Green LED is permanently ON and indicates presence of power supply voltage. In case of phase failure or exceeding voltage level red LED flashes and relay breaks. When changing to faulty state, time delay applies. Time delay setting is set by a potentiometer on front panel of the device. In case of incorrect phase sequence red LED shines permanently and relay is open. In case supply voltage falls below 60 % Un (OFF lower level) relay immediately opens with no delay and faulty state is indicated by red LED.

**HRN-55** - thanks to supply all phases, this relay is able to stay operational also if one phase is out.

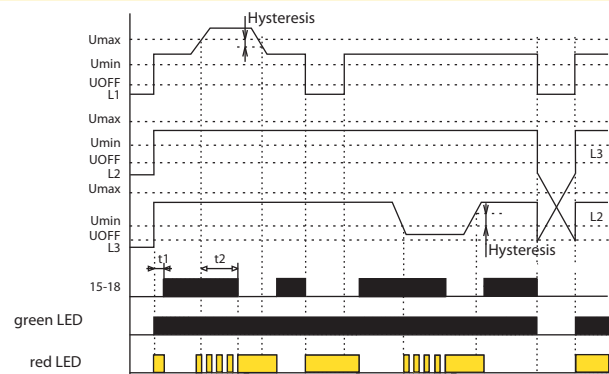
**HRN-55N** - supply L1, L2, L3-N, means that relay monitor also failure in neutral wire.

- Relay monitors phase sequence and failure, exceeding of monitored voltage in 3-phase main.
- **HRN-55**: supply from all phases, which means that function of relay is applicable also if 1-phase fails.
- **HRN-55N**: supply L1, L2, L3-N, it means that relay also monitors break of neutral point.
- Fixed delay T1 (500 ms) and adjustable delay T2 (0.1 - 10 s).

### Description

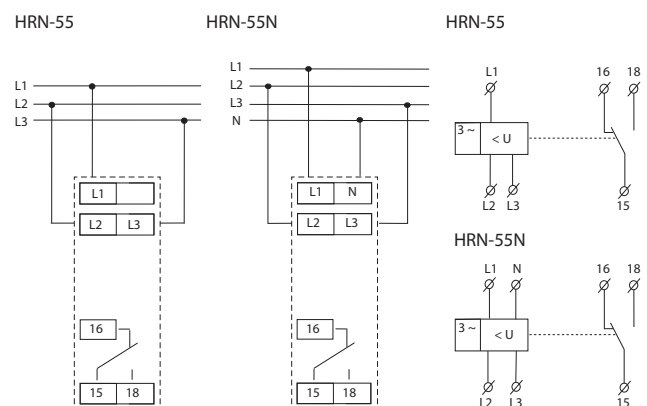


### Function



### Connection

### Symbol



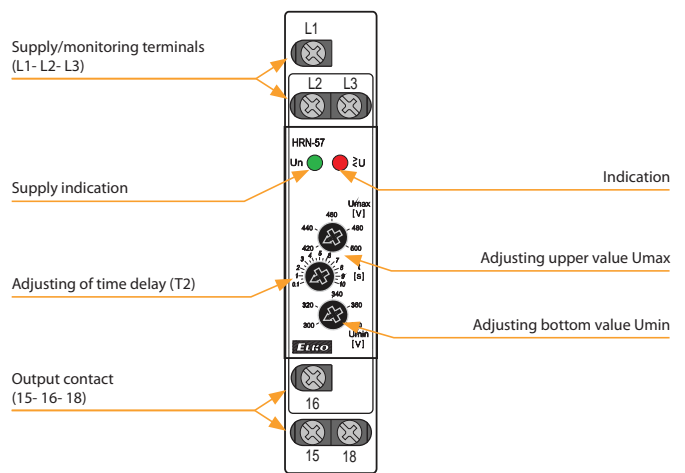


EAN code  
 HRN-57: 8595188137256  
 HRN-57N: 8595188137249

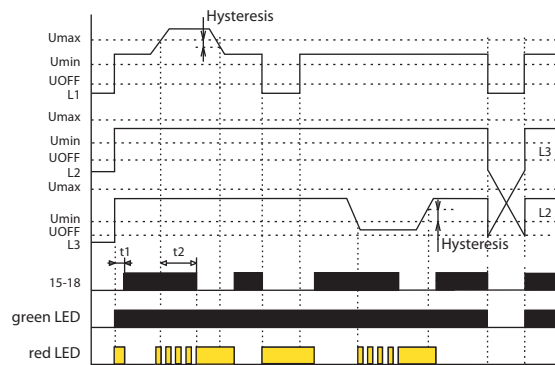
Technical parameters	HRN-57	HRN-57N
Monitoring terminals:	L1, L2, L3	L1, L2, L3, N
Supply terminals:	L1, L2, L3	L1, L2, L3, N
Voltage:	3x 400 V (50-60 Hz)	3x 400 V/230 V (50-60 Hz)
Burden:	max. 2 VA/1 W	
Max. dissipated power (Un + terminals):	2 W	
Level Umax:	105 - 125 % Un	
Level Umin:	75 - 95 % Un	
Hysteresis:	2 %	
Max. permanent overload:	AC 3x 460 V	AC 3x 265 V
Peak overload <1ms:	AC 3x 500 V	AC 3x 288 V
Time delay T1:	max. 500 ms	
Time delay T2:	adjustable 0.1-10 s	
<b>Output</b>		
Number of contacts:	1x changeover/SPDT (AgNi/Silver Alloy)	
Current rating:	8 A/AC1	
Breaking capacity:	2000 VA/AC1, 240 W/DC	
Inrush current:	10 A	
Switching voltage:	250 V AC/24 V DC	
Output indication:	red LED	
Mechanical life:	60.000.000 ops.	
Electrical life (AC1):	150.000 ops.	
<b>Other information</b>		
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:	IP40 from front panel/IP10 terminals	
Overvoltage category:	III.	
Pollution degree:	2	
Max. cable size (mm²):	solid wire max. 2x 2.5 or 1x 4/ with sleeve max. 1x 2.5 or 2x 1.5 (AWG 12)	
Dimensions:	90 x 17.6 x 64 mm (3.5" x 0.7" x 2.5")	
Weight:	62 g (2.19 oz.)	63 g (2.22 oz.)
Standards:	EN 60255-1, EN 60255-26, EN 60255-27	

- It serves to monitor voltage in a switchboard, protection of devices in 3-phase main.
- It monitors value of voltage in 3-phase main.
- It is possible to set upper and lower level independently.
- Adjustable time delay eliminated short voltage peaks and failures in the main.
- Relay doesn't monitor phase sequence.
- **HRN-57:** supply from all phases, means that relay is functional also in case of failure in one phase.
- **HRN-57N:** supply L1, L2, L3-N, means that relay monitors also failure of neutral wire.

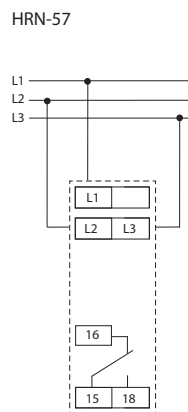
**Description**



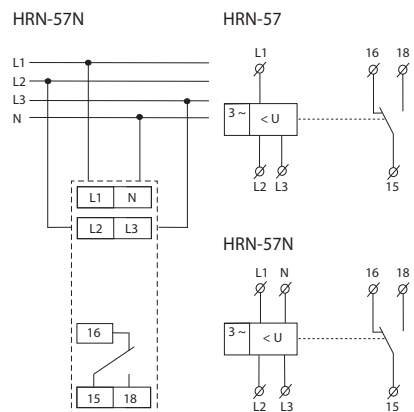
**Function**



**Connection**



**Symbol**



**Function description**

Relay in 3-phase main monitors size of phase voltage. It is possible to set two independent voltage levels and thus it is possible to set two independent voltage levels and monitor e.g. undervoltage and overvoltage independently. In normal state when voltage is within set levels, output relay is closed and red LED shines. In case supply voltage falls below 60 % Un (U<sub>OFF</sub> lower level) relay immediately breaks without delay and faulty state is indicated by red LED. In case voltage exceeds or falls below the set levels, output relay breaks and red LED shines (LED indicates faulty state - flashes when timing). In case timing is in progress and faulty state is indicated, timing is immediately stopped.



EAN code  
 HRN-54: 8595188137201  
 HRN-54N: 8595188137218

Technical parameters	HRN-54	HRN-54N
Supply and measuring:	L1, L2, L3	L1, L2, L3, N
Supply terminals:	L1, L2, L3	L1, L2, L3, N
Supply/measured voltage:	3x 400 V (50-60 Hz)	3x 400 V/230 V (50-60 Hz)
Burden:	max. 2 VA/1 W	
Max. dissipated power (Un + terminals):	1 W	
Level Umax:	105 - 125 % Un	
Level Umin:	75 - 95 % Un	
Hysteresis:	2 %	
Max. permanent overload:	AC 3x 460 V	AC 3x 265 V
Peak overload <1ms:	AC 3x 500 V	AC 3x 288 V
Time delay T1:	max. 500 ms	
Time delay T2:	adjustable 0.1-10 s	
<b>Output</b>		
Number of contacts:	1x changeover/SPDT (AgNi/Silver Alloy)	
Current rating:	8 A/AC1	
Breaking capacity:	2000 VA/AC1, 240 W/DC	
Inrush current:	10 A	
Switching voltage:	250 V AC/24 V DC	
Indication of state:	red LED	
Mechanical life:	60.000.000 ops.	
Electrical life (AC1):	150.000 ops.	
<b>Other information</b>		
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:	IP40 from front panel/IP10 terminals	
Overvoltage category:	III.	
Pollution degree:	2	
Max. cable size (mm <sup>2</sup> ):	solid wire max. 2x 2.5 or 1x 4/ with sleeve max. 1x 2.5 or 2x 1.5 (AWG 12)	
Dimensions:	90 x 17.6 x 64 mm (3.5" x 0.7" x 2.5")	
Weight:	62 g (2.19 oz.)	63 g (2.22 oz.)
Standards:	EN 60255-1, EN 60255-26, EN 60255-27	

### Function description

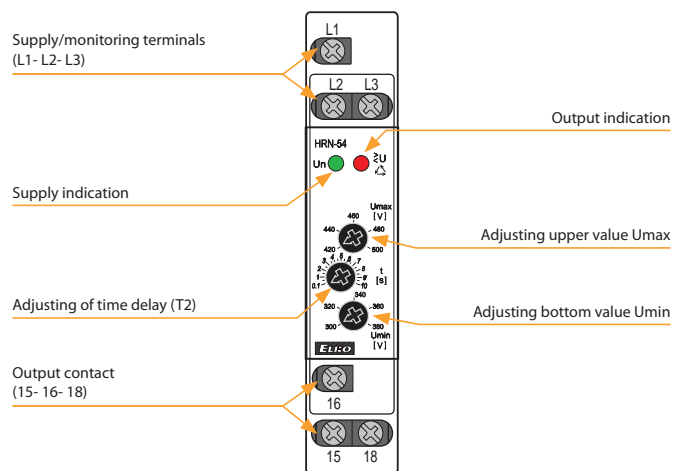
Relay in 3-phase main monitors size of phase voltage. It is possible to set two independent voltage levels and thus it is possible to set two independent voltage levels and monitor e.g. undervoltage and overvoltage independently. In normal state when voltage is within set levels, output relay is closed and red LED shines. In case voltage exceeds or falls below the set levels, output relay opens and red LED shines (LED indicates faulty state - flashes when timing).

In case supply voltage falls below 60 % Un ( $U_{OFF}$  lower level) relay immediately opens without delay and faulty state is indicated by red LED.

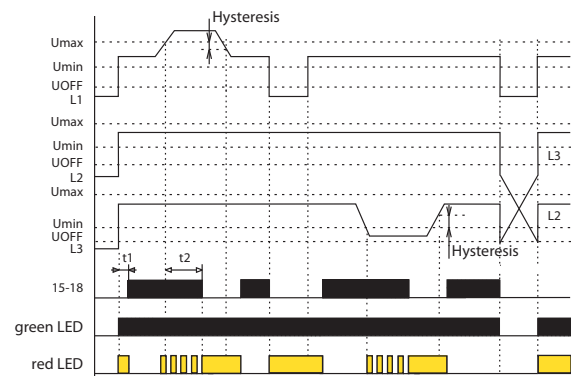
In case timing is in progress and faulty state is indicated, timing is immediately stopped.

- It serves to monitor voltage, phase failure and sequence in switchboards, protection of devices in 3-phase mains.
- It is possible to set upper and lower level of monitoring voltage.
- Adjustable time delay eliminates short voltage peaks and failures in the main.
- In case supply voltage falls below 60 % Un ( $U_{OFF}$  lower level) relay immediately opens without delay.
- **HRN-54:** supply from all phases which means that relay is functional also in case when one phase is faulty.
- **HRN-54N:** supply L1, L2, L3-N, means that relay monitors also failure of neutral wire.

### Description

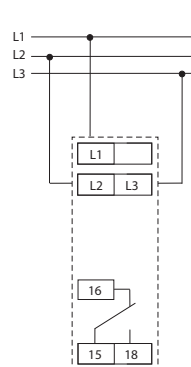


### Function

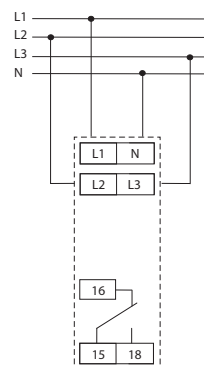


### Connection

HRN-54

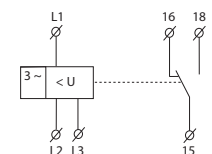


HRN-54N

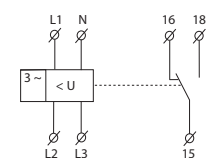


### Symbol

HRN-54



HRN-54N





EAN code  
 HRN-56/208V: 8595188130134  
 HRN-56/240V: 8595188137119  
 HRN-56/400V: 8595188137126  
 HRN-56/480V: 8595188130189  
 HRN-56/575V: 8595188130196

- Relay monitors phase sequence and failure (e.g. control of correct motor winding etc.).
- Relay is designated for monitoring of 3-phase networks.
- Supply from all phases which means that relay is functional also in case of one phase failure.
- Supply and monitored supply Un:
 

1-MODULE	3-MODULE
HRN-56/208 - 3x 208 V	HRN-56/480 - 3x 480 V
HRN-56/240 - 3x 240 V	HRN-56/575 - 3x 575 V
HRN-56/400 - 3x 400 V	
- Fixed time delay T1 (500 ms) and adjustable time delay T2 (0 - 10 s).

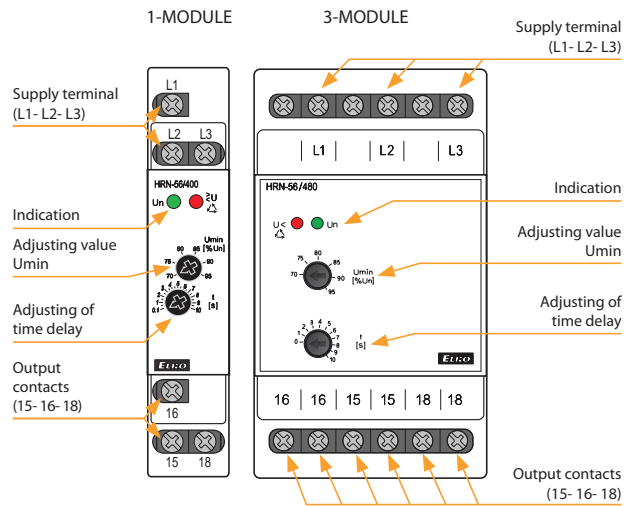
Technical parameters	HRN-56				
	208	240	400	480	575
Monitoring terminals:	L1, L2, L3				
Supply terminals:	L1, L2, L3				
Supply/measured voltage:	3x 208 V L-L (3x120 V L-N) (50-60 Hz)	3x 240 V L-L (3x139 V L-N) (50-60 Hz)	3x 400 V L-L (3x230 V L-N) (50-60 Hz)	3x 480 V L-L (3x277 V L-N) (50-60 Hz)	3x 575 V L-L (3x332 V L-N) (50-60 Hz)
Burden:	max. 2 VA/1 W				
Max. dissipated power (Un + terminals):	2 W				
Level Umin:	adjustable 70 - 95 % Un				
Level Uoff:	60 % Un				
Hysteresis:	2 %				
Max. permanent overload:	AC 3x 276 V	AC 3x 460 V	AC 3x 550 V	AC 3x 660 V	AC 3x 700 V
Peak overload <1s:	AC 3x 300 V	AC 3x 500 V	AC 3x 600 V	AC 3x 700 V	AC 3x 700 V
Time delay T1:	max. 500 ms				
Time delay T2:	adjustable 0 - 10 s				
<b>Output</b>					
Number of contacts:	1x changeover/SPDT (AgNi/Silver Alloy)				
Current rating:	8 A/AC1				
Breaking capacity:	2000 VA/AC1, 240 W/DC				
Inrush current:	10 A				
Switching voltage:	250 V AC/24 V DC				
Indication of state:	red LED				
Mechanical life:	60.000.000 ops.				30.000.000 ops.
Electrical life (AC1):	150.000 ops.				200.000 ops.
<b>Other information</b>					
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)				
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)				
Dielectrical strength:	4 kV (supply - output)				
Operating position:	any				
Mounting:	DIN rail EN 60715				
Protection degree:	IP40 from front panel/ IP10 terminals				IP40 from front panel/ IP20 terminals
Overvoltage category:	III.				
Pollution degree:	2				
Max. cable size (mm <sup>2</sup> ):	solid wire max. 2x 2.5 or 1x 4/ with sleeve max. 1x 2.5 or 2x 1.5 (AWG 12)		max. 1x 2.5, max. 2x 1.5/ with sleeve max. 1x 1.5 (AWG 12)		
Dimensions:	90 x 17.6 x 64 mm (3.5" x 0.7" x 2.5")		90 x 52 x 65 mm (3.5" x 2" x 2.6")		
Weight:	65 g (2.3 oz.)	65 g (2.3 oz.)	66 g (2.3 oz.)	110 g (3.9 oz.)	110 g (3.9 oz.)
Standards:	EN 60255-1, EN 60255-26, EN 60255-27				

**Function description**

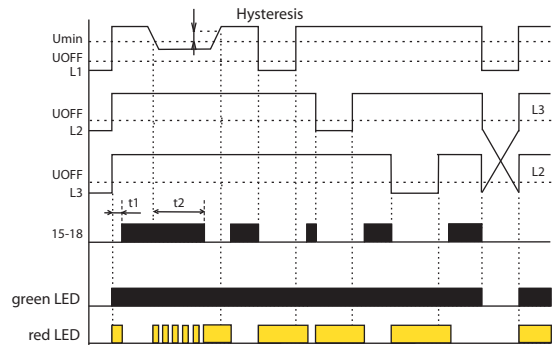
Relay in 3-phase main monitors correct phase sequence and phase failure. Green LED illuminates permanently and indicates energization. In case of phase failure red LED flashes and relay turns off. When changing to faulty state, time delay applies - delay setting is done by potentiometer on the front panel of the device. In case of incorrect phase sequence, red LED shines permanently and relay is open. In case supply voltage falls below 60 % Un (U<sub>off</sub> lower level), relay immediately opens with no delay and faulty state is indicate by red LED.

**HRN-56:** Thanks to supply from all phases, relay is functional also in case of one phase failure.

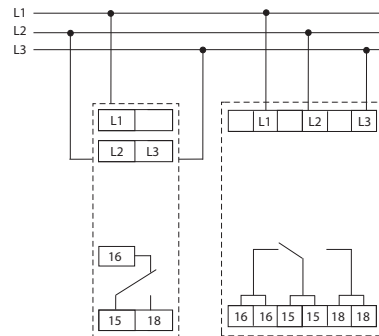
**Description**



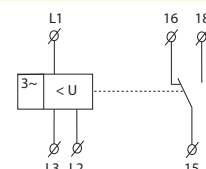
**Function**



**Connection**



**Symbol**







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

### Technical parameters

	HRN-43	HRN-43N
<b>Supply</b>		
Supply terminals:	A1 - A2	
Supply voltage:	AC 230 V, AC 400 V, AC/DC 24 V (AC 50-60 Hz)	
Consumption max.:	5 VA/2.5 W (AC 230 V, AC 400 V), 2 VA/1.4 W (AC/DC 24 V)	
Max. dissipated power (Un + terminals):	6.5 W (230 V, 400 V), 5.5 W (24 V)	
Supply voltage tolerance:	-15 %; +10 %	

### Measuring circuit

	3x 400 V (50-60 Hz)	3x 400 V/230 V (50-60 Hz)
Voltage set:	L1, L2, L3	L1, L2, L3, N
Monitored terminals:	240 - 480 V	138 - 276 V
Upper voltage level:	35 - 99 % Umax	
Bottom voltage level:	3x 480 V	
Max. permanent overload:	adjustable 5 % or 10 % of set value	
Hysteresis:	5 - 20 %	
Asymmetry:	600 V < 1 ms	
Peak overload < 1 ms:	350 V < 1 ms	
Time delay t1:	fixed, max. 200 ms	
Time delay t2:	adjustable 0.1-10 s	

### Accuracy

Set. accuracy (mechanical):	5 %
Repeat accuracy:	< 1 %
Temperature dependence:	< 0.1 %/°C (°F)
Limit values tolerance:	5 %

### Output

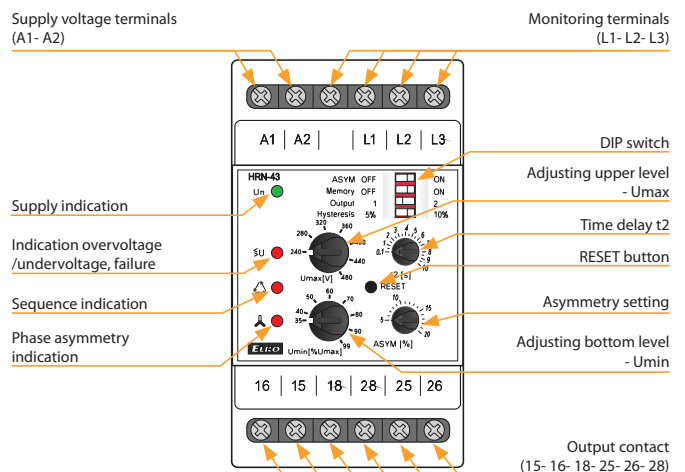
Number of contacts:	2x changeover/SPDT (AgNi/Silver Alloy)
Rated current:	16 A/AC1
Switching capacity:	4000 VA/AC1, 384 W/DC
Inrush current:	30 A/< 3 s
Switching voltage:	250 V AC/24 V DC
Mechanical life:	10.000.000 ops.
Electrical life (AC1):	100.000 ops.

### Other information

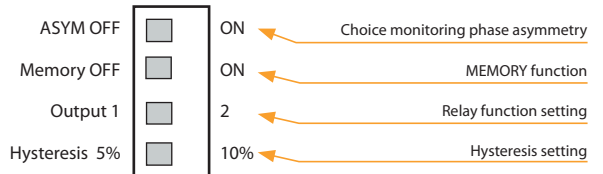
Operating temperature:	-20 °C to 55 °C (-4 °F to 131 °F)
Storage temperature:	-30 °C to 70 °C (-22 °F to 158 °F)
Dielectrical strength:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP40 from front panel/IP20 terminals
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm <sup>2</sup> ):	solid wire max. 1x 2.5 or 2x 1.5/ with sleeve max. 1x 1.5 (AWG 12)
Dimensions:	90 x 52 x 65 mm (3.5" x 2" x 2.6")
Weight:	248 g (110 V, 230 V, 400 V) (8.7 oz.), 146 g (24 V) (5.1 oz.)
Standards:	EN 60255-1, EN 60255-26, EN 60255-27

- Monitoring of 3-phase mains:
  - voltage in 2 levels (undervoltage and overvoltage) in range 138-276 V (3x 400 V/230 V) or 280-480 V (3x 400 V)
  - phase asymmetry (can be switched off)
  - phase sequence
  - phase failure.
- Function of second relay (independent/parallel).
- HRN-43:** for circuits 3x 400 V (without neutral).
- HRN-43N:** for circuits 3x 400/230 V (with neutral).
- Galvanically separated supply voltage AC 400 V, AC 230 V, AC/DC 24 V.

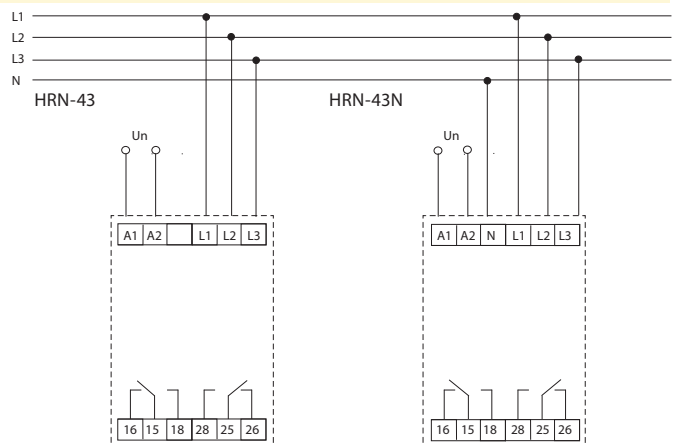
### Description



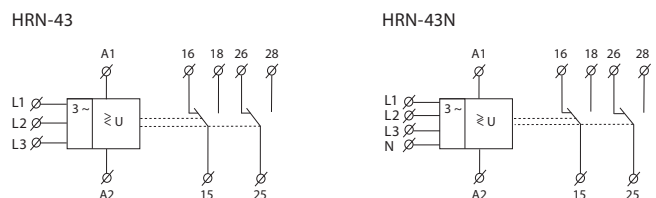
### Description and importance of DIP switches



### Connection

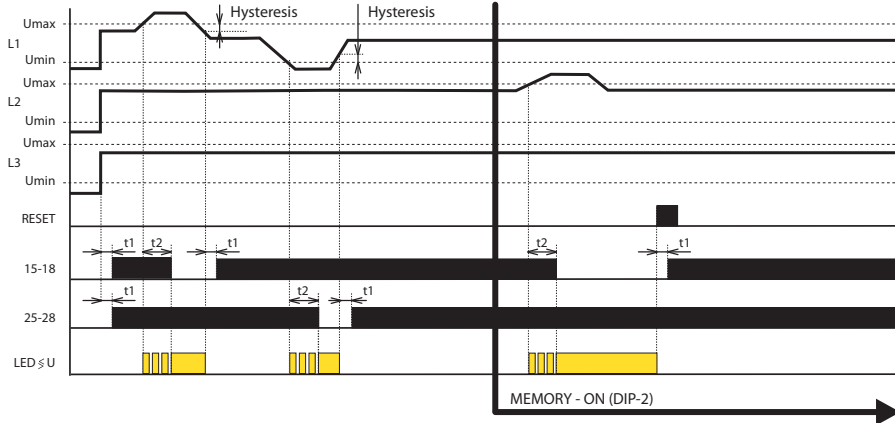


### Symbol



Function

Overvoltage - undervoltage



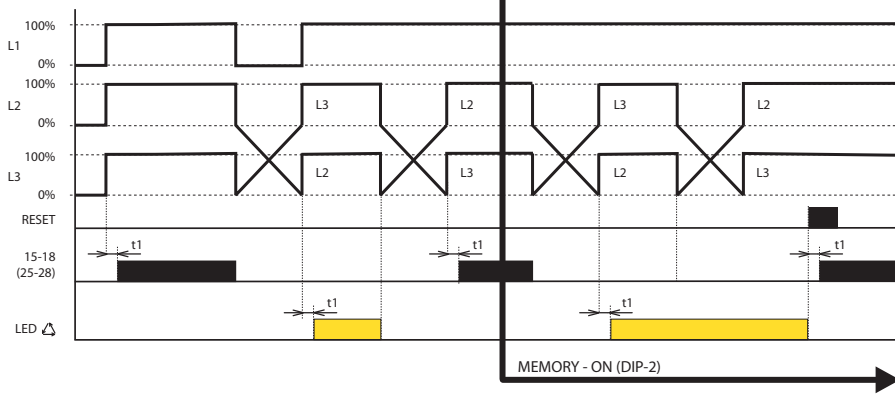
**Legend:**  
 L1, L2, L3 - 3-phase voltage  
 RESET - press of the button on frontal panel  
 t1 - time delay, fixed  
 t2 - time delay, adjustable  
 15-18 output relay 1  
 25-28 output relay 2  
 LED  $\geq U$  - indication overvoltage/undervoltage

**Selection of 2<sup>nd</sup> 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 "phase sequence") or both relays will switch in parallel way (see diagram "phase sequence").

Selection via DIP switch Output.

Phase sequence

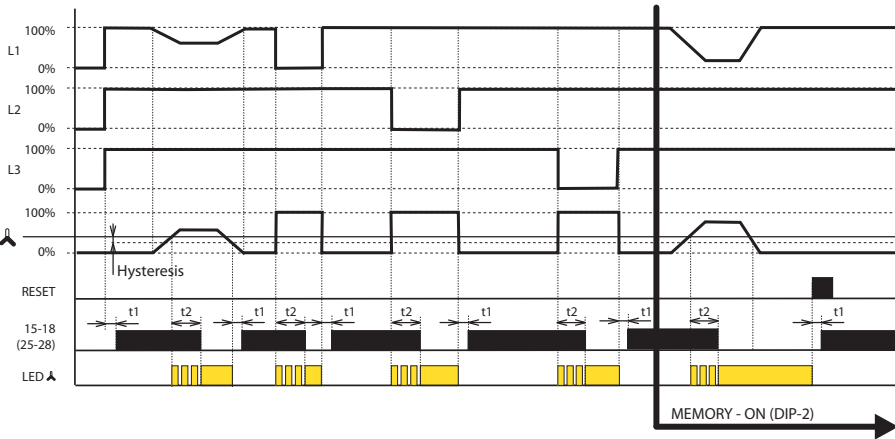


**Legend:**  
 L1, L2, L3 - 3-phase voltage  
 RESET - press of the button on frontal panel  
 t1 - time delay, fixed  
 t2 - time delay, adjustable  
 15-18 output relay 1  
 25-28 output relay 2  
 LED  $\Delta$  - indication of phase sequence

**Selection of 2<sup>nd</sup> relay function:**

The function is not implied in the monitoring phase sequence, the relays are switched in parallel way. DIP switch Output 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  
 $\blacktriangle$  - adjustable asymmetry  
 15-18 output contact of relay 1  
 25-28 output contact of relay 2  
 LED  $\blacktriangle$  - asymmetry indicator

**Selection of 2<sup>nd</sup> relay function:**

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

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 (Output) 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 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). In case of failure of two or three phases, the relay is deactivated immediately regardless of the set delay t2.

**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. Monitoring asymmetry can be switched off by DIP switch ASYM.