

1-phase

AC



**HRN-33**

Supply and monitored voltage in range AC 48-276 V, 1x output for Umax and Umin adjustable level. page 90



**HRN-35**

As HRN-33 but individual output for each level (Umax/Umin). 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 Umax and Umin 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 Umin. page 97



**HRN-56/240**

Adjustable level Umin. page 97



**HRN-56/400**

Adjustable level Umin. page 97



**HRN-56/480**

Adjustable level Umin. page 97



**HRN-56/575**

Adjustable level Umin. 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 φ) 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



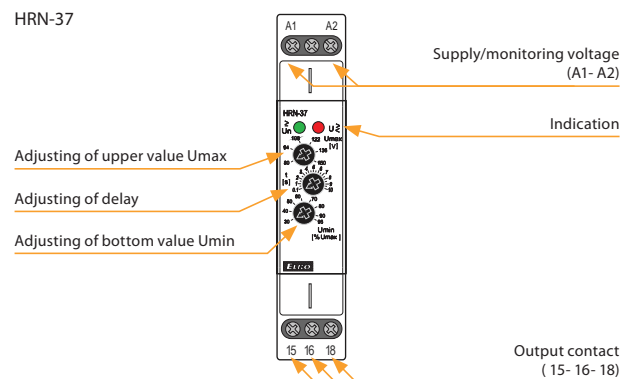
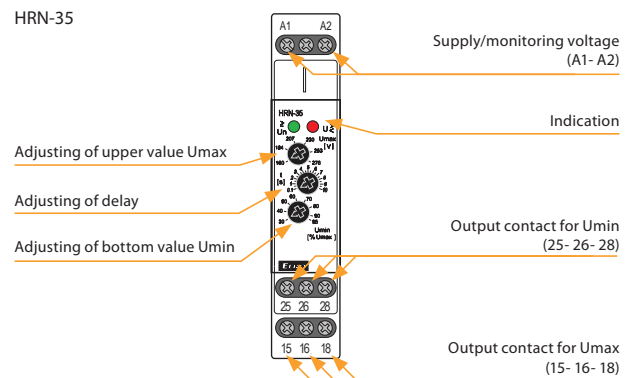
## EAN code

HRN-33: 8595188115636  
 HRN-34: 8595188115643  
 HRN-35: 8595188115650  
 HRN-37: 8595188130615  
 HRN-63: 8595188130622  
 HRN-64: 8595188130639  
 HRN-67: 8595188130646

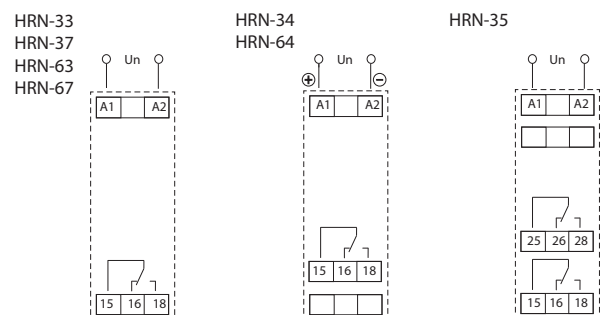
Technical parameters	HRN-33/ HRN-63	HRN-34/ HRN-64	HRN-35	HRN-37/ HRN-67
<b>Supply and measuring</b>				
Terminals:	A1 - A2	A1 - A2	A1 - A2	A1 - A2
Voltage range:	AC 48 - 276 V (50-60 Hz)	DC 6 - 30 V	AC 48 - 276 V (50-60 Hz)	AC 24-150 V (50-60 Hz)
Burden:	HRN-33 max. 26 VA	-	max. 45 VA	HRN-37 max. 8 VA
	HRN-63 max. 45 VA	-		HRN-67 max. 30 VA
Max. dissipated power (Un + terminals):	max. 2 W	max. 0.5 W	max. 2 W	max. 2 W
Upper level (Umax):	AC 160 - 276 V	DC 18 - 30 V	AC 160 - 276 V	AC 80-150 V
Bottom level (Umin):	30-95 % Umax	35 - 95 % Umax	30 - 95 % Umax	30-95 % Umax
Max. permanent overload:	AC 276 V	DC 36 V	AC 276 V	AC 276 V
Peak overload <1ms:	AC 290 V	DC 50 V	AC 290 V	AC 290 V
Time delay:	adjustable 0 - 10 s			
<b>Accuracy</b>				
Setting accuracy (mechanical):	5 %			
Repeat accuracy:	<1 %			
Dependence on temperature:	< 0.1 %/°C (°F)			
Tolerance of limit values:	5 %			
Hysteresis (from fault to normal):	2 - 6 % of adjusted value (only HRN-33, HRN-34, HRN-35, HRN-37)			
<b>Output</b>				
1x changeover				
Number of contacts:	SPDT (AgNi/ Silver Alloy)	SPDT (AgNi/ Silver Alloy)	for each level of voltage, (AgNi)	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 AC/24 V DC			
Output indication:	red/green LED			
Mechanical life:	10.000.000 ops.			
Electrical life (AC1):	60.000 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, 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 2.5 (AWG 12)			
Dimensions:	90 x 17.6 x 64 mm (3.5" x 0.7" x 2.5")			
Weight:	62 g (2.2 oz.)	75 g (2.6 oz.)	86 g (3 oz.)	61 g (2.2 oz.)
Standards:	EN 60255-1, EN 60255-26, EN 60255-27			

- It serves to control supply voltage for appliances sensitive to supply tolerance, protection of the device against under/over voltage.
- HRN-3x is band voltage relay, HRN-6x is over/under voltage relay. For difference - see graph of function.
- **HRN-33, HRN-63**
  - monitors voltage in range AC 48 - 276 V
  - Umax and Umin can be monitored independently.
- **HRN-34, HRN-64**
  - like HRN-33, but voltage range is DC 6 - 30 V
  - monitoring of battery circuits (24 V).
- **HRN-35**
  - like HRN-33, but independent output relays for each voltage level
  - switching of other loads possible.
- **HRN-37, HRN-67**
  - like HRN-33, monitors voltage in range AC 24 - 150 V
  - it is possible to monitor level of overvoltage and undervoltage independently.
- Voltage Umin adjusted as % of Umax.
- 3-state indication - LEDs indicating normal state and 2 fault states.

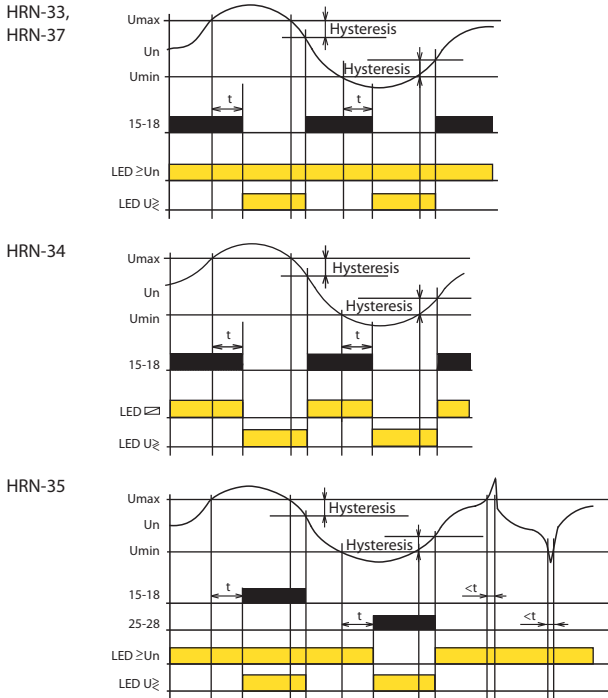
## Description



## Connection



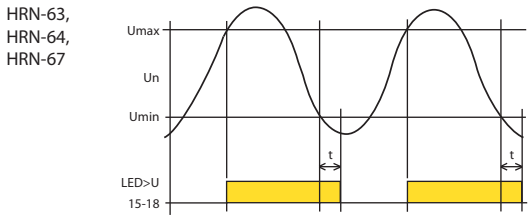
Function HRN-33, 34, 35, 37 (band voltage relay)



Monitoring relay series HRN-3x monitors level of voltage in single - phase circuits. Monitored voltage serves also as supply voltage. It is possible to set two independent (all occurrences) levels of voltage, when exceeded the output is activated. HRN-33 and HRN-34 - in normal state the output relay is permanently switched. It switches off when there is a limit settings. This combination of linkage of the output relay is advantageous when the full failure of supply (monitored) voltage is considered to be a faulty state in the same way as a decrease of voltage within the set level. Output relay is in both situations always switched off.

Differently HRN-35 version uses independent relay for each level, in normal state it is switched off. If the upper level is exceeded (for example overvoltage) 1 relay switches on, when the bottom level (e.g. undervoltage) is exceeded, 2 relay switches. It is thus possible to see the particular faulty state. To eliminate short peaks in the main the time delay, which is possible to be set in range 0 - 10 s, is used. It functions when changing from normal to faulty state and prevents unavailing pulsation of the output relay caused by parasitic peaks. Time delay doesn't apply when changing from faulty to normal state, but hysteresis (1 - 6 % depends on the voltage setting) apply. Thanks to changeover contacts it is possible to get other configurations and functions according to actual requirements of the application.

Function HRN-63, 64, 67 (over/under voltage relay)

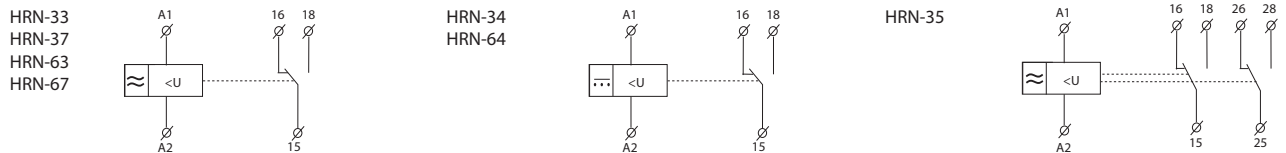


Monitoring relay line HRN-6x serves to monitor levels of voltage in single-phase or DC circuits. Monitored voltage is in the same time also supply voltage. It is possible to set two independent levels of voltage. When Umax is exceeded, output is activated. In case voltage level falls below Umin, output is deactivated. This combination is advantageous when full absence of supply voltage is understood as faulty state, as well as voltage drop within the set level. To eliminate short voltage peaks in the main there is time delay which can be set in a range of 0 - 10 sec. Such delay applies in case of going from overvoltage to undervoltage.

In case of returning from undervoltage to overvoltage this delay doesn't apply. Thanks to changeover output contacts it is possible to reach various configurations and functions according to requirements or an application.

**Legend:**  
 Umax - upper adjustable level of voltage  
 Un - measured voltage  
 Umin - bottom adjustable level of voltage  
 15-18 - switching contact of output relay No.1  
 25-28 - switching contact of output relay No. 2  
 LED ≥ Un - green indicator light  
 LED U ≥ - red indicator light  
 LED U > - red indicator light

Symbol



Indication LED

<p>HRN-33, HRN-37</p> <p><b>Normal state</b>              Umin &lt; Un &lt; Umax              Green LED = ON              Red LED = OFF</p> <p><b>Exceeded Umax (overvoltage)</b>              Drop below Umin (undervoltage)              Un &gt; Umax or Un &lt; Umax              Green LED = ON              Red LED = ON</p>	<p>HRN-34</p> <p><b>Normal state</b>              Umin &lt; Un &lt; Umax              Green LED = ON              Red LED = OFF</p> <p><b>Exceeded Umax (overvoltage)</b>              Drop below Umin (undervoltage)              Un &gt; Umax or Un &lt; Umax              Green LED = OFF              Red LED = ON</p>	<p>HRN-63, HRN-67</p> <p><b>Exceeded Umax (overvoltage)</b>              Un &gt; Umax              Green LED = ON              Red LED = ON</p> <p><b>Drop below Umin (undervoltage)</b>              Un &lt; Umin              Green LED = ON              Red LED = OFF</p>	<p>HRN-64</p> <p><b>Exceeded Umax (overvoltage)</b>              Un &gt; Umax              Green LED = OFF              Red LED = ON</p> <p><b>Drop below Umin (undervoltage)</b>              Un &lt; Umin              Green LED = ON              Red LED = OFF</p>
<p>HRN-35</p> <p><b>Normal state</b>              Umin &lt; Un &lt; Umax              Green LED = OFF              Red LED = OFF</p> <p><b>Exceeded Umax (overvoltage)</b>              Un &gt; Umax              Green LED = ON              Red LED = ON</p> <p><b>Drop below Umin (undervoltage)</b>              Un &lt; Umin              Green LED = OFF              Red LED = ON</p>			



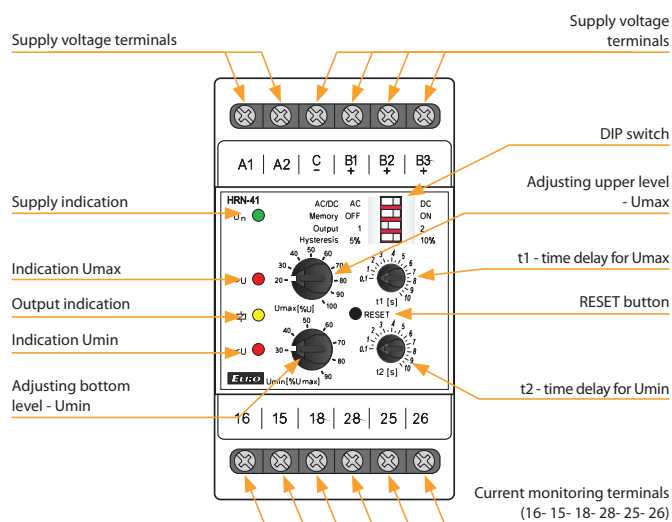
EAN code  
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 HRN-41/400V: 8595188140423  
 HRN-41/24V: 8595188140416  
 HRN-42/230V: 8595188140447  
 HRN-42/24V: 8595188140454

Technical parameters	HRN-41	HRN-42	
<b>Supply</b>			
Supply terminals:	A1 - A2		
Voltage range:	AC 230 V, AC 400 V or AC/DC 24 V (AC 50-60 Hz)		
Burden max.:	5 VA/2.5 W (AC 230 V, AC 400 V), 2 VA/2.5 W (AC/DC 24 V)		
Max. dissipated power (Un + terminals):	7 W (230 V, 400 V), 6 W (24 V)		
Supply voltage tolerance:	-15 %; +10 %		
<b>Measuring</b>			
Ranges:*	AC/DC 10 - 50 V (AC 50-60 Hz)	AC/DC 32 - 160 V (AC 50-60 Hz)	AC/DC 100 - 500 V (AC 50-60 Hz)
Terminals:	C - B1	C - B2	C - B3
Input resistance:	212 kΩ	676 kΩ	2.12 MΩ
Max. permanent overload:	100 V	300 V	600 V
Peak overload <1ms:	250 V	700 V	1 kV
Time delay for Umax:	adjustable 0.1 - 10 s		
Time delay for Umin:	adjustable 0.1 - 10 s		
<b>Accuracy</b>			
Setting accuracy (mechanical):	5 %		
Repeat accuracy:	<1 %		
Dependence on temperature:	< 0.1 %/°C (°F)		
Tolerance of limit values:	5 %		
Hysteresis (from fault to normal):	selectable 5 %/10 % from range		
<b>Output</b>			
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 AC/24 V DC		
Output indication:	yellow LED		
Mechanical life:	10.000.000 ops.		
Electrical life (AC1):	100.000 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:	DIN rail EN 60715		
Mounting:	IP40 from front panel/IP20 terminals		
Protection degree:	III.		
Overvoltage category:	2		
Pollution degree:	solid wire max. 1x 2.5 or 2x 1.5/ with sleeve max. 1x 1.5 (AWG 12)		
Max. cable size (mm <sup>2</sup> ):	90 x 52 x 65 mm (3.5" x 2" x 2.6")		
Dimensions:	249 g (110 V, 230 V, 400 V) (8.8 oz.), 146 g (24 V) (5.1 oz.)		
Weight:	EN 60255-1, EN 60255-26, EN 60255-27		
Standards:			

\* Only one of the inputs can be connected.

- Relay designed for monitoring DC and AC voltage in three ranges.
- The relay controls the size of the voltage in two independent levels (Umin, Umax).
- Setting the monitored level Umax (in % of range).
- Setting the monitored level Umin  
(in % of range - for HRN-42 - function WINDOW,  
(in % of the set upper limit - for HRN-41 - function HYSTERESIS).
- Function of second relay (independently/in parallel).
- Adjustable delay for eliminating short-term outages and surges for every level independently.
- Galvanically separated power supply from monitoring inputs.
- Output contact for each monitored voltage level.

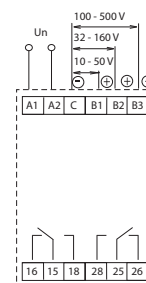
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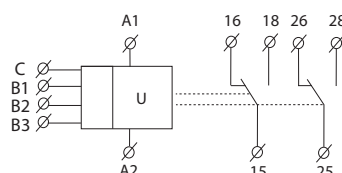
## Description and importance of DIP switches

AC/DC AC	<input type="checkbox"/>	DC	Measured AC/DC voltage
Memory OFF	<input type="checkbox"/>	ON	MEMORY function
Output 1	<input type="checkbox"/>	2	Relay function setting
Hysteresis 5%	<input type="checkbox"/>	10%	Hysteresis setting

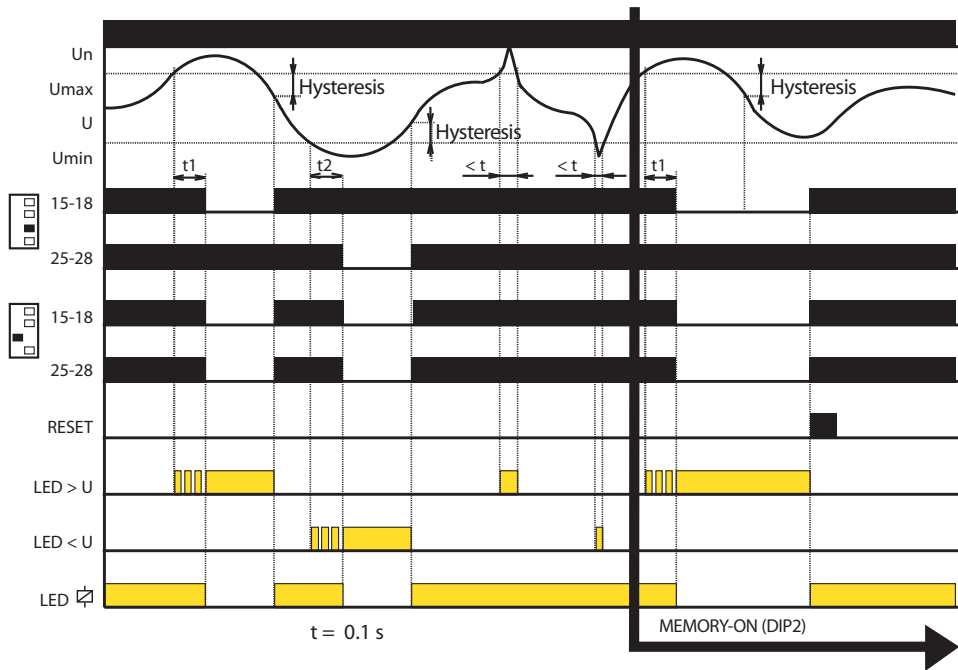
## Connection



## Symbol



Function



- If the value of the monitored voltage is in the zone between the set upper and lower levels, the status OK occurs - both relays are closed and the yellow LED illuminates. If the value of the monitored voltage is outside the set limits ( $> U_{max}$  or  $< U_{min}$ ), an error state occurs.
- When moving to an error state  $U > U_{max}$ , it times the delay  $t_1$  and a red  $LED > U$  simultaneously flashes. After the  $t_1$  time elapses, the red  $LED > U$  illuminates and the relevant relay opens.
- When moving to an error state  $U < U_{min}$ , it times the delay  $t_2$  and a red  $LED < U$  simultaneously flashes. After the time  $t_2$  elapses, the red  $LED < U$  illuminates and the relevant relay opens.
- When moving from the error status to the OK status, the relevant red LED immediately goes out, and the corresponding relay closes.