

March 2024

UL Certified Relays Catalog



www.elkoepna.com



ABOUT ELKO EP NORTH AMERICA

ELKO EP North America is a new addition to ELKO EP Holding. With 15 years of OEM expertise and private label success in the region, we are embarking on a new venture – proudly bringing the globally recognized ELKO brand directly to businesses and customers all across North America. With our headquarters nestled in the vibrant city of Miami, FL, we also operate offices in Chicago, IL, and have a strategically located warehouse in Louisville, KY, ensuring prompt service and product availability.

While our North American operations continue to thrive, our global reach is expansive. As OEM partners, we collaborate with renowned entities worldwide, underscoring our global expertise and commitment to excellence. Our products are recognized for quality, holding UL, CE and EAC certifications.

Internationally, ELKO EP stands out as the largest DIN Rail Relay Manufacturer in the European Union. Our robust team consists of 400 dedicated employees, with 45 specialists engaged in Research & Development, pushing the boundaries of innovation. Our global presence is further emphasized by our export network extending to 80 countries, supported by 15 branches worldwide. With a turnover of 40 million USD, our commitment to quality, innovation, and customer satisfaction remains paramount.



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www.elkoepna.com



5 Reasons to Become a Partner

- **Work Directly with the Manufacturer**

Forge a direct connection with the visionaries behind the products. Our EU-based R&D and manufacturing are enhanced by a supportive US-based head office & warehouse.

- **US-Stocked Products**

Our commitment to local stock ensures zero drop-shipping and guarantees a swift delivery window of just 1-10 days.

- **Quality Endorsed by the North American Market**

Forge a direct connection with the visionaries behind the products. Our EU-based R&D and manufacturing are enhanced by a supportive US-based head office & warehouse.

- **A Unique Product Portfolio**

Expand your offerings with our diverse product range, opening doors to attract and serve new customers.

- **An Unbeatable Price Advantage**

Savor the competitive edge with our direct-to-customer model, presenting partners with a lucrative margin.

Attained awards & Memberships



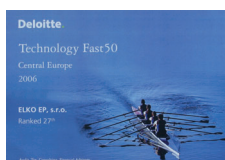
Czech Business
Superbrands



Vodafone
Company of the
Year 2012



Electronics
Representatives
Association member



Technology Fast 50



Global exporter
in 2016

...and many others.



ABOUT ELKO EP HOLDING

ELKO EP has been your partner in the field for 30 years, developing and manufacturing the highest quality electronic devices for electroinstallation and smart systems for residential and building automation.

ELKO EP employs more than 400 people across 15 foreign branches and exports its products to more than seventy countries. Company of the Year, Visionary of the Year, Superbrands and Global Exporter of the Year are just some of the awards we have received throughout the years as we consistently strive to move forward in the field of innovation and development.

Millions of relays, thousands of smart homes, hundreds of buildings and many satisfied customers - This is ELKO EP; a traditional company based in the center of Europe, where own development, production, logistics, and service are at the forefront of our focus.

Facts and stats



30 %

Czech

40 %

Export

30 %

Branches



WORLDWIDE

11 Branches
3 Franchises
80 Export Countries

400

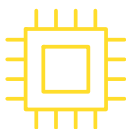
Employees
in Holding

30 000 +

iNELS
Installations

30 000 000 +

Manufactured
Products



R&D

Continuously
Innovative

MANUFACTURER

Fully Automated
Complete Process

SUPPORT

24 / 7 / 365

World leader
In DIN Rail Relays Production

Product lines ELKO EP



Timers/Relays

Time relays, auxiliary relays, installation contactors, memory and bistable relays, staircase switches, time switches, twilight and light switches, dimmers and light intensity controllers, power supplies and bell transformers, controlling and signalling devices.

www.elkoep.com/relays



Monitoring/Protection relays

Voltage relays 1-phase and 3-phase (undervoltage, overvoltage, phase failure, phase asymmetry and phase sequence), current relays, liquid level relays, thermostats, voltage indicator, power factor and frequency monitoring relays.

www.elkoep.com/monitoring

Multifunction current monitoring relay in 1P - PRI-34

It is a new line of PRI-34 current monitoring relays in a **multifunction** design. All types now measure **TRUE RMS** values (thus with minimal fault regardless of the shape of measured current). Of course, it is possible to **connect external current transformers** (possible extension of the measured range up to 1600A). There is a choice of eight functions incl. the memory ones.

Individual types are divided according to the nominal monitored current:

- ♦ PRI-34/1 A – monitored range AC 0.05 - 1 A
- ♦ PRI-34/2 A – monitored range AC 0.1 - 2 A
- ♦ PRI-34/5 A – monitored range AC 0.25 - 5 A
- ♦ PRI-34/8 A – monitored range AC 0.4 - 8 A
- ♦ PRI-34/16 A – monitored range AC 0.8 - 16 A



Multifunction voltage monitoring relay in 1P - HRN-3x, PMR1

The original HRN-3x types on a DIN rail will be replaced by new ones that are **multifunction** and bring several improvements. Now you have options with **one or two** output contacts. The **design into a socket** is the PMR1 model. As well as the previous novelty, also this one measures **TRUE RMS** values. This is related with monitoring of **DC voltage in higher ranges**. The original DC range was slightly modified for optional monitoring of 24 V batteries. Multifunctionality enables the selection of up to nine functions incl. memory ones. Also an **external input** for memory reset was added.

Individual types are divided according to the monitored range:

On DIN rail:

- ♦ HRN-31, HRN-31/2, HRN-32/2 – monitored range AC/DC 48 to 276V
- ♦ HRN-36, HRN 36/2 – monitored range DC 6 to 30V
- ♦ HRN-39, HRN 39/2 – monitored range AC/DC 24 to 150V

Into a socket:

- ♦ PMR1-31, PMR1-31/2 – monitored range AC/DC 48 to 276V
- ♦ PMR1-36, PMR1-36/2 – monitored range DC 6 to 30V
- ♦ PMR1-39, PMR1-39/2 – monitored range AC/DC 24 to 150V



TIME RELAYS - MULTIFUNCTION

DESIGN

CRM-161 Multifunction time relay - economy version	(1-MODULE)	11
CRM-91H, CRM-93H Multifunction time relays - BESTSELLER	(1-MODULE)	12
CRM-91H-SL, CRM-93H-SL Multifunction time relays - screwless terminals	(1-MODULE)	13
NEW CRM-91HE Multifunction time relay with external potentiometer	(1-MODULE)	14
NEW CRM-111H, CRM-113H Multifunction time relays with inhibit delay	(1-MODULE)	16
CRM-121H Multifunction time relay with galvanically separated control input	(1-MODULE)	18
NEW CRM-131H Multifunction time relay with three control inputs	(1-MODULE)	20
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TIME RELAYS - SINGLEFUNCTION, SPECIAL

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CRM-2H Asymmetric flasher	(1-MODULE)	26
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TIME RELAYS - PLUG-IN

PTRM-216TP, PTRM-216KP Multifunction time relays with inhibit delay	(11-PIN)	28
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INSTALLATION CONTACTORS

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PS1M, PS2M, PS3M, PS4M Switching power supplies DC - unregulated	(1/2/3/4-MODULE)	44
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VOLTAGE 1-PHASE

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CURRENT

PRI-32 Current monitoring relay of I_{max} level passing through a hole in 1P - AC	(1-MODULE)	61
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TECHNICAL DETAILS

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Multifunction



CRM-161

6 functions, 6 time ranges, output contact 1x 8 A changeover, power supply AC 24-240 V, DC 24 V, economy version of CRM-91H. page 11



CRM-91H

10 functions, 10 time ranges, 1x output 16 A changeover/SPDT, multivoltage or 230 V supply. page 12



CRM-93H

As CRM-91H, but output 1x 16 A + 2x 8 A changeover/SPDT. page 12



CRM-91H-SL

As CRM-91H but with screwless terminals. page 13



CRM-93H-SL

As CRM-93H, but with screwless terminals page 13



CRM-91HE

As CRM-91H but with time setting by external potentiometer (for frequent setting). page 14



CRM-111H

11 functions 10 time ranges, output contact: 1x 16 A changeover. page 16



CRM-113H

10 functions, 10 time ranges, output contact: 1x 16 A + 2x 8 A changeover, mode selection of output contacts. page 16



CRM-121H

As CRM-111H, but with galvanically separated input. page 18



CRM-131H

11 functions, 10 time ranges, output contact: 1x 16 A changeover, three control inputs. page 20



CRM-82TO

"TRUE OFF DELAY relay - switch off after power supply failure for backup circuits. page 22

Singlefunction, special



CRM-2T

Star/delta timer relay page 23



CRM-181J

Variants of 4 functions with time range 0.1s - 100 h, output 1x 16 A changeover, UNI power supply. page 24



CRM-183J

As CRM-181J, but output 1x16A + 2x 8 A changeover. page 24



CRM-2H

Asymmetric flasher, independent time setting ON/OFF. page 26



CRM-2HE

As CRM-2H, but time setting by external potentiometers (for frequent setting). page 27

PLUG-IN



PTRM-216TP

10 functions, 10 time ranges, output contact: 2x 16 A changeover, voltage dependent input, mode selection of output contact, tuning with dials. page 28



PTRM-216KP

As PTRM-216TP, but fine tuning using a knob. page 28



PTRM-216T

10 functions, 10 time ranges, output contact: 2x 16 A changeover, potential-free input, mode selection of output contact, dial tuning. page 29



PTRM-216K

As PTRM-216T, but fine tuning using a knob. page 29



PTRM-216T

10 function, 10 time ranges, output contact 2x 16 A changeover, three control inputs and mode selection of output contact, tuning with dials. page 30



PTRM-216K

As PTRM-216T, but fine tuning help with a knob. page 30

	CRM-161	CRM-91H, CRM-91H-SL	CRM-93H, CRM-93H-SL	CRM-91HE	CRM-111H	CRM-113H	CRM-121H	CRM-131H	CRM-71TO	CRM-2T	CRM-181J ZR	CRM-181J ZN	CRM-181J BL	CRM-181J OD	CRM-183J ZR	CRM-183J ZN	CRM-183J BL	CRM-183J OD	CRM-2H	CRM-2HE	PTRM-216TP	PTRM-216KP	PTRM-216T	PTRA-216K	PTRA-216T	PTRA-216K	
Design																											
1-MODULE	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●						
3-MODULE																											
PLUG-IN																						●	●	●	●	●	●
Under the switch																											
Control elements																											
Rotary switches/potentiometers	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Large rotary knob																							●		●		●
Buttons																											
External potentiometer				●																			●				
Time range																											
50 ms – 0.5 s					●	●	●	●	●													●	●	●	●	●	●
0.1 – 1 s	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1 – 10 s	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
3 – 30 s											●	●	●	●	●	●	●	●	●	●	●						
0.1 – 1 min	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1 – 10 min	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
3 – 30 min											●	●	●	●	●	●	●	●	●	●	●						
0.1 – 1 h	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1 – 10 h	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
3 – 30 h											●	●	●	●	●	●	●	●	●	●	●						
0.1 – 1 d		●	●	●	●	●	●	●	●	●											●	●	●	●	●	●	●
1 – 10 d											●	●	●	●	●	●	●	●	●	●	●						
10 – 100 h		●	●	●	●	●	●	●	●	●											●	●	●	●	●	●	●
3 – 30 d					●	●	●	●	●	●											●	●	●	●	●	●	●
10 – 100 d										●											●	●					
0.5 – 10 min																											
0.01s – 100 h																											
0.1s – 999 h																											
Supply voltage																											
AC 230 V		□	□							●										●							
AC/DC 12–240 V	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
AC 24–240 V, DC 24 V	●																										
AC/DC 24–240 V																											
Output contact																											
1x changeover 8 A	●																										
1x changeover 16 A		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2x changeover 8 A										●																	
2x changeover 16 A																						●	●	●	●	●	●
1x switching 16 A																											
1x changeover 16 A, 2x changeover 8 A		●		●										●	●	●	●	●	●	●							
Solid state (triac)																											

- only for CRM-91H, CRM-93H
- with the option of extending it to 30 min

	CRM-161	CRM-91H, CRM-91H-SL	CRM-93H, CRM-93H-SL	CRM-91HE	CRM-111H	CRM-113H	CRM-121H	CRM-131H	CRM-82TO	CRM-2T	CRM-181J ZR	CRM-181J ZN	CRM-181J BL	CRM-181J OD	CRM-183J ZR	CRM-183J ZN	CRM-183J BL	CRM-183J OD	CRM-2H	CRM-2HE	PTRM-216x	PTRM-216xP	PTRA-216x	
Functions																								
Staircase switch																								
Programmable staircase switch (with/without signaling)																								
Delayed start	●	●	●	●	●	●	●	x	●	●					●						●	●	x	
Delayed start with delay suppression					●	●	●			●					●						●	●		
Delayed start after switching on the control contact	●																							
Delayed start after opening of the control contact																								
Delayed start after closing and delayed return after opening the control contact		●	●	●	●	●	●	x													●	●	x	
Delayed start (repeatable) until the power is turned off																								
Delayed start star / triangle										●														
2x delayed start																								
Delayed return	●	●	●	●	●	●	●	x			●				●						●	●	x	
Delayed return with delay suppression					●	●	●				●				●						●	●		
Delay off on downward edge																								
TRUE OFF DELAY																								
TRUE SINGLE SHOT																								
TRUE INTERVAL ON																								
TRUE INTERVAL ON/OFF									●															
Delayed return after closing the control contact		●	●	●	●	●	●	x													●	●	x	
Delayed return after opening the control contact		●	●	●																				
Delayed return after opening the control contact with immediate closing of the output		●	●	●	●	●	●	x				●					●				●	●	x	
Delayed return after closing the control contact - renewable					●	●	●	x													●	●	x	
Delayed return after closing and opening of the control contact					●	●	●	x													●	●	x	
Delayed return when closing the control contact with delayed output																								
Emergency light tester																								
Flasher 1:1 starting with an impulse	●	●	●	●	●	●	●	x				●				●					●	●	x	
Flasher 1:1 starting with a delay-suppressed impulse												●				●								
Flasher 1:1 starting with an impulse while the control button is pressed																								
Flasher 1:1 starting with a gap		●	●	●	●	●	●	x														●	●	x
Flasher 1:1 starting with a gap while the control button is pressed																								
Asymmetric flasher starting with an impulse																					●	●		
Asymmetric flasher starting with a gap																					●	●		
Impulse relay		●	●	●	●	●	●															●	●	
Impulse relay with delay	●				●		●	x															x	
Pulse generator		●	●	●	●	●	●	x														●	●	x
Pulse generator with delay suppression					●	●	●															●	●	

x functions controlled by inputs START, INHIBIT, RESET

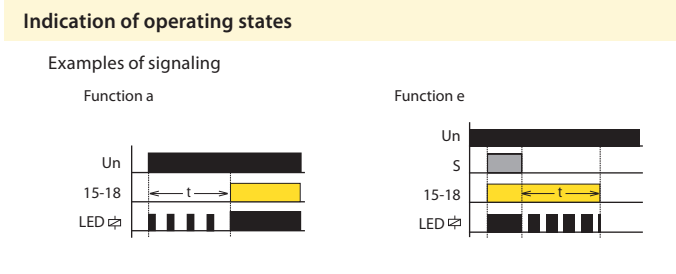
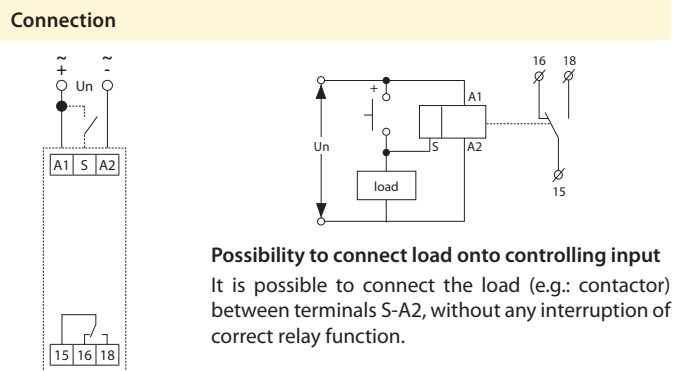
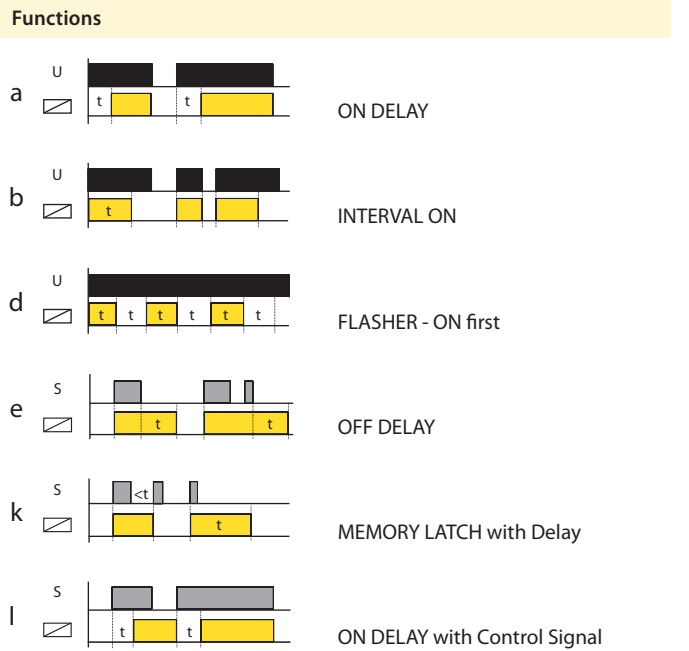
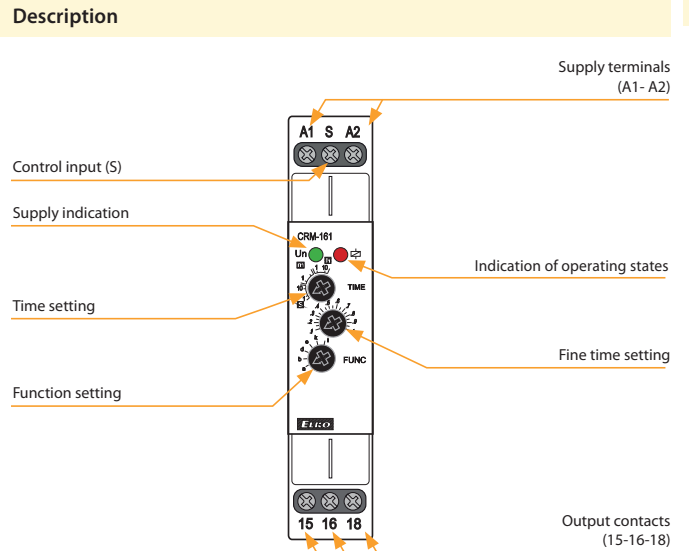
■ functions controlled by inputs START, STOP



EAN code
CRM-161: 8595188181617

- Multifunction economy version of time relay for universal use in automation, control and regulation or in house installations.
- Universal supply voltage: AC 24 – 240 V (AC 50/60 Hz) and DC 24 V.
- Comfortable and well-arranged function and time-range setting by rotary switches.
- Time scale 0.1 s - 10 hrs divided into 6 ranges: (0.1 s - 1 s/1 s - 10 s/0.1 min - 1 min/1 min - 10 min/0.1 hrs - 1 h/1 h - 10 hrs).
- Output contact: 1x changeover/SPDT 8 A.
- Multifunction red LED flashes or shines depending on the operating status.

Technical parameters	CRM-161
Power supply	
Supply terminals:	A1 - A2
Voltage range:	AC 24 - 240 V DC 24 V (AC 50-60 Hz)
Power input (max.):	2 VA/1.5 W
Supply voltage tolerance:	-15 %; +10 %
Supply indication:	green LED
Time circuit	
Number of functions:	6
Time ranges:	0.1 s - 10 hrs
Time setting:	rotary switch and potentiometer
Time deviation:	5 % - mechanical setting
Repeat accuracy:	0.2 % - set value stability
Temperature coefficient:	0.01 %/°C, at = 20 °C (0.01 %/°F, at = 68 °F)
Output	
Number of contacts:	1x changeover/SPDT (AgNi)
Current rating:	8 A/AC1; 1/2 HP 240 Vac, 1/3 HP 120 Vac; PD. B300
Breaking capacity:	2000 VA/AC1, 192 W/DC
Switching voltage:	250 V AC/24 V DC
Max. power dissipation:	0.6 W
Output indication:	multifunction red LED
Mechanical life:	10.000.000 ops.
Electrical life (AC1):	100.000 ops.
Control	
Control terminals:	A1-S
Load between S-A2:	Yes
Impulse length:	min. 25 ms/max. unlimited
Reset time:	max. 150 ms
Other information	
Operating temperature:	-20 .. +55 °C (-4 .. 131 °F)
Storage temperature:	-30 .. +70 °C (-22 .. 158 °F)
Dielectric strength:	4kV AC (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):	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.)
Standards:	EN 61812-1



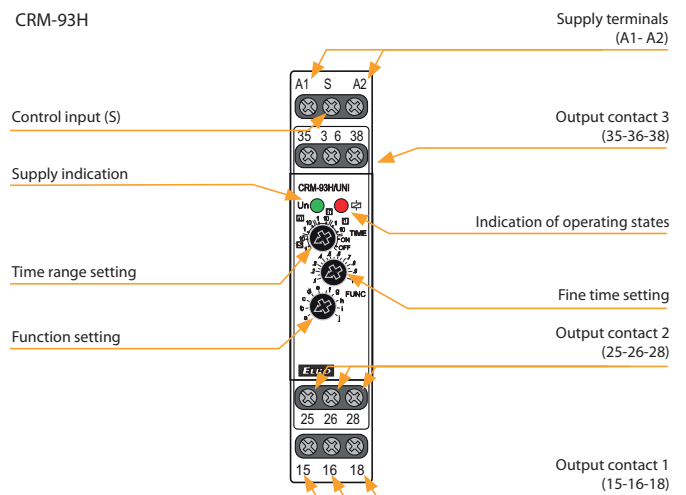


EAN code
 CRM-91H/230V: 8595188112444
 CRM-91H/UNI: 8595188112420
 CRM-93H/230V: 8595188112789
 CRM-93H/UNI: 8595188112468

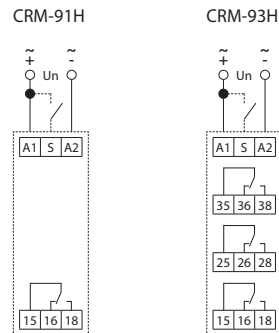
Technical parameters	CRM-91H	CRM-93H
Power supply		
Supply terminals:	A1 - A2	
Voltage range:	AC/DC 12 - 240 V (AC 50-60 Hz)	
Power input (max.):	2 VA/1.5 W	2.5 VA/1.5 W
Voltage range:	AC 230 V (50/60 Hz)	
Power input (max.):	3VA/1.4W	4VA/2W
Supply voltage tolerance:	-15 %; +10 %	
Supply indication:	green LED	
Time circuit		
Number of functions:	10	
Time ranges:	0.1 s - 10 days	
Time setting:	rotary switch and potentiometer	
Time deviation:	5 % - mechanical setting	
Repeat accuracy:	0.2 % - set value stability	
Temperature coefficient:	0.01 %/°C, at = 20 °C (0.01 %/°F, at = 68 °F)	
Output		
Number of contacts 1:	1x changeover/SPDT (AgNi)	
Current rating:	16 A/AC1; 1 HP 240 Vac, 1/2 HP 120 Vac; PD. B300	
Breaking capacity:	4000 VA/AC1, 384 W/DC	
Electrical life (AC1):	100.000 ops.	
Number of contacts 2 (3):	x	2x chang./DPDT (AgNi)
Current rating:	x	8 A/AC1; 1/2 HP 240Vac; PD. B300
Breaking capacity:	x	2000 VA/AC1, 192 W/DC
Electrical life (AC1):	x	50.000 ops.
Switching voltage:	250 V AC/24 V DC	
Max. power dissipation:	1.2 W	2.4 W
Output indication:	multifunction red LED	
Mechanical life:	10.000.000 ops.	
Control		
Control. terminals:	A1-S	
Load between S-A2:	Yes	
Impulse length:	min. 25 ms/max. unlimited	
Reset time:	max. 150 ms	
Other information		
Operating temperature:	-20 .. +55 °C (-4 .. 131 °F)	
Storage temperature:	-30 .. +70 °C (-22 .. 158 °F)	
Dielectric strength:		
supply - output 1	4kV AC	
supply - output 2 (3)	x	1kV AC
output 1 - output 2	x	1kV AC
output 2 - output 3	x	1kV AC
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):	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:	UNI - 62 g (2.2 oz.); 230 - 57 g (2 oz.)	UNI - 85 g (3oz.); 230 - 80 g (2.8 oz.)
Standards:	EN 61812-1	

- Multifunction time relay for universal use in automation, control and regulation or in house installations.
- Comfortable and well-arranged function and time-range setting by rotary switches.
- Multifunction red LED flashes or shines depending on the operating status.

Description



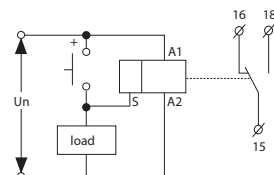
Connection



CRM-93H:
 The potential difference between the supply terminals (A1-A2), output contact 2 (25-26-28) and output contact 3 (35-36-38) must be a maximum of 250V AC rms/DC.

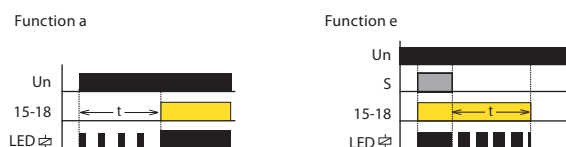
Possibility to connect load onto controlling input

It is possible to connect the load (e.g.: contactor) between terminals S-A2, without any interruption of correct relay function.



Indication of operating states

Examples of signaling



Function

Function (page 15).

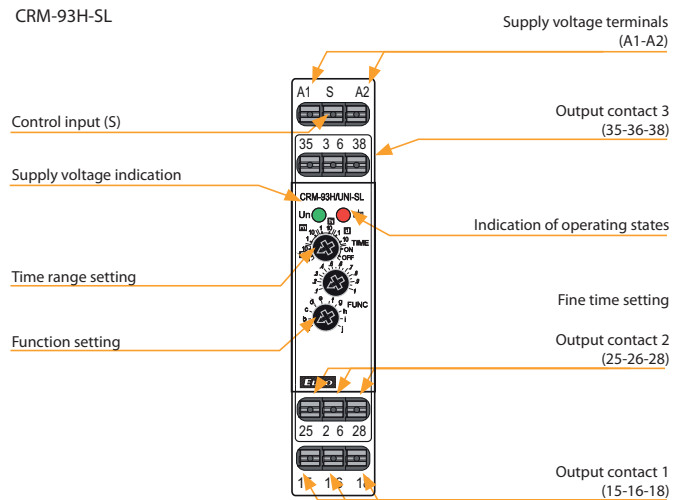


EAN code
CRM-91H/UNI-SL: 8595188184816
CRM-93H/UNI-SL: 8595188184823

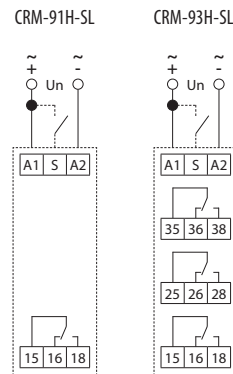
Technical parameters	CRM-91H-SL	CRM-93H-SL
Power supply		
Supply terminals:	A1-A2	
Supply voltage:	AC/DC 12 – 240 V (AC 50-60 Hz)	
Consumption (max.):	2 VA/1.5 W	2.5 VA/1.5 W
Supply voltage tolerance:	-15 %; +10 %	
Time circuit		
Number of functions:	10	
Time ranges:	0.1 s – 10 days	
Time setting:	rotary switch and potentiometer	
Time deviation:	5 % – mechanical setting	
Repeat accuracy:	0.2 % – set value stability	
Temperature coefficient:	0.01 %/°C, at = 20 °C (0.01 %/°F, at = 68 °F)	
Output		
Output contact 1:	1x changeover/SPDT (AgNi)	
Current rating:	16 A/AC1; 1 HP 240 Vac, 1/2 HP 120 Vac; PD. B300	
Breaking capacity:	4000 VA/AC1, 384 W/DC1	
Electrical life (AC1):	100.000 ops.	
Output contact 2 (3):	x	2x chang./DPDT (AgNi)
Current rating:	x	8 A/AC1; 1/2 HP 240Vac; PD. B300
Breaking capacity:	x	2000 VA/AC1, 192 W/DC
Electrical life (AC1):	x	50.000 ops.
Switching voltage:	250 V AC/24 V DC	
Power dissipation (max.):	1.2 W	2.4 W
Mechanical life:	10.000.000 ops.	
Control		
Control terminals:	A1-S	
Load between S-A2:	Yes	
Impulse length:	min. 25 ms / max. unlimited	
Reset time:	max. 150 ms	
Other information		
Operating temperature:	-20 .. +55 °C (-4 .. 131 °F)	
Storage temperature:	-30 .. +70 °C (-22 .. 158 °F)	
Dielectric strength:		
supply – output 1	4 kV AC	
supply – output 2 (3)	x	1 kV AC
output 1 – output 2	x	1 kV AC
output 2 – output 3	x	1 kV AC
Operating position:	any	
Mounting:	DIN rail EN 60715	
Protection degree:	IP40 front panel / IP20 terminals	
Overvoltage category:	III.	
Pollution degree:	2	
Connected wire cross-section (mm ²):	solid wire max. 1x 2.5, 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:	58 g (1.86 oz)	
Standards:	EN 61812-1	

- Multi-function time relay for universal use in automation, control and regulation or in house installations
- Universal supply voltage AC/DC 12 – 240V
- Easy connection with screw-less terminals
- Comfortable and well-arranged function and time-range setting by rotary switches.
- Time scale 0.1 s - 10 days divided into 10 ranges: (0.1 s - 1 s / 1 s - 10 s / 0.1 min - 1 min / 1 min - 10 min / 0.1 hrs - 1 h / 1 h - 10 hrs / 0.1 day - 1 day / 1 day - 10 days / only ON / only OFF)
- Output contact:
 - CRM-91H-SL: 1x changeover / SPDT 16A
 - CRM-93H-SL: 1x changeover / SPDT 16A, 2x changeover / DPDT 8A
- Multifunction red LED flashes or shines depending on the operating states

Description



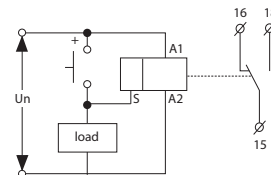
Connection



CRM-93H-SL:
The potential difference between the supply terminals (A1-A2), output contact 2 (25-26-28) and output contact 3 (35-36-38) must be a maximum of 250V AC rms/DC.

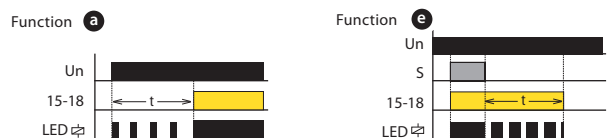
Possibility to connect load onto controlling input

It is possible to connect the load (e.g.: contactor) between terminals S-A2, without any interruption of correct relay function.



Indication of operating states

Signaling examples:



Function

Function (page 15).



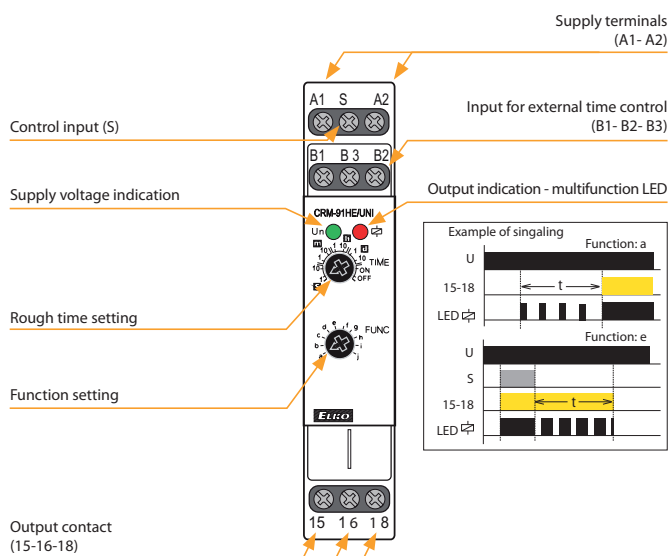
EAN code
CRM-91HE/UNI:8595188118958
CRM-91HE/UNI + potentiometer: 8595188142052
Potentiometer: 859232367967

Technical parameters	CRM-91HE
Number of functions:	10
Supply terminals:	A1 - A2
Supply voltage:	AC/DC 12 - 240 V (AC 50-60 Hz)
Consumption (max.):	3 VA/1.7 W
Max. dissipated power:	4 W (Un + terminals)
Supply voltage tolerance:	-15 %; +10 %
Supply indication:	green LED
Time ranges:	0.1 s - 10 days
Time setting:	rotary switch, external potentiometer
Time deviation:	5 % - mechanical setting
Repeat accuracy:	0.2 % - set value stability
Temperature coefficient:	0.01 %/°C, at = 20°C (0.01%/°F, at = 68°F)
Output	
Contact type:	1x changeover/SPDT (AgNi/Silver Alloy)
Current rating:	16 A/AC1; 1 HP 240 Vac, 1/2 HP 120 Vac; PD. B300
Breaking capacity:	4000 VA/AC1, 384 W/DC1
Inrush current:	30 A/<3 s
Switching voltage:	250V AC/24V DC
Output indication:	multifunction red LED
Mechanical life:	10.000.000 ops.
Electrical life (AC1):	100.000 ops.
Controlling	
Control voltage:	AC/DC 12 - 240 V (AC 50-60 Hz)
Consumption of input:	AC 0.025-0.2 VA/DC 0.1-0.7 W
Load between S-A2:	Yes
Glow-tubes:	No
Control. terminals:	A1-S
Impulse length:	min. 25 ms/max. unlimited
Reset time:	max. 150 ms
Other information	
Operating temperature:	-20 .. +55 °C (-4 .. 131 °F)
Storage temperature:	-30 .. +70 °C (-22 .. 158 °F)
Dielectrical strength:	AC 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
Cross-wire section - solid/ stranded with ferrule (mm ²):	max. 1x 2.5, 2x 1.5/ max. 1x 2.5 (AWG 12)
Dimensions:	90 x 17.6 x 64 mm (3.5" x 0.7" x 2.5")
Weight:	75 g (2.6 oz)
Standards:	EN 61812-1

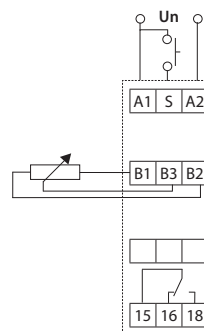
Technical parameters	Potentiometer
Potentiometer:	5 - 150kΩ, linear
Protection degree:	IP 65 front side / IP20 f back side
Max. cable size (mm ²):	1.5 with sleeve/without sleeve max. 2.5 (AWG 12)
Weight:	16 g (0.6 oz.)
Dimensions:	see page Accessories

- Control by external control unit - potentiometer (can be placed/mounted for example on switch board doors or in panel).
- 10 functions:
 - 5 time functions controlled by supply voltage
 - 4 time functions controlled by control input
 - 1 function of latching relay.
- Possible to connect external potentiometer - max. distance 10 m (32.8 ft.) from relay.

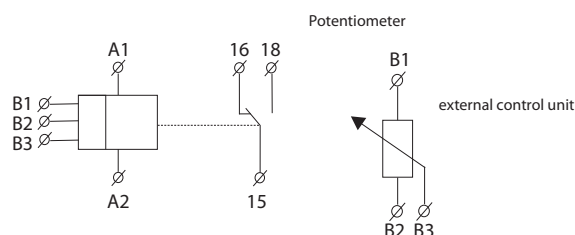
Description



Connection



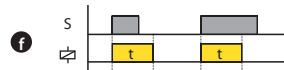
Symbol



Function



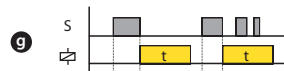
ON DELAY
When the input voltage U is applied, timing delay t begins. Relay contacts R change state after time delay is complete. Contacts R return to their shelf state when input voltage U is removed. Trigger switch is not used in this function.



SINGLE SHOT
Upon application of input voltage U, the relay is ready to accept trigger signal S. Upon application of the trigger signal S, the relay contacts R transfer and the preset time t begins. During time-out, the trigger signal S is ignored. The relay resets by applying the trigger switch S when the relay is not energized.



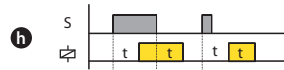
INTERVAL ON
When input voltage U is applied, relay contacts R change state immediately and timing cycle begins. When time delay is complete, contacts return to shelf state. When input voltage U is removed, contacts will also return to their shelfstate. Trigger switch is not used in this function.



SINGLE SHOT falling edge
Upon application of input voltage U, the relay is ready to accept trigger signal S. Upon application of the trigger signal S, the relay contacts R transfer and the preset time t begins. At the end of the preset time t, the relay contacts R return to their normal condition unless the trigger switch S is opened and closed prior to time out t (before preset time elapses). Continuous cycling of the trigger switch S at a rate faster than the preset time will cause the relay contacts R to remain closed. If input voltage U is removed, relay contacts R return to their shelf state.



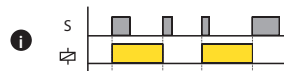
FLASHER - OFF first
When input voltage U is applied, time delay t begins. When time delay t is complete, relay contacts R change state for time delay t. This cycle will repeat until input voltage U is removed. Trigger switch is not used in this function.



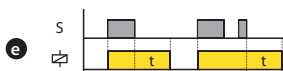
ON/OFF DELAY
Input voltage U must be applied continuously. When trigger switch S is closed, time delay t begins. When time delay t is complete, relay contacts R change state and remain transferred until trigger switch S is opened. If input voltage U is removed, relay contacts R return to their shelf state.



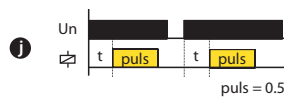
FLASHER - ON first
When input voltage U is applied, relay contacts R change state immediately and time delay t begins. When time delay t is complete, contacts return to their shelf state for time delay t. This cycle will repeat until input voltage U is removed. Trigger switch is not used in this function.



MEMORY LATCH
Input voltage U must be applied continuously. Output changes state with every trigger switch S closure. If input voltage U is removed, relay contacts R return to their shelf state.



OFF DELAY
Input voltage U must be applied continuously. When trigger switch S is closed, relay contacts R change state. When trigger switch S is opened, delay t begins. When delay t is complete, contacts R return to their shelf state. If trigger switch S is closed before time delay t is complete, then time is reset. When trigger switch S is opened, the delay begins again, and relay contacts R remain in their energized state. If input voltage U is removed, relay contacts R return to their shelf state.



PULSE GENERATOR
Upon application of input voltage U, a single output pulse of 0.5 seconds is delivered to relay after time delay t. Power must be removed and reapplied to repeat pulse. Trigger switch is not used in this function.



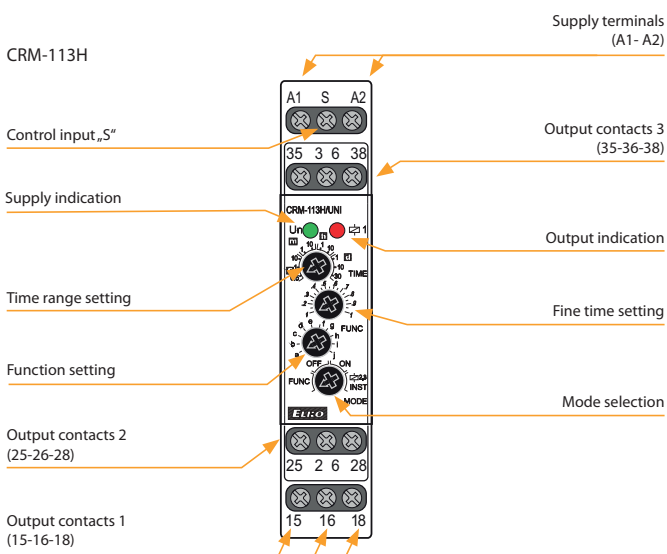
EAN code
 CRM-111H/UNI: 8595188175548
 CRM-113H/UNI: 8595188180634

Technical parameters	CRM-111H	CRM-113H
Power supply		
Supply terminals:	A1 - A2	
Voltage range:	AC/DC 12 - 240 V (AC 50/60 Hz)	
Power input (max.):	2 VA/1.5 W	2.5 VA/1.5 W
Supply voltage tolerance:	-15 %; +10 %	
Supply indication:	green LED	
Time circuit		
Number of functions:	11	10
Time ranges:	50 ms - 30 days	
Time setting:	rotary switches and potentiometers	
Time deviation*:	5 % - mechanical setting	
Repeat accuracy:	0.2 % - set value stability	
Temperature coefficient:	0.01 %/°C, at = 20 °C (0.01 %/°F, at = 68 °F)	
Output		
Number of contacts 1:	1x changeover/SPDT (AgNi)	
Current rating:	16 A/AC1; 1 HP 240 Vac, 1/2 HP 120 Vac; PD. B300	
Breaking capacity:	4000 VA/AC1, 384 W/DC	
Electrical life (AC1):	100.000 ops.	
Number of contacts 2 (3):	x	2x chang./DPDT (AgNi)
Current rating:	x	8 A/AC1; 1/2 HP 240Vac; PD. B300
Breaking capacity:	x	2000 VA/AC1, 192 W/DC
Electrical life (AC1):	x	50.000 ops.
Switching voltage:	250V AC/24 V DC	
Max. power dissipation:	1.2 W	2.4 W
Output indication:	multifunction red LED	
Mechanical life:	10.000.000 ops.	
Control		
Control terminals:	A1-S	
Load between S-A2:	Yes	
Impulse length:	min. 25 ms/max. unlimited	
Reset time:	max. 150 ms	
Other information		
Operating temperature:	-20 .. +55 °C (-4 .. 131 °F)	
Storage temperature:	-30 .. +70 °C (-22 .. 158 °F)	
Dielectric strength:		
supply - output 1	4kV AC	
supply - output 2 (3)	x	1kV AC
output 1 - output 2	x	1kV AC
output 2 - output 3	x	1kV AC
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):	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.)	85 g (3 oz.)
Standards:	EN 61812-1	

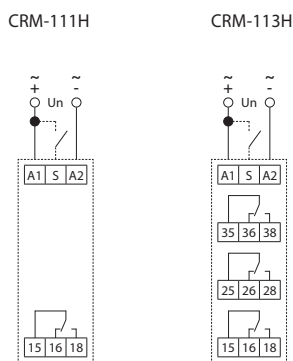
* for adjustable delay <100 ms, a time deviation of ± 10 ms applies

- Multifunction time relay for universal use in automation, control and regulation or in house installations.
- All functions initiated by the supply voltage, except for the flasher function, can use the control input to inhibit the delay (pause).
- Mode selection - according to the set function, permanently closed, permanently open, function of MEMORY LATCH with delay (CRM-111H)/switching of the second output contact according to supply voltage (CRM-113H).
- Multifunction red LED flashes or shines depending on the operating status.

Description

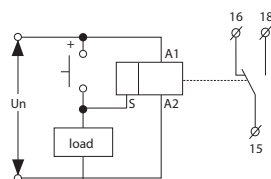


Connection



Possibility to connect load onto controlling input

It is possible to connect the load (e.g.: contactor) between terminals S-A2, without any interruption of correct relay function.



Indication of operating states



Mode selection

FUNC. Settings function mode

The desired function a-j is set with the FUNC rotary switch.

OFF. Output contact open mode



ON. Output contact closed mode



k. Function: MEMORY LATCH with delay (Only for CRM-111H)



When the supply voltage is applied, the relay is open. If the control contact is closed, the relay closes and the time delay T starts. It does not matter the length of the control pulse. When the timing is complete, the relay opens. If the control contact is closed during timing, the relay opens immediately. Each time the control contact closes during relay timing, it changes status.

2,3 INST. Second and third output contact instantaneous (Only for CRM-113H)



The second output contact switches according to the supply voltage. The first output contact switches according to the function (a-j) set by the trimmer FUNC.

Function

Function (page 19).



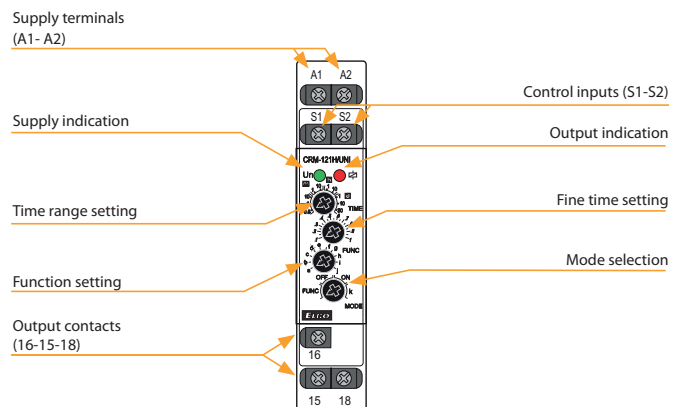
EAN code
CRM-121H/UNI: 8595188175555

Technical parameters		CRM-121H
Power supply		
Supply terminals:	A1 - A2	
Voltage range:	AC/DC 12 - 240 V (AC 50-60 Hz)	
Power input (max.):	2 VA/1.5W	
Supply voltage tolerance:	-15 %; +10 %	
Supply indication:	green LED	
Time circuit		
Number of functions:	11	
Time ranges:	50 ms - 30 days	
Time setting:	rotary switch and potentiometer	
Time deviation:*	5 % - mechanical setting	
Repeat accuracy:	0.2 % - set value stability	
Temperature coefficient:	0.01 %/°C, at = 20 °C (0.01 %/°F, at = 68 °F)	
Output		
Number of contacts	1x changeover/SPDT (AgNi)	
Current rating:	16 A/AC1; 1 HP 240 Vac, 1/2 HP 120 Vac; PD. B300	
Breaking capacity:	4000 VA/AC1, 384 W/DC	
Switching voltage:	250 V AC/24 V DC	
Max. power dissipation:	1.2 W	
Output indication:	multifunction red LED	
Mechanical life:	10.000.000 ops.	
Electrical life (AC1):	100.000 ops.	
Control		
Control terminals:	S1-S2	
Impulse length:	min. 25 ms/max. unlimited	
Reset time:	max. 150 ms	
Other information		
Operating temperature:	-20 .. +55 °C (-4 ..131 °F)	
Storage temperature:	-30 .. +70 °C (-22 ..158 °F)	
Dielectric strength:	4 kV AC (supply - output) 4 kV AC (supply - control input)	
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 ²):	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:	72 g (2.5 oz.)	
Standards:	EN 61812-1	

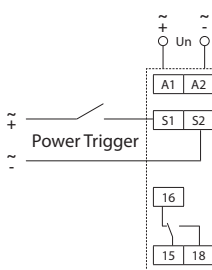
* for adjustable delay <100 ms, a time deviation of ± 10 ms applies

- Multifunction time relay for universal use in automation, control and regulation or in house installations.
- Galvanically separated control input (Power Trigger).
- All functions initiated by the supply voltage, except for the flasher function, can use the control input to inhibit the delay (pause).
- Mode selection - according to the set function, permanently closed, permanently open, function of MEMORY LATCH with delay.
- Time scale 50 ms - 30 days divided into 10 ranges.
- Multifunction red LED flashes or shines depending on the operating status.

Description

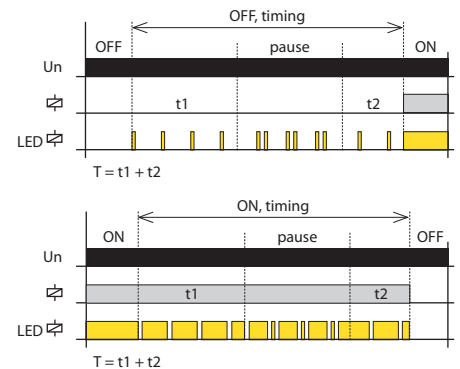


Connection



(Range of control voltage same as supply voltage)

Indication of operating states



Mode selection

FUNC. Settings function mode

The desired function a-j is set with the FUNC rotary switch.

OFF. Output contact open mode



ON. Output contact closed mode



k. Function: MEMORY LATCH with delay



When the supply voltage is applied, the relay is open. If the control contact is closed, the relay closes and the time delay T starts. It does not matter the length of the control pulse. When the timing is complete, the relay opens. If the control contact is closed during timing, the relay opens immediately. Each time the control contact closes during relay timing, it changes status.

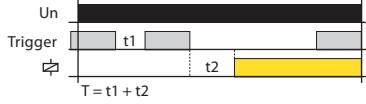
Function

a. ON DELAY



When the supply voltage is applied, the time delay T begins. When the timing is complete, the relay closes and this condition continues until the supply voltage is disconnected.

ON DELAY with Inhibit



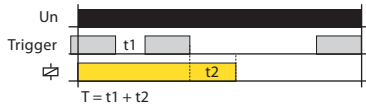
If the control contact is closed and the supply voltage is connected, the relay is opened and timing does not start until the control contact opens. When the timing is complete, the relay closes. If the control contact is closed during timing, the timing is interrupted and continues only after the control contact opens.

b. INTERVAL ON



After supply voltage relay closes and starts the delay time T. After the end of the timing relay opens and this state lasts until the supply voltage is disconnected.

INTERVAL ON with Inhibit



If the control contact is closed and the supply voltage is connected, the relay will close and the timing will start only after the control contact has been opened. When the timing is complete, the relay opens. If the control contact is closed during timing, the timing is interrupted and continues only after the control contact opens.

c. FLASHER - ON first



After supply voltage relay closes and starts the delay time T. After the end of the timing relay opens and again runs delay time T. When the timing is complete, the relay closes again and the sequence is repeated until the supply voltage is disconnected. If the control contact is closed during timing, this does not affect the operation of the cycler.

FLASHER - OFF first



If the control contact is closed during timing; this does not affect the operation of the cycler. If the control contact is closed and the supply voltage is connected, the cycler starts with a pause (relay open).

d. MEMORY LATCH



When the supply voltage is applied, the relay is open. When the control contact is closed, the relay closes. When the control contact is opened, the status does not change until the control contact is opened. When the control contact is closed again, the relay opens. Each time the control contact is closed, the relay changes status.

e. OFF DELAY



When the supply voltage is applied, the relay is open. When the control contact is closed, the relay closes. When the control contact opens, the time delay T begins. If the control contact is closed during timing, the time is reset and the relay remains closed. When the control contact opens, the time delay T starts again and opens when the relay closes.

f. SINGLE SHOT



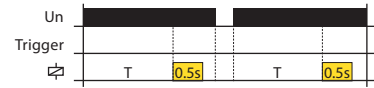
When the supply voltage is applied, the relay is open. When the control contact is closed, the relay closes and the time delay T begins. Closing the control contact during timing is ignored.

g. WATCHDOG



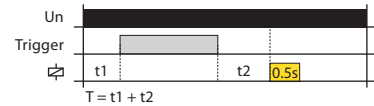
When the supply voltage is applied, the relay is open. When the control contact is closed, the relay closes and the time delay T begins. Closing the control contact during timing triggers a new time delay T - the relay closing time is thus increased.

h. PULSE GENERATOR 0.5 s



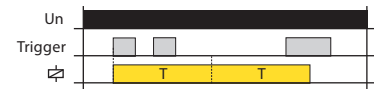
After the supply voltage has been applied, the time delay T begins. When the timing is complete, the relay closes for a fixed time (0.5 s).

PULSE GENERATOR 0.5 s with Inhibit



After supply voltage starts the time delay T. By closing timing of the control contact during timing is suspended. When the control contact opens, the time interval is completed and the relay closes for a fixed time (0.5 s).

i. INTERVAL ON/OFF



When the supply voltage is applied, the relay is open. When the control contact is closed, the relay closes and the time delay T begins. When the control contact is opened, the relay closes and the time delay T begins. If the control contact is open during timing, the relay remains closed for 2T. When the timing is complete, the relay opens. Any other change of control contact status during timing is ignored.

j. ON/OFF DELAY



When the supply voltage is applied, the relay is open. If control contact is closed, time delay T starts. When the control contact is opened, a new time delay T begins. If the control contact is open during timing, the relay closes at the end of the timing and opens the relay after the new time delay. Any other change of control contact status during timing is ignored.



EAN code
CRM-131H/UNI: 8595188175562

Technical parameters

CRM-131H

Power supply

Supply terminals:	A1 - A2
Voltage range:	AC/DC 12 - 240 V (AC 50-60 Hz)
Power input (max.):	2 VA/1.5W
Supply voltage tolerance:	-15 %; +10 %
Supply indication:	green LED

Time circuit

Number of functions:	11
Time ranges:	50 ms - 30 days
Time setting:	rotary switch and potentiometer
Time deviation*:	5 % - mechanical setting
Repeat accuracy:	0.2 % - set value stability
Temperature coefficient:	0.01 %/°C, at = 20 °C (0.01 %/°F, at = 68 °F)

Output

Number of contacts	1x changeover/SPDT (AgNi)
Current rating:	16 A/AC1; 1 HP 240 Vac, 1/2 HP 120 Vac; PD. B300
Breaking capacity:	4000 VA/AC1, 384 W/DC
Switching voltage:	250 V AC/24 V DC
Max. power dissipation:	1.2 W
Output indication:	multifunction red LED
Mechanical life:	10.000.000 ops.
Electrical life (AC1):	100.000 ops.

Control

Load between I, S, R - A2:	Yes
Control terminals:	I, S, R - A1
Impulse length:	min. 25 ms/max. unlimited
Reset time:	max. 150 ms

Other information

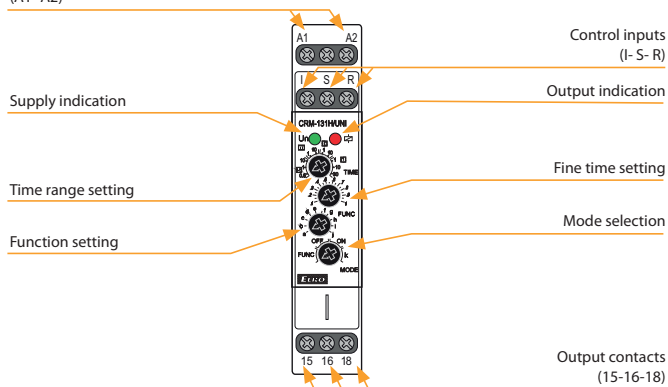
Operating temperature:	-20 .. +55 °C (-4 .. 131 °F)
Storage temperature:	-30 .. +70 °C (-22 .. 158 °F)
Dielectric strength:	4 kV AC (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP40 from front panel/IP20 terminals
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm ²):	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:	61 g (2.2 oz.)
Standards:	EN 61812-1

* for adjustable delay <100 ms, a time deviation of ± 10 ms applies

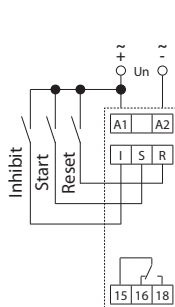
- Multifunction time relay for universal use in automation, control and regulation or in house installations.
- Three control inputs - START, INHIBIT, RESET.
- Mode selection - according to the set function, permanently closed, permanently open, function of MEMORY LATCH with delay.
- Multifunction red LED flashes or shines depending on the operating status.

Description

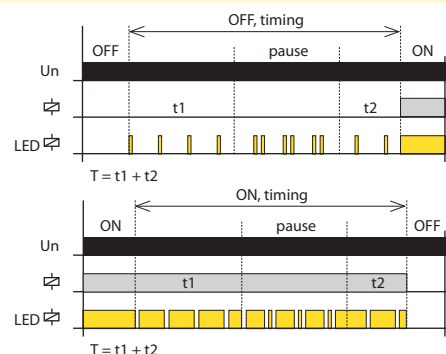
Supply terminals
(A1 - A2)



Connection



Indication of operating states



Mode selection

FUNC. Settings function mode

The desired function a-j is set with the FUNC rotary switch.

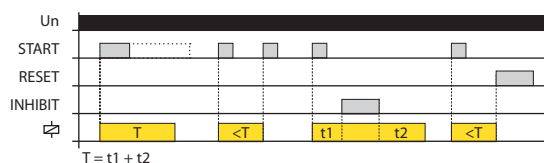
OFF. Output contact open mode



ON. Output contact closed mode



k. MEMORY LATCH with delay



When the supply voltage is applied, the relay is open. If the START control contact is closed, the relay closes and the time delay T starts. It does not matter the length of the control pulse. When the timing is complete, the relay opens. If the START control contact is closed during timing, the relay opens immediately. Each time the control contact is closed during relay timing, it changes status. Closing the INHIBIT control contact pauses the timing, after opening the INHIBIT control contact the timing continues from the moment of interruption. Closing the RESET control contact immediately ends the timing and the relay opens, just like as when the supply voltage is disconnected.

Function

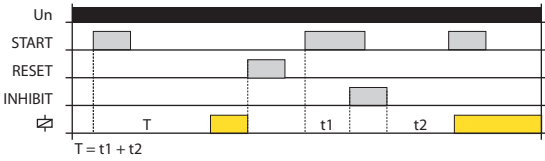
Control input function description:

- Contact START starts the time function
- INHIBIT contact pauses timing (pause)
- The RESET contact simulates switching the supply voltage on and off

Same for all features:

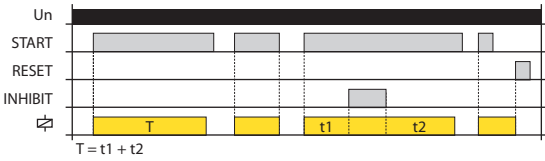
- If the control contact START is closed and the supply voltage is connected, the time function is activated when the supply voltage is connected.
- Closing the control contact INHIBIT pauses the timing, after opening the control contact INHIBIT timing continues from the moment of interruption.
- If the INHIBIT control contact is closed, the START control contact is activated and the timing is paused.
- Closing the control contact RESET immediately terminates the timing and the relay opens, just as when the supply voltage is disconnected.
- If the control contact RESET is closed and then the control contact START is closed, the time function is activated when the control contact RESET is opened as well as when the supply voltage is connected.

a. ON DELAY with Control Signal



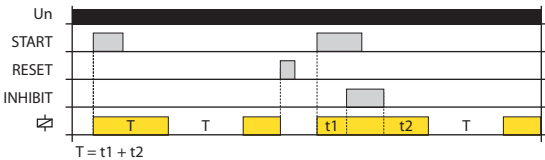
When the supply voltage is applied, the relay is open. If the control contact START is closed, the time delay T starts. The closing of the START control contact during timing is ignored.

b. INTERVAL ON with Control Signal



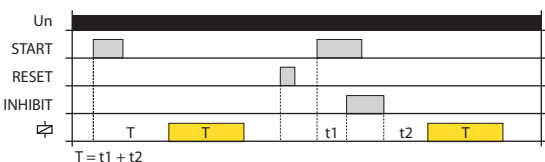
When the supply voltage is applied, the relay is open. When the control contact START is closed, the relay closes and the time delay T begins. If the START control contact is open during timing, the time interval is immediately terminated and the relay opens.

c. FLASHER - ON first with Control Signal



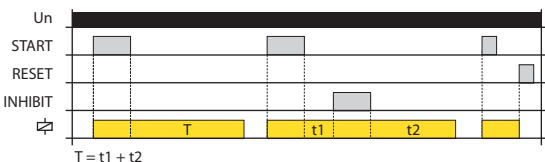
When the supply voltage is applied, the relay is open. When the START control contact is closed, the relay energizes and starts the delay time T. After the end of the timing relay opens and again runs delay time T. Upon completion timing again switches, and the sequence is repeated until the supply voltage is disconnected.

d. FLASHER - OFF first with Control Signal



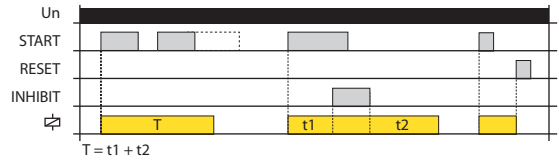
When the supply voltage is applied, the relay is open. When the START control contact is closed, starts the time delay T. After the end of the timing relay closes and again runs delay time T. After the end of the timing relay opens and the sequence is repeated until the supply voltage is disconnected.

e. OFF DELAY



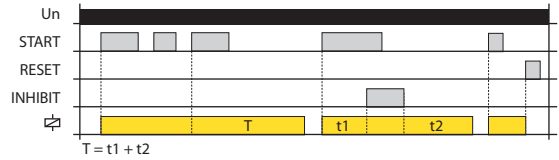
When the supply voltage is applied, the relay is open. If the control contact START is closed, the relay closes. After tripping Contact Start starts the delay time T. After the end of the timing relay is switched off.

f. SINGLE SHOT



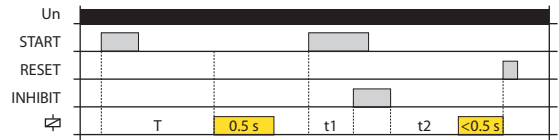
When the supply voltage is applied, the relay is open. When the START control contact is closed, the relay energizes and starts the delay time T. After the end of the timing relay is switched off. The closing of the START control contact during timing is ignored.

g. WATCHDOG



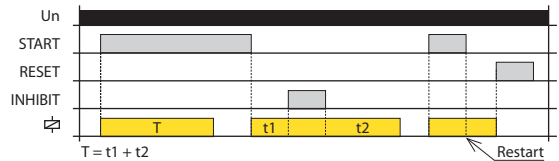
When the supply voltage is applied, the relay is open. When the START control contact is closed, the relay energizes and starts the delay time T. After the end of the timing relay is switched off. Closing control contact START during timing triggers a new time delay T - the relay closing time is thus increased.

h. PULSE GENERATOR 0.5 s with Control Signal

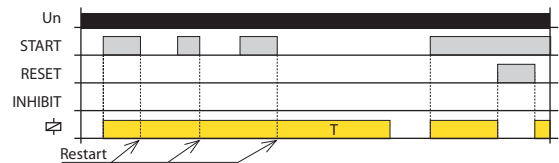


When the supply voltage is applied, the relay is open. When the START control contact is closed, starts the time delay T. After the end of the timing relay switches for the fixed time (0.5 sec).

i. INTERVAL ON/OFF

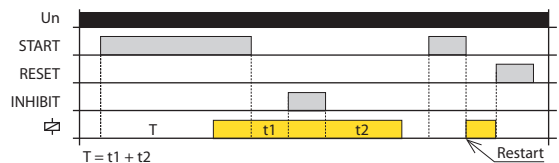


When the supply voltage is applied, the relay is open. When the START control contact is closed, the relay energizes and starts the delay time T. After the end of the timing relay is switched off. By opening the control contact start relay again closes and starts the delay time T. After the end of the timing relay is switched off.

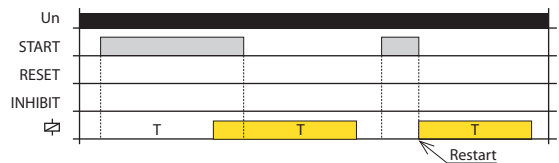


If the START control contact is open during timing, a restart occurs - the relay remains closed and a new time delay T begins. When the timing is complete, the relay opens.

j. ON/OFF DELAY



When the supply voltage is applied, the relay is open. When the START control contact is closed, starts the time delay T. After the end of the timing relay switches. Opening the control contact START starts a new time delay T. When the timing is complete, the relay opens.



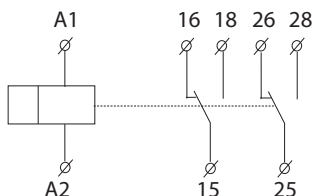
If the START control contact is open during timing, a restart occurs - the relay closes and a new time delay T begins. When the timing is complete, the relay opens.



EAN code
CRM-82TO/UNI: 8595188137614

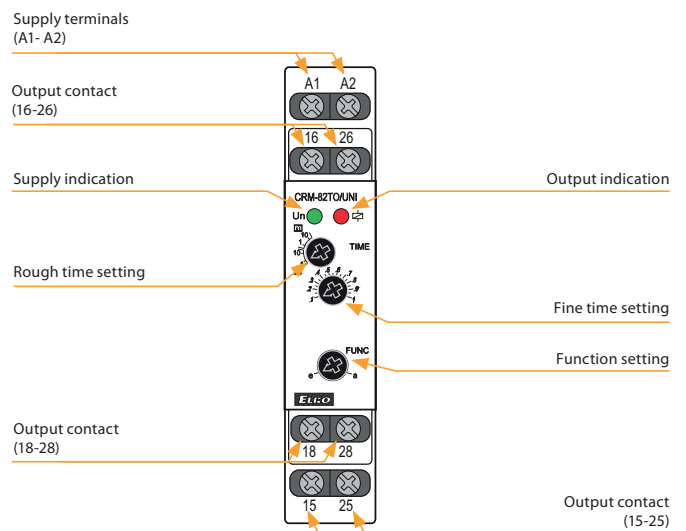
Technical parameters		CRM-82TO
Number of functions:	a - TRUE OFF DELAY / e - ON DELAY	
Supply terminals:	A1 - A2	
Voltage range:	AC/DC 12 - 240 V (AC 50-60 Hz)	
Burden (max.):	3 VA / 1.7 W	
Max. dissipated power (Un + terminals):	2.5 W	
Supply voltage tolerance:	-15 %; +10 %	
Supply indication:	green LED	
Time ranges:	0.1 s - 10 min	
Time setting:	potentiometer	
Time deviation:	5 % - mechanical setting	
Repeat accuracy:	0.2 % - set value stability	
Temperature coefficient:	0.1 %/°C, at = 20 °C (0.1 %/°F, at = 68 °F)	
Output		
Number of contacts:	2x changeover/DPDT (AgNi/Silver Alloy)	
Current rating:	8 A/AC1; 1/2 HP 240 Vac; PD. B300	
Breaking capacity:	2000 VA/AC1, 192 W/DC	
Inrush current:	10 A/<3 s	
Switching voltage:	250 V AC/24 V DC	
Output indication:	red LED	
Mechanical life:	2.000.000 ops.	
Electrical life (AC1):	200.000 ops.	
Other information		
Operating temperature:	-20 .. 55 °C (-4 .. 131 °F)	
Storage temperature:	-30 .. 70 °C (-22 .. 158 °F)	
Dielectric 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 ²):	solid wire max. 2x 2.5 or 1x 4, with sleeve max. 2x 1.5 or 1x 2.5 (AWG 12)	
Dimensions:	90 x 17.6 x 64 mm (3.5" x 0.7" x 2.5")	
Weight:	73 g (2.6 oz.)	
Standards:	EN 61812-1	

Symbol



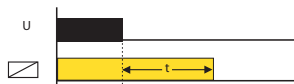
- „TRUE OFF DELAY“ relay starts timing after power supply failure. Example of use case: back-up source for DELAY OFF in case power supply failure. (e.g. emergency lighting, emergency respirator, or protection of el. controlled doors - in case of fire).
- 2 time functions adjustable by rotary switch:
a - delayed return after disconnecting of supply
e - delayed start.
- Time range (adjustable by rotary switch and fine setting by potentiometer): 0.1 s - 10 min.
- Interruptions in the power supply must take time steps (tens to hundreds of milliseconds).
- Output status indicated by red LED (only in case of supply voltage connection).

Description

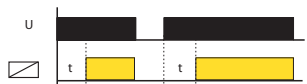


Function

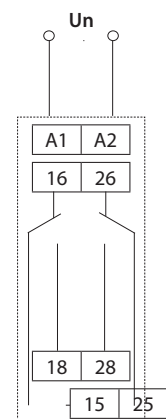
a - TRUE OFF DELAY



e - ON DELAY



Connection





EAN code
CRM-2T/230V: 8595188112291
CRM-2T/UNI: 8595188112437

Technical parameters CRM-2T

Power supply

Supply terminals:	A1 - A2
Voltage range:	AC/DC 12 - 240 V (AC 50-60 Hz)
Power input (max.):	2 VA/1.5 W
Voltage range:	AC 230 V (50-60 Hz)
Power input (max.):	AC 3 VA/1.4 W
Supply voltage tolerance:	-15 %; +10 %
Supply indication:	green LED

Function

Time scale:	t1: 0.1 s - 100 days, t2: 0.1 s - 1 s
Time setting:	rotary switch and potentiometer
Time deviation:	5% - mechanical setting
Repeat accuracy:	0.2 % - set value stability
Temperature coefficient:	0.01 %/°C, at = 20 °C (0.01 %/°F, at = 68 °F)

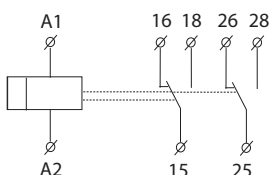
Output

Number of contacts:	2x changeover/SPDT (AgNi)
Current rating:	16 A/AC1; 1 HP 240 Vac, 1/2 HP 120 Vac; PD. B300
Breaking capacity:	4000 VA/AC1, 384 W/DC
Inrush current:	30 A/< 3 s
Switching voltage:	250 V AC/24 V DC
Max. power dissipation:	1.2 W
Output indication:	multifunction red LED
Mechanical life:	10.000.000 ops.
Electrical life (AC1):	100.000 ops.
Reset time:	max. 150 ms

Other information

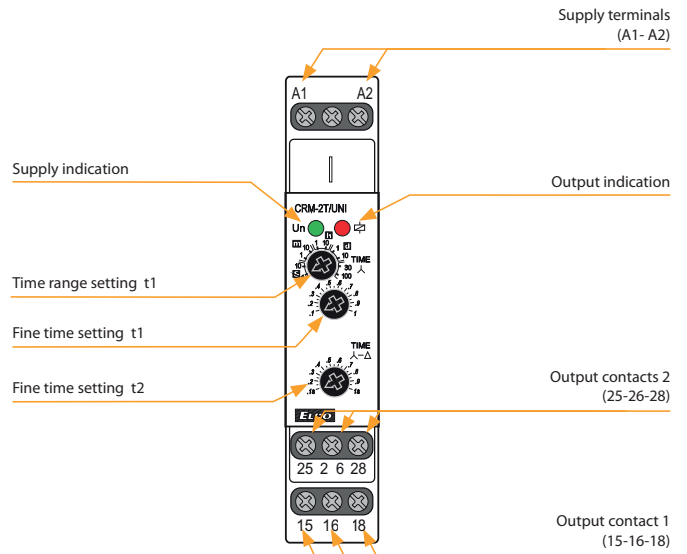
Operating temperature:	-20 .. 55 °C (-4 .. 131 °F)
Storage temperature:	-30 .. 70 °C (-22 .. 158 °F)
Dielectric strength:	
supply - output 1	4 kV AC
supply - output 2	4 kV AC
output 1 - output 2	4 kV AC
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP40 from front panel/IP20 terminals
Overvoltage category:	III.
Pollution degree:	2
Terminal wire capacity (mm²):	max.1x 2.5, 2x1.5, 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:	UNI - 78 g (2.8 oz.), 230 - 73 g (2.6 oz.)
Standards:	EN 61812-1

Symbol



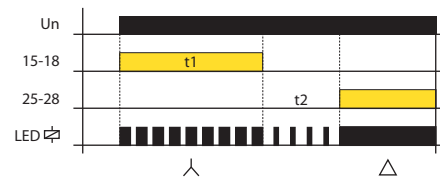
- It serves for delay ON of motors star/delta.
- Time t1 (star):
 - time range setting by rotary switch
 - fine time setting by potentiometer.
- Time t2 (delay) between λ/Δ
 - fine time setting by potentiometer.
- Multifunction red LED flashes or shines depending on the operating status.

Description



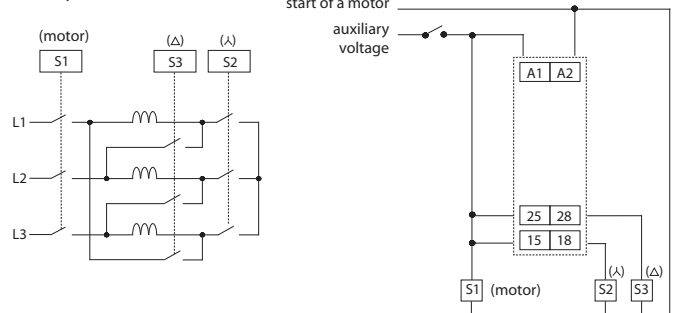
Function

STAR/DELTA timer



Connection

Start up of motor (λ - Δ)





EAN code

CRM-181J/UNI ZR: 8595188180382
 CRM-181J/UNI ZN: 8595188180399
 CRM-181J/UNI BL: 8595188180405
 CRM-181J/UNI OD: 8595188180412

CRM-183J/UNI ZR: 8595188180610
 CRM-183J/UNI ZN: 8595188180603
 CRM-183J/UNI BL: 8595188180580
 CRM-183J/UNI OD: 8595188180597

Technical parameters	CRM-181J	CRM-183J
Power supply		
Supply terminals:	A1 - A2	
Voltage range:	AC/DC 12 - 240 V (AC 50-60 Hz)	
Power input (max.):	2 VA/1.5 W	2.5 VA/1.5 W
Supply voltage tolerance:	-15 %; +10 %	
Supply indication:	green LED	
Time circuit		
Time ranges:	0.1 s - 100 h	
Time setting:	rotary switch and potentiometer	
Time deviation:	5 % - mechanical setting	
Repeat accuracy:	0.2 % - set value stability	
Temperature coefficient:	0.01%/°C, at =20 °C (0.01 %/°F, at = 68°F)	
Output		
Output contact 1:	1x changeover/SPDT (AgNi)	
Current rating:	16 A/AC1; 1 HP 240 Vac, 1/2 HP 120 Vac; PD. B300	
Breaking capacity:	4000 VA/AC1, 384 W/DC	
Electrical life (AC1):	100.000 ops.	
Output contact 2 (3):	x	2x chang./DPDT (AgNi)
Current rating:	x	8 A/AC1; 1/2 HP 240Vac; PD. B300
Breaking capacity:	x	2000 VA/AC1, 192 W/DC
Electrical life (AC1):	x	50.000 ops.
Switching voltage:	250 V AC/24 V DC	
Max. power dissipation:	1.2 W	2.4 W
Output indication:	multifunction red LED	
Mechanical life:	10.000.000 ops.	
Control		
Control terminals:	A1-S	
Load between S-A2:	Yes	
Impulse length:	min. 25 ms/max. unlimited	
Reset time:	max. 150 ms	
Other information		
Operating temperature:	-20 .. +55 °C (-4 .. 131 °F)	
Storage temperature:	-30 .. +70 °C (-22 .. 158 °F)	
Dielectric strength:		
supply - output 1	4 kV AC	
supply - output 2 (3)	x	1 kV AC
output 1 - output 2	x	1 kV AC
output 2 - output 3	x	1 kV AC
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):	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:	61 g (2.2 oz.)	84 g (3 oz.)
Standards:	EN 61812-1	

- Single function time relays are suitable for applications where there is a clear function requirement in advance and are suitable for universal use in automation, control and regulation or in house installations.
- Choice of four types: ZR, ZN, BL, OD.
- All functions initiated by the supply voltage can use the control input to inhibit the ongoing delay (pause).
- Multifunction red LED flashes or shines depending on the operating status.

Description

CRM-183J

Supply terminals
(A1 - A2)

Control input (S)

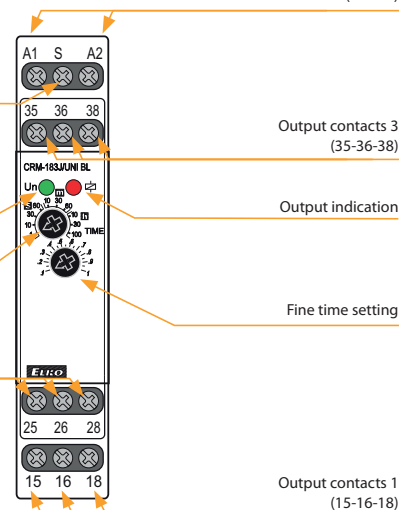
Output contacts 3
(35-36-38)

Supply indication

Output indication

Time range setting

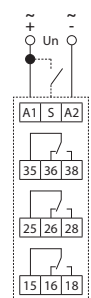
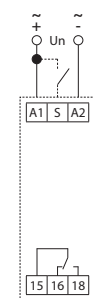
Fine time setting

Output contacts 2
(25-26-28)

Connection

CRM-181J

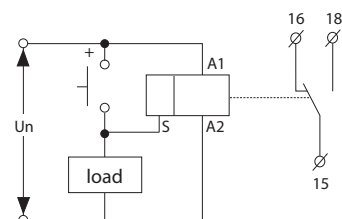
CRM-183J



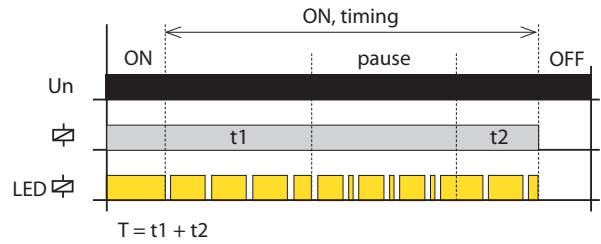
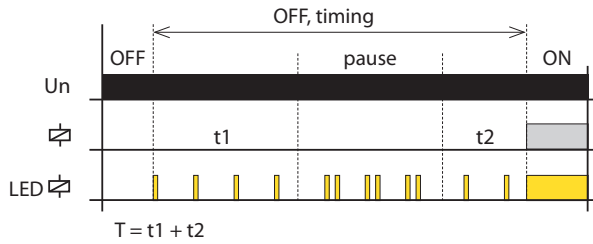
CRM-183J:
 The potential difference between the supply terminals (A1-A2), output contact 2 (25-26-28) and output contact 3 (35-36-38) must be a maximum of 250 V AC rms/DC.

Possibility to connect load onto controlling input

It is possible to connect the load (e.g.: contactor) between terminals S-A2, without any interruption of correct relay function.



Indication of operating states



Function

ZR: ON DELAY



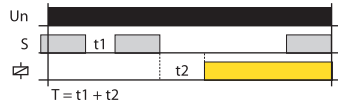
When the supply voltage is applied, the time delay T begins. When the timing is complete, the relay closes and this condition continues until the supply voltage is disconnected.

BL: FLASHER - ON first



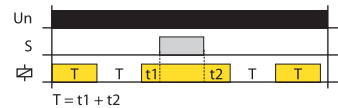
If the control contact is closed and the supply voltage is connected, the relay will close and the timing will start only after the control contact has been opened. When the timing is complete, the relay opens.

ON DELAY with Inhibit



If the control contact is closed and the supply voltage is connected, the relay is opened and timing does not start until the control contact opens. When the timing is complete, the relay closes. If the control contact is closed during timing, the timing is interrupted and continues only after the control contact opens.

FLASHER - ON first with Inhibit



If the control contact is closed during an active timer setting, the timing is interrupted and continues only after the control contact opens again.

ZN: INTERVAL ON



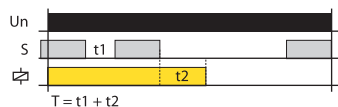
After supply voltage relay closes and starts the delay time T. After the end of the timing relay opens and this state lasts until the supply voltage is disconnected.

OD: OFF DELAY



When the supply voltage is applied, the relay is open. When the control contact is closed, the relay closes. When the control contact opens, the time delay T begins. If the control contact is closed during timing, the time is reset and the relay remains closed. When the control contact opens, the time delay T starts again and opens when the relay closes.

INTERVAL ON with Inhibit



If the control contact is closed and the supply voltage is connected, the relay will close and the timing will start only after the control contact has been opened. When the timing is complete, the relay opens. If the control contact is closed during timing, the timing is interrupted and continues only after the control contact opens.

Note:

ZR, ZN and BL functions are initiated by connecting the supply voltage to the product, i.e. In the event of a failure and recovery of the supply voltage, the relay automatically performs 1 cycle.

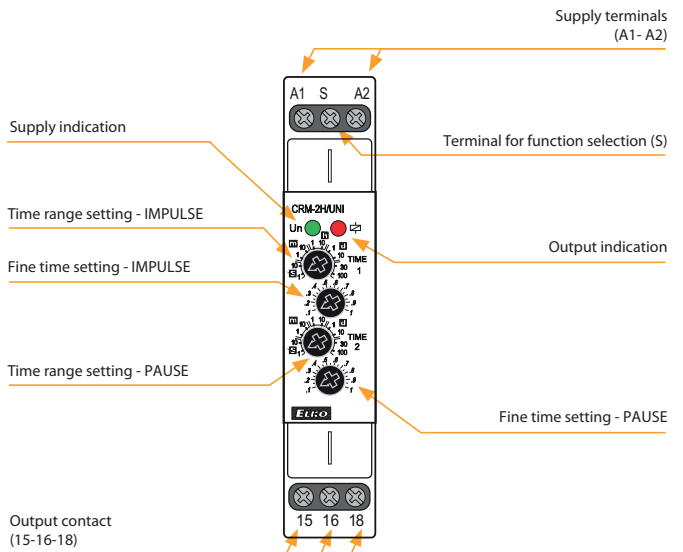


EAN code
CRM-2H/230V: 8595188124201
CRM-2H/UNI: 8595188113007

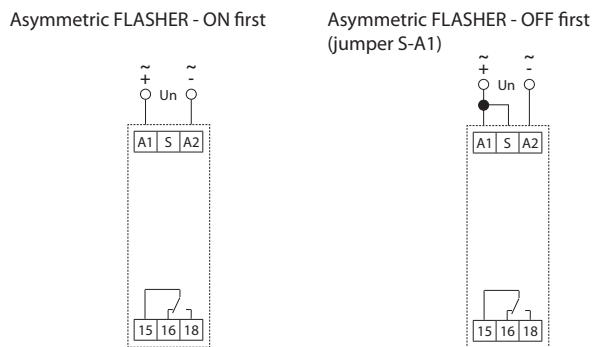
Technical parameters		CRM-2H
Power supply		
Supply terminals:		A1 - A2
Voltage range:	UNI	AC/DC 12 - 240 V (AC 50-60 Hz)
Power input (max.):		2 VA/1.5 W
Voltage range:	230	AC 230 V (50/60 Hz)
Power input (max.):		AC 3 VA/1.4 W
Supply voltage tolerance:		-15 %; +10 %
Supply indication:		green LED
Function		
Time scale:		0.1 s - 100 days
Time setting:		rotary switch and potentiometer
Time deviation:		5 % - mechanical setting
Repeat accuracy:		0.2 % - set value stability
Temperature coefficient:		0.01 %/°C, at = 20°C (0.01 %/°F, at = 68°F)
Output		
Number of contacts:		1x changeover/SPDT (AgNi)
Current rating:		16 A/AC1; 1 HP 240 Vac, 1/2 HP 120 Vac; PD. B300
Breaking capacity:		4000 VA/AC1, 384 W/DC
Inrush current:		30 A/< 3 s
Switching voltage:		250 V AC/24 V DC
Max. power dissipation:		1.2 W
Output indication:		multifunction red LED
Mechanical life:		10.000.000 ops.
Electrical life (AC1):		100.000 ops.
Reset time:		max. 150 ms
Other information		
Operating temperature:		-20 .. 55 °C (-4 .. 131 °F)
Storage temperature:		-30 .. 70 °C (-22 .. 158 °F)
Dielectric strength:		4 kV AC (supply - output)
Operating position:		any
Mounting:		DIN rail EN 60715
Protection degree:		IP40 from front panel/IP20 terminals
Overvoltage category:		III.
Pollution degree:		2
Terminal wire capacity (mm²):		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		UNI - 61 g (2.2 oz.), 230 - 58 g (2 oz.)
Standards:		EN 61812-1

- Flasher with independent adjustable switch ON and switch OFF.
- Used for regular room ventilation, cyclic dehumidification, light control, circulating pumps, illuminated advertising, etc.
- 2 time functions:
 - 1) Asymmetric FLASHER - ON first
 - 2) Asymmetric FLASHER - OFF first
- Function choice is done by an external jumper of terminals S-A1.
- Time scale 0.1 s - 100 days divided into 10 time ranges.
- Time range setting via rotary switch.
- Fine time setting by potentiometer.
- Multifunction red LED flashes or shines depending on the operating status.

Description

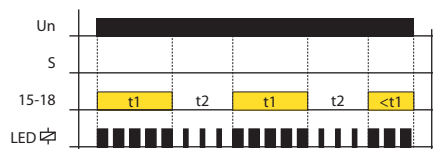


Connection

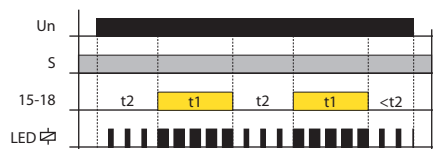


Function

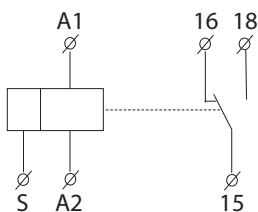
Asymmetric FLASHER - ON first



Asymmetric FLASHER - OFF first



Symbol





EAN code
 CRM-2HE/UNI: 8595188124553
 CRM-2HE/UNI + 2X potentiometer: 8595188142069
 Potentiometer: 859232367981

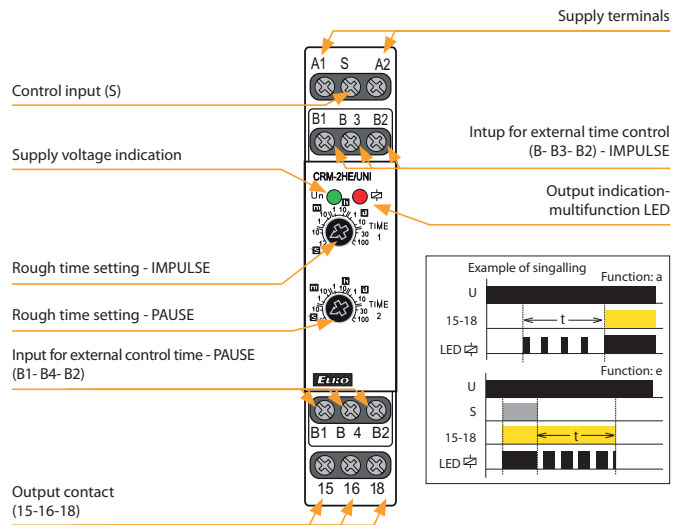
- Control by external control unit - potentiometer (can be placed/ mounted for example on switch board doors or in panel).
- Asymmetric cycler - 2 time functions:
 - flasher beginning with pulse
 - flasher beginning with gap.
- Function selected via external wired link on control input S-A1.
- Possible to connect external potentiometer - max. distance 10 m (32.8 ft.) from relay.

Technical parameters	CRM-2HE
Number of functions:	2
Supply terminals:	A1 - A2
Supply voltage:	AC/DC 12 - 240 V (AC 50-60 Hz)
Consumption (max.):	3 VA / 1.7 W
Max. dissipated power:	4 W (Un + terminals)
Supply voltage tolerance:	-15 %; +10 %
Supply indication:	green LED
Time ranges:	0.1 s - 100 days
Time setting:	rotary switch, external potentiometer
Time deviation:	5 % - mechanical setting
Repeat accuracy:	0.2 % - set value stability
Temperature coefficient:	0.01 %/°C, at = 20°C (0.01%/°F, at = 68°F)
Output	
Contact type:	1x changeover/SPDT (AgNi/Silver Alloy)
Current rating:	16 A/AC1; 1 HP 240 Vac, 1/2 HP 120 Vac; PD. B300
Breaking capacity:	4000 VA/AC1, 384 W/DC1
Inrush current:	30 A/<3 s
Switching voltage:	250 V AC/24 V DC
Output indication:	multifunction red LED
Mechanical life:	10.000.000 ops.
Electrical life (AC1):	100.000 ops.
Controlling	
Control voltage:	AC/DC 12 - 240 V (AC 50-60 Hz)
Consumption of input:	AC 0.025-0.2 VA/DC 0.1-0.7 W
Load between S-A2:	Yes
Glow-tubes:	No
Control terminals:	A1-S
Reset time:	max. 150 ms
Other information	
Operating temperature:	-20 .. +55 °C (-4 .. 131 °F)
Storage temperature:	-30 .. +70 °C (-22 .. 158 °F)
Dielectric strength:	AC 4 kV (supply - output)
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. 1x 2.5, 2x 1.5/ max. 1x 2.5 (AWG 12)
Dimensions:	90 x 17.6 x 64 mm (3.5" x 0.7" x 2.5")
Weight:	78 g (2.8 oz.)
Standards:	EN 61812-1

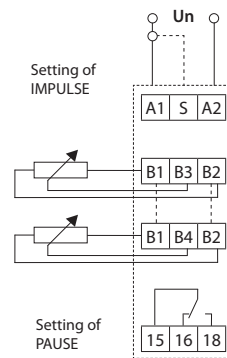
Potentiometer

Potentiometer:	10 - 150 kΩ, linear
Protection degree:	IP65 from front side/IP20 from back side
Max. cable size (mm²):	1.5 with sleeve/without sleeve max. 2.5 (AWG 12)
Weight:	16 g (0.6 oz.)
Dimensions:	see page Accessories

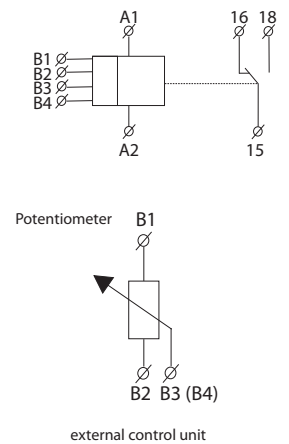
Description



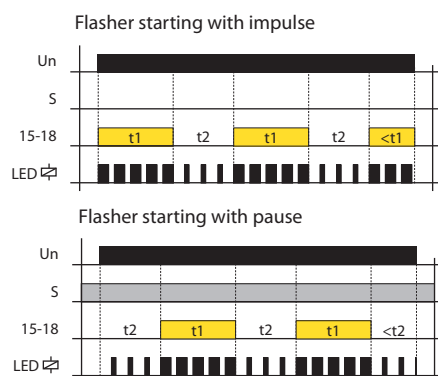
Connection



Symbol



Function





EAN code
PTRM-216TP/UNI: 8595188179386
PTRM-216KP/UNI: 8595188178617

Technical parameters	PTRM-216TP	PTRM-216KP
Power supply		
Power pins:	2, 10	
Voltage range:	AC/DC 12 – 240 V (AC 50-60 Hz)	
Power input (max.):	2.5 VA/1.5 W	
Supply voltage tolerance:	±10 %	
Supply indication:	green LED	
Time circuit		
Number of functions:	10	
Time ranges:	50 ms - 30 days	
Time setting:	rotary switch and potentiometer	
Time deviation:*	5 % - mechanical setting	
Repeat accuracy:	0.2 % - set value stability	
Temperature coefficient:	0.01 %/°C, at = 20 °C (0.01 %/°F, at = 68 °F)	
Output		
Number of contacts:	2x changeover/SPDT (AgNi)	
Current rating:	16 A/AC1; 1 HP 240 Vac, 1/2 HP 120 Vac; PD. B300	
Breaking capacity:	4000 VA/AC1, 384 W/DC	
Switching voltage:	250 V AC/24 V DC	
Max. power dissipation:	2.4 W	
Output indication:	multifunction red LED	
Mechanical life:	10.000.000 ops.	
Electrical life (AC1):	100.000 ops.	
Control		
Control pins:	5 (2) -6	
Impulse length:	min. 25 ms/max. unlimited	
Reset time:	max. 150 ms	
Other information		
Operating temperature:	-20 .. +55 °C (-4 .. 131 °F)	
Storage temperature:	-30 .. +70 °C (-22 .. 158 °F)	
Dielectric strength:		
supply - output 1 (1, 3, 4)	2.5 kV AC	
supply - output 2 (8, 9, 11)	2.5 kV AC	
output 1 - output 2	2.5 kV AC	
Operating position:	any	
Mounting:	11 pin octal socket	
Protection degree:	IP40 from front panel	
Overvoltage category:		
for supply voltage 12-150 V AC/DC	III.	
for supply voltage 150-240 V AC/DC	II.	
Pollution degree:	2	
Dimensions:	48x48x79mm (1.7"x1.7"x3.1")	48x48x89mm (1.7"x1.7"x3.5")
Weight:	111 g (3.9 oz.)	108 g (3.81 oz.)
Standards:	EN 61812-1	

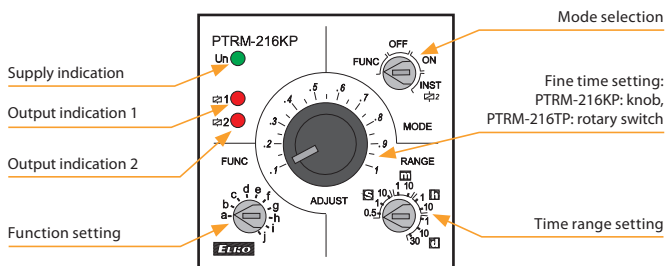
* for adjustable delay <100 ms, a time deviation of ± 10 ms applies

Function

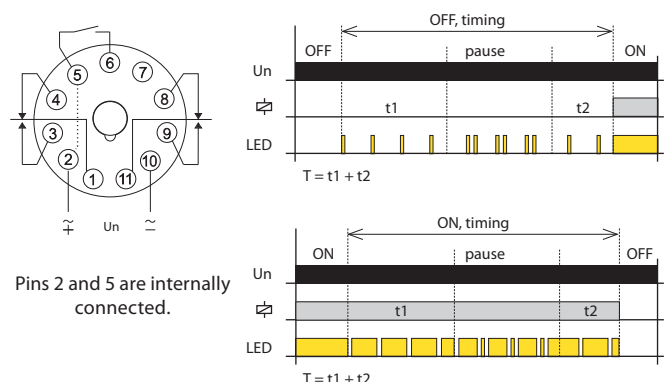
Functions (page 19).

- Multifunction time relay for universal use in automation, control and regulation or in house installations.
- Possibility to select the control element for fine time setting:
PTRM-216KP - knob, for easy handling without the need for tools
PTRM-216TP - rotary switch, for the possibility of using a sealable cover.
- All functions initiated by the supply voltage, except for the flasher function, can use the control input to inhibit the delay (pause).
- Mode selection - according to the set function, permanently closed, permanently open, and switching of the second output contact according to the supply voltage.
- Multifunction red LED flashes or shines depending on the operating status.

Description

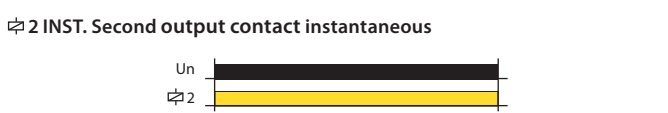
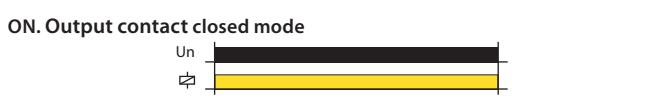
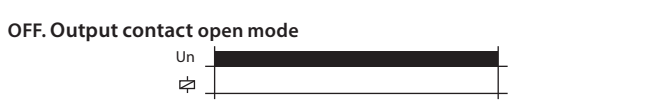


Connection Indication of operating states



Mode selection

FUNC. Settings function mode
The desired function a-j is set with the FUNC rotary switch.



The second output contact switches according to the supply voltage. The first output contact switches according to the function (a-j) set by the trimmer FUNC.



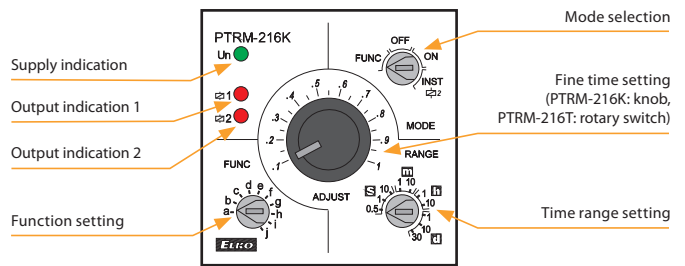
EAN code
 PTRM-216T/UNI: 8595188175586
 PTRM-216K/UNI: 8595188175579

- Multifunction time relay for universal use in automation, control and regulation or in house installations.
- Potential-free control input (Control Switch Trigger).
- Possibility to select the control element for fine time setting:
- **PTRM-216K** - knob, for easy handling without the need for tools.
- **PTRM-216T** - rotary switch, for the possibility of using a sealable cover.
- All functions initiated by the supply voltage, except for the flasher function, can use the control input to inhibit the delay (pause).
- Mode selection - according to the set function, permanently closed, permanently open, and switching of the second output contact according to the supply voltage.
- Multifunction red LED flashes or shines depending on the operating status.

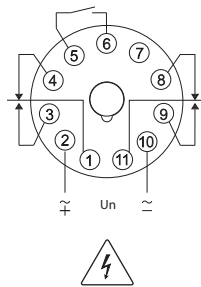
Technical parameters	PTRM-216T	PTRM-216K
Power supply		
Power pins:	2, 10	
Voltage range:	AC/DC 12 – 240 V (AC 50-60 Hz)	
Power input (max.):	2.5 VA/1.5 W	
Supply voltage tolerance:	±10 %	
Supply indication:	green LED	
Time circuit		
Number of functions:	10	
Time ranges:	50 ms - 30 days	
Time setting:	rotary switch and potentiometer	
Time deviation*:	5 % - mechanical setting	
Repeat accuracy:	0.2 % - set value stability	
Temperature coefficient:	0.01 %/°C, at = 20 °C (0.01 %/°F, at = 68 °F)	
Output		
Number of contacts:	2x changeover/SPDT (AgNi)	
Current rating:	16 A/AC1; 1 HP 240 Vac, 1/2 HP 120 Vac; PD. B300	
Breaking capacity:	4000 VA/AC1, 384 W/DC	
Switching voltage:	250 V AC/24 V DC	
Max. power dissipation:	2.4 W	
Output indication:	multifunction red LED	
Mechanical life:	10.000.000 ops.	
Electrical life (AC1):	100.000 ops.	
Control		
Control pins:	5 - 6	
Impulse length:	min. 25 ms/max. unlimited	
Reset time:	max. 150 ms	
Other information		
Operating temperature:	-20 .. +55 °C (-4 ..131 °F)	
Storage temperature:	-30 .. +70 °C (-22 .. 158 °F)	
Dielectric strength:		
supply - output 1 (1, 3, 4)	2.5 kV AC	
supply - output 2 (8, 9, 11)	2.5 kV AC	
output 1 - output 2	2.5 kV AC	
Operating position:	any	
Mounting:	11 pin octal socket	
Protection degree:	IP40 from front panel	
Overvoltage category:		
for supply voltage	12-150V AC/DC III.	
for supply voltage	150-240V AC/DC II.	
Pollution degree:	2	
Dimensions:	48x48x79mm (1.7"x1.7"x3.1")	48x48x89mm (1.7"x1.7"x3.5")
Weight:	111 g (3.9 oz.)	108 g (3.81 oz.)
Standards:	EN 61812-1	

* for adjustable delay <100 ms, a time deviation of ± 10 ms applies

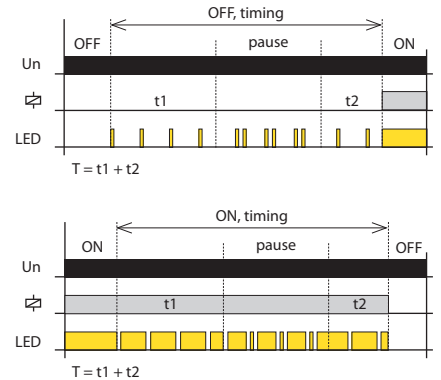
Description



Connection **Indication of operating states**



Do not apply voltage to terminals 5, 6, 7!



Mode selection

FUNC. Settings function mode
 The desired function a-j is set with the FUNC rotary switch.

OFF. Output contact open mode



ON. Output contact closed mode



∅ 2 INST. Second output contact instantaneous



The second output contact switches according to the supply voltage. The first output contact switches according to the function (a-j) set by the trimmer FUNC.

Function

Functions (page 19).



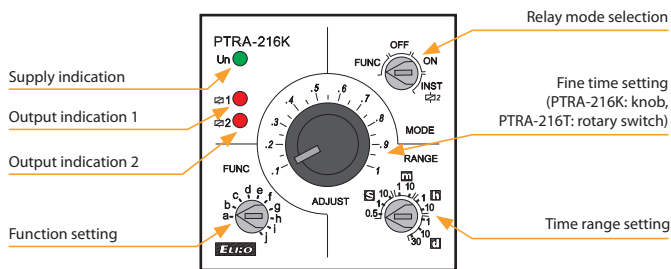
EAN code
 PTRA-216T/UNI: 8595188175609
 PTRA-216K/UNI: 8595188175593

Technical parameters	PTRA-216T	PTRA-216K
Power supply		
Power pins:	2, 10	
Voltage range:	AC/DC 12 – 240 V (AC 50-60 Hz)	
Power input (max.):	2.5 VA/1.5 W	
Supply voltage tolerance:	±10 %	
Supply indication:	green LED	
Time circuit		
Number of functions:	10	
Time ranges:	50 ms - 30 days	
Time setting:	rotary switch and potentiometer	
Time deviation*:	5 % - mechanical setting	
Repeat accuracy:	0.2 % - set value stability	
Temperature coefficient:	0.01 %/°C, at = 20 °C (0.01 %/°F, at = 68 °F)	
Output		
Number of contacts:	2x changeover/SPDT (AgNi)	
Current rating:	16 A/AC1; 1 HP 240 Vac, 1/2 HP 120 Vac; PD. B300	
Breaking capacity:	4000 VA/AC1, 384 W/DC	
Switching voltage:	250 V AC/24 V DC	
Max. power dissipation:	2.4 W	
Output indication:	multifunction red LED	
Mechanical life:	10.000.000 ops.	
Electrical life (AC1):	100.000 ops.	
Control		
Control pins:	5 - 2, 6 - 2, 7 - 2	
Impulse length:	min. 25 ms/max. unlimited	
Reset time:	max. 150 ms	
Other information		
Operating temperature:	-20 .. +55 °C (-4 .. 131 °F)	
Storage temperature:	-30 .. +70 °C (-22 .. 158 °F)	
Dielectric strength:		
supply - output 1 (1, 3, 4)	2.5 kV AC	
supply - output 2 (8, 9, 11)	2.5 kV AC	
output 1 - output 2	2.5 kV AC	
Operating position:	any	
Mounting:	11 pin octal socket	
Protection degree:	IP40 from front panel	
Overvoltage category:		
for supply voltage	12-150V AC/DC III.	
for supply voltage	150-240V AC/DC II.	
Pollution degree:	2	
Dimensions:	48x48x79mm (1.7"x1.7"x3.1")	48x48x89mm (1.7"x1.7"x3.5")
Weight:	111 g (3.9 oz.)	108 g (3.81 oz.)
Standards:	EN 61812-1	

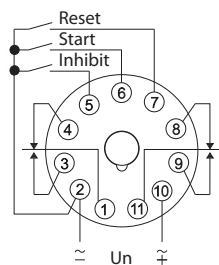
* for adjustable delay <100 ms, a time deviation of ± 10 ms applies

- Multifunction time relay for universal use in automation, control and regulation or in house installations.
- Three control inputs - START, INHIBIT, RESET.
- Possibility to select the control element for fine time setting:
PTRA-216K - knob, for easy handling without the need for tools
PTRA-216T - rotary switch, for the possibility of using a sealable cover.
- Mode selection - according to the set function, permanently closed, permanently open, and switching of the second output contact according to the supply voltage.
- Multifunction red LED flashes or shines depending on the operating status.

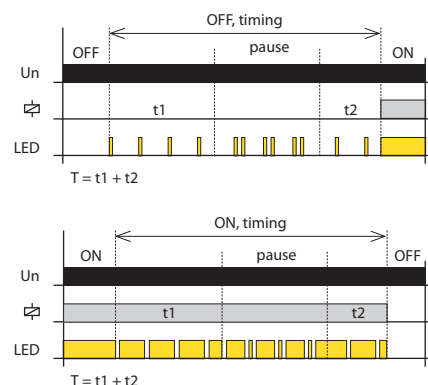
Description



Connection



Indication of operating states



Mode selection

FUNC. Settings function mode

The desired function a-j is set with the FUNC rotary switch.

OFF. Output contact open mode



ON. Output contact closed mode



2 INST. Second output contact instantaneous



The second output contact switches according to the supply voltage. The first output contact switches according to the function (a-j) set by the trimmer FUNC.

Function

Functions (page 21).

VS



VS116B/230

Supply voltage:
AC 230 V
Output contact:
1x changeover/SPDT 16 A.
page 32



VS116K

Supply voltage:
AC 230 V and AC/DC 24 V
Output contact:
1x changeover/SPDT 16 A.
page 32



VS308K

Supply voltage:
AC 230 V and AC/DC 24 V
Output contacts:
3x changeover/TPDK 8 A.
page 32



VS316/24

Supply voltage: AC/DC
24 V Output contacts:
3x changeover/TPDT
16 A, possibility to be
connected into 3-phase
circuit.
page 32



VS316/230

Supply voltage:
AC 230 V
Output contacts:
3x changeover/TPDT
16 A, possibility to be
connected into 3-phase
circuit.
page 32



VS116U

Supply voltage:
AC/DC 12-240 V
Output contact:
1x changeover/SPDT 16 A.
page 32



VS308U

Supply voltage:
AC/DC 12-240 V
Output contacts:
3x changeover/TPDT 8 A.
page 32

Type	Design	Supply voltage	Output contact	Other features			Description	Page
				LED signal light	RC unit	Parallel diode		
VS116B/230	BOX	AC 230 V	1x16 A changeover/ SPDT	●	x	x	VS116B/230 MINI, with installation into junction box or ceiling that allows control of lights, shades or awnings drives	32
VS116K	1M-DIN	AC 230, AC/DC 24 V	1x16 A changeover/ SPDT	●	●	●	as a separation relay (4kV), direct switching of appliances up to 4000 VA (e.g. heaters), well visible signalization	
VS116U	1M-DIN	AC/DC 12 – 240 V	1x16 A changeover/ SPDT	●	●	●	as VS116K, but universal supply voltage	
VS308K	1M-DIN	AC 230, AC/DC 24 V	3x 8 A changeover/ TPDT	●	●	●	a "multiplication" of contacts, 3x changeover contact/ 3PDT only in 1-MODULE, well visible signalization	
VS308U	1M-DIN	AC/DC 12 – 240 V	3x 8 A changeover/ TPDT	●	●	●	as VS308K, but universal supply voltage	
VS316/24	1M-DIN	AC/DC 24 V	3x16 A changeover/ TPDT	●	●	●	3x changeover contact in 1-MODULE, possibility of "multiplication" of contacts and in the same time possibility of switching high output, possibility of 3 phase switching	
VS316/230	1M-DIN	AC 230 V	3x16 A changeover/ TPDT	●	●	●	as VS316/24, but AC 230 V	

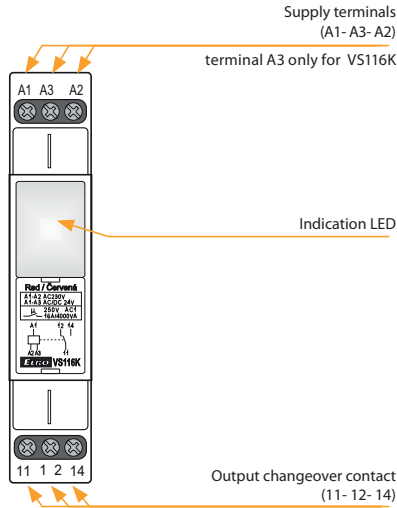


- Power relay used for switching larger load output, strengthen or „multiplying“ contacts of the existing device.
- Relays VS316/24, VS316/230 enable connection to a 3-phase circuit.
- In the design 1-MODULE , DIN rail mounting, output status indicated by high intensity LED with choice of LED color (red, green, blue or white LED*).
- **VS116B/230** MINI, mounting in installation box or ceilings, enabling switching of lights, motors for blinds or awnings.
- For **VS116B/230** status of output indicated by LED on front panel of device.

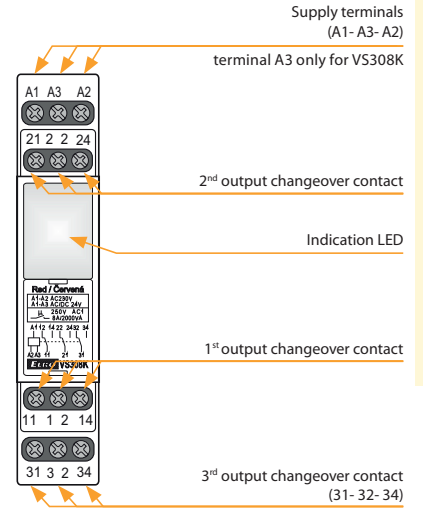
Technical parameters	VS116B/230	VS116K	VS116U	VS308K	VS308U	VS316/24	VS316/230
Supply terminals:	L - N		A1 - A2				
Voltage range:	AC 230 V (50-60 Hz)	AC 230 V (50-60 Hz)	AC/DC 12-240 V (50-60 Hz)	AC 230 V (50-60 Hz)	AC/DC 12-240 V (50-60 Hz)	AC/DC 24 V (50-60 Hz)	AC 230 V (50-60 Hz)
Burden (max.):	AC 7.5 VA 1 W	AC 7.5 VA 1 W	AC 0.7 - 3 VA/DC 0.5 - 1.7 W	AC 10.3 VA 1.1 W	AC 0.7 - 3 VA/DC 0.5 - 1.7 W	1.6 VA 1.2 W	2.5 VA
Supply terminals:	x	A1 - A3	x	A1 - A3		x	
Voltage range:	x	AC/DC 24 V (AC 50-60 Hz)	x	AC/DC 24 V (AC 50-60 Hz)		x	
Burden:	x	AC 1 VA/DC 1W	x	AC 1 VA/DC 1W		x	
Supply voltage tolerance:	-15%; +10%						
Max. dissipated power (Un + terminals):	4 W			3 W		8 W	6 W
Output							
Number of contacts:	1 x changeover/SPDT (AgSnO ₂)			3 x changeover/TPDT (AgNi/Silver Alloy)		3 x changeover/TPDT (AgSnO ₂)	
Current rating:	16 A/AC1; 1 HP 240Vac, 1/2 HP 120Vac; PD. B300			8 A/AC1; 1/2 HP 240Vac; PD. B300		16A/AC1; 1 HP 240Vac, 1/2 HP 120Vac; PD. B300	
Breaking capacity:	4000VA/AC1, 384W/ DC			2000VA/AC1, 192W/ DC		4000VA/AC1, 384W/DC	
Inrush current:	30 A/<3 s			10 A/<3 s		30 A/<3 s	
Switching voltage:	250V AC/24V DC						
Output indication:	red LED	high intensity LED					
Mechanical life:	30.000.000 ops.						
Electrical life (AC1):	100.000 ops.			60.000 ops.		100.000 ops.	
Time between switching:	min. 2s					20 ms	50 ms
Other information							
Operating temperature:	-20 .. +55 °C (-4 .. 131 °F)						
Storage temperature:	-30 .. +70 °C (-22 .. 158 °F)						
Dielectric strength:	4 kV (supply-output)						
Operating position:	any						
Mounting:	free at connecting wire	DIN rail EN 60715					
Protection degree:	IP30	IP40 from front panel/IP20 terminals					
Overvoltage category:	III.						
Pollution degree:	2						
Max. cable size (mm ²):	2x 0.75 mm ² (AWG 18), 3x 2.5 mm ² (AWG 10)	max. 1x 2.5 or 2x 1.5 max. 1x 2.5 (AWG 12)					
Dimensions:	49 x 49 x 21 mm (2" x 2" x 0.8")	90 x 17.6 x 64 mm (3.5" x 0.7" x 2.5")					
Weight:	48 g (1.7 oz.)	56 g (2 oz.)	59 g (2.1 oz.)	78 g (2.75 oz.)	80 g (2.8 oz.)	90 g (3.17 oz.)	93 g (3.3 oz.)
Standards:	EN 60669-1, EN 60669-2-1						

Description

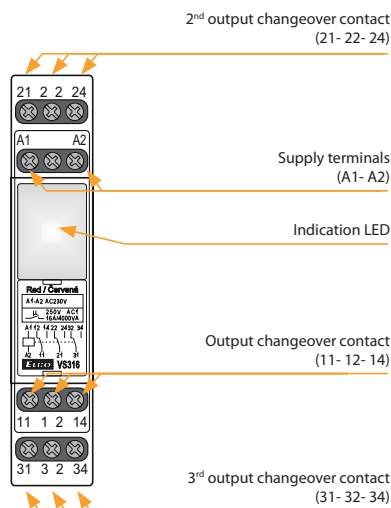
VS116K, VS116U



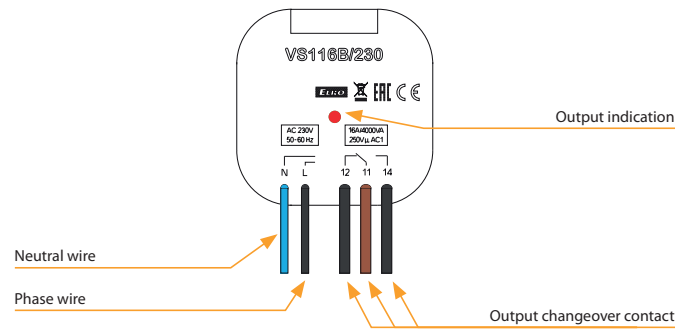
VS308K, VS308U



VS316/24, VS316/230

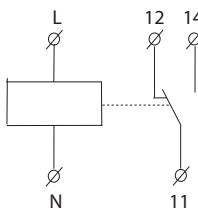


VS116B/230

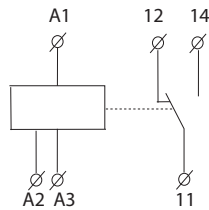


Symbol

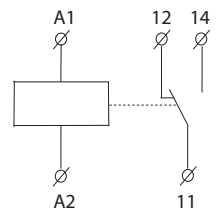
VS116B/230



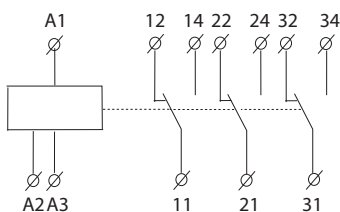
VS116K



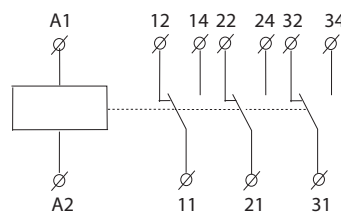
VS116U



VS308K







VS308U, VS316/24, VS316/230



EAN codes

VS116B/230	8595188147545				
VS116K/red	8595188122597	VS308K/red	8595188122696	VS316/24 red	8595188135771
VS116K/green	8595188122610	VS308K/green	8595188122719	VS316/24 green	8595188136105
VS116K/white	8595188122573	VS308K/white	8595188122672	VS316/24 white	8595188136099
VS116K/blue	8595188122603	VS308K/blue	8595188122702	VS316/24 blue	8595188136112
VS116U/red	8595188124607	VS308U/red	8595188130103	VS316/230 red	8595188135559
VS116U/green	8595188136433	VS308U/green	8595188136440	VS316/230 green	8595188136075
VS116U/white	8595188138482	VS308U/white	8595188138512	VS316/230 white	8595188136051
VS116U/blue	8595188138475	VS308U/blue	8595188138505	VS316/230 blue	8595188136068

Order code

	VS116K/red: 2295	VS116U/red: 2460	VS308K/red: 2269	VS308U/red: 3010	VS316/24V red: 3577	VS316/230V red: 4471
	VS116K/green: 2261	VS116U/green: 3643	VS308K/green: 2271	VS308U/green: 3644	VS316/24V green: 3610	VS316/230V green: 4472
	VS116K/white: 2257	VS116U/white: 3848	VS308K/white: 2267	VS308U/white: 3851	VS316/24V white: 3609	VS316/230V white: 4470
	VS116K/blue: 2260	VS116U/blue: 3847	VS308K/blue: 2270	VS308U/blue: 3850	VS316/24V blue: 3611	VS316/230V blue: 4474

Notes

Max. time of changeover of contact is 10 ms.

VS316/24 or VS316/230 enables switching of different phases or 3-phase voltage.

* possibility to choose blue and white color of LED for power relays line VS in case of minimal order quantity 100 pcs.

Installation contactors VS



VS120

Number of contacts:
1x20 A. Configuration
of switching and
breaking contacts:
10, 01.
page 36



VS220

Number of contacts:
2x20 A. Configuration
of switching and
breaking contacts: 20,
11, 02.
page 36



VS420

Number of contacts:
4x20 A. Configuration
of switching and
breaking contacts:
40, 31.
page 36



VS425

Number of contacts:
4x25 A. Configuration
of switching and
breaking contacts:
40, 31, 22, 04.
page 36



VS440

Number of contacts:
4x40 A. Configuration
of switching and
breaking contacts:
40, 31, 22, 04.
page 36



VS463

Number of contacts:
4x63 A. Configuration
of switching and
breaking contacts:
40, 31, 22.
page 36

Installation contactors with manual control VSM



VSM220

Number of contacts:
2x20 A. Configuration
of switching and
breaking contacts: 20,
11, 02.
page 36



VSM425

Number of contacts:
4x25 A. Configuration
of switching and
breaking contacts:
40, 31, 22, 04.
page 36



- For switching electric circuits, especially for resistive loads and 3-phase induction motors
- Number of contacts: **VS120 - 1, VS220 - 2, VS325, VS340, VS363 - 3, VS420, VS425, VS440, VS463 - 4**
- It is produced in configuration of switching and breaking contacts:
 - VS120:** 10, 01 **VS220:** 20, 11, 02
 - VS420:** 40, 31
 - VS325:** 30 **VS425:** 40, 31, 22, 13 04
 - VS340:** 30 **VS440:** 40, 31, 22, 04
 - VS363:** 30 **VS463:** 40, 31, 22
- Protection IP20 - on request we deliver covers that ensure protection IP40 except contactor VS420
- It is possible to connect auxiliary contacts VSK to contactors VS425, VS440, VS463

EAN code
see page 59

Technical parameters	VS120	VS220	VS420	VS325/VS425	VS340/VS440	VS363/VS463
Rated insulation voltage (Ui):	230 V	230 V	415 V	440 V	440 V	440 V
Rated thermo-current I _{th} (in AC):	20 A	20 A	20 A	25 A	40 A	63 A
Voltage range:	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Switched operation						
AC-1 for 400 V, 3 phase:	x	x	13 kW	16 kW	26 kW	40 kW
AC-1 for 230 V:	4 kW, 1 phase	4 kW, 1 phase	7.5 kW, 3 phase	9 kW, 3 phase	16 kW, 3 phase	24 kW, 3 phase
AC-3 for 400 V, 3 phase:	x	x	2.2 kW	4 kW	11 kW	15 kW
AC-3 for 230 V:	1.3 kW only NO, 1 phase	1.3 kW only NO, 1 phase	1.1 kW, 3 phase	2.2 kW, 3 phase	5.5 kW, 3 phase	8.5 kW, 3 phase
AC-7a for 400 V, 3 phase:	x	x	13 kW	16 kW	26 kW	40 kW
AC-7a for 230 V:	4 kW, 1 phase	4 kW, 1 phase	7.5 kW, 3 phase	9 kW, 3 phase	16 kW, 3 phase	24 kW, 3 phase
AC-7b for 400 V, 3 phase:	x	x	2.2 kW	4 kW	11 kW	15 kW
AC-7b for 230 V:	1.3 kW only NO, 1 phase	1.3 kW only NO, 1 phase	1.1 kW, 3 phase	2.2 kW, 3 phase	5.5 kW, 3 phase	8.5 kW, 3 phase
AC-15 for 400 V, 1 phase:	4 A	4 A	4 A	4 A	4 A	4 A
AC-15 for 230 V, 1 phase:	6 A	6 A	6 A	6 A	6 A	6 A
DC1 U _c = 24/110/220 V:	20/6/0.6 A	20/6/0.6 A	20/2/0.5 A	25/6/0.6 A	40/4/1.2 A	63/4/1.2 A
Loadability of modular contactors see page 58						
The max. number of switching for max. load:	600 switch/hr.	600 switch/hr.	600 switch/hr.	600 switch/hr.	600 switch/hr.	600 switch/hr.
Electrical life in 230/400 V						
AC-1- resistive load :	200.000	200.000	200.000	200.000	100.000	100.000
AC-3-power load:	300.000	300.000	300.000	500.000	500.000	150.000
AC-5a - high-intensity discharge lamp:	100.000 by 30 µF	100.000 by 30 µF	300.000 by 36 µF	100.000 by 36 µF	100.000 by 220 µF	100.000 by 330 µF
AC-5b - incandescent lamps:	100.000 by 2 kW	100.000 by 2 kW	100.000 by 2 kW	100.000 by 2 kW	100.000 by 4 kW	100.000 by 5 kW
AC-7a - resistive household devices:	200.000	200.000	200.000	200.000	100.000	100.000
AC-7b - inductive household devices:	300.000	300.000	300.000	300.000	150.000	150.000
Minimal load:	≥ 17 V, ≥ 50 mA	≥ 17 V, ≥ 50 mA	≥ 17 V, ≥ 50 mA	≥ 17 V, ≥ 50 mA	≥ 17 V, ≥ 50 mA	≥ 24 V, ≥ 100 mA
Short circuit protection with the fuse char. aM:	20 A	20 A	20 A	25 A	63 A	80 A
Coordination Type according EN 60 947-4-1:	2	2	2	2	2	2
Dielectric strength:	4 kV	4 kV	4 kV	4 kV	4 kV	4 kV
Contacts - max. cable size						
Solid conductor:	AWG 7 (10 mm ²)	AWG 7 (10 mm ²)	AWG 14 (2.5 mm ²)	AWG 10 (10 mm ²)	AWG 10 (25 mm ²)	AWG 10 (25 mm ²)
Stranded conductor:	AWG 8 (6 mm ²)	AWG 8 (6 mm ²)	AWG 14 (2.5 mm ²)	AWG 8 (6 mm ²)	AWG 4 (16 mm ²)	AWG 4 (16 mm ²)
Maximal torque:	1.2 Nm (10.62 lbf.in)	1.2 Nm (10.62 lbf.in)	1.2 Nm (10.62 lbf.in)	1.2 Nm (10.62 lbf.in)	3.5 Nm (30.95 lbf.in)	3.5 Nm (30.95 lbf.in)
Coil - max. cable size						
Solid conductor:	AWG 14 (2.5 mm ²)	AWG 14 (2.5 mm ²)	AWG 14 (2.5 mm ²)	AWG 14 (2.5 mm ²)	AWG 14 (2.5 mm ²)	AWG 14 (2.5 mm ²)
Stranded conductor:	AWG 14 (2.5 mm ²)	AWG 14 (2.5 mm ²)	AWG 14 (2.5 mm ²)	AWG 14 (2.5 mm ²)	AWG 14 (2.5 mm ²)	AWG 14 (2.5 mm ²)
Max. torque:	0.6 Nm (5.31 lbf.in)	0.6 Nm (5.31 lbf.in)	0.6 Nm (5.31 lbf.in)	0.6 Nm (5.31 lbf.in)	0.6 Nm (5.31 lbf.in)	0.6 Nm (5.31 lbf.in)
Operating						
Coil control voltage:	AC/DC 24 V, 120 V, 230 V	AC/DC 24 V, 48 V, 120 V, 230 V	AC 12 V, 24 V, 48 V, 120 V, 230 V	AC/DC 24 V, 48 V, 120 V, 230 V	AC/DC 24 V, 120 V, 230 V	AC/DC 24 V, 48 V, 120 V, 230 V
Coil permanent supply +/- 10%:	2.1 VA/2.1 W	2.1 VA/2.1 W	5 VA/1.5 W	2.6 VA/2.6 W *	5 VA/5 W	5 VA/5 W
Coil gear supply +/- 10%:	2.1 VA/2.1 W	2.1 VA/2.1 W	30 VA/25 W	2.6 VA/2.6 W *	5 VA/5 W	5 VA/5 W
Mounting side-by-side:	max. 2 contactors**	max. 2 contactors**	max. 2 contactors**	max. 2 contactors**	max. 2 contactors**	max. 2 contactors**
Operational temperature:	-5 .. +55 °C (23 .. 131 °F)					
Storing temperature:	-30 .. +80 °C (-22 .. 176 °F)					
Weight:	120 g (4.2 oz.)	130 g (4.6 oz.)	170 g (6 oz.)	213 g (7.5 oz.)	400 g (14 oz.)	400 g (14 oz.)
Dimensions:	17.5 x 85 x 60 mm (0.7" x 3.35" x 2.4")	17.5 x 85 x 60 mm (0.7" x 3.35" x 2.4")	35 x 62.5 x 57 mm (1.4" x 2.7" x 2.24")	35 x 85 x 60 mm (1.4" x 3.35" x 2.4")	53.3 x 84 x 60 mm (2.1" x 3.31" x 2.4")	53.3 x 84 x 60 mm (2.1" x 3.31" x 2.4")
Standards:	IEC 60947-4-1, IEC 60947-5-1, IEC 61095, EN 60947-4-1, EN 60947-5-1, EN 61095, EN 60947-1					

* 3.8 VA/3.8 W for -04 version of contacts

** Note: If several contactors are mounted close together a gap of 9 mm must be maintained between every other contactor.

*** HP rating: VS120 & VS220: 1-phase 1 HP|240 Vac, 1/3 HP|120 Vac; PD. B300, P300

VS325 & VS425: 1-phase 1 HP|240 Vac, 1/3 HP|120 Vac; 3-phase 3 HP|240 Vac, 5 HP|460 Vac; PD. B300, P300

VS340 & VS440: 1-phase 3 HP|240 Vac, 1 HP|120 Vac; 3-phase 7 HP|240 Vac, 15 HP|460 Vac; PD. B300, P300

VS363 & VS463: 1-phase 5 HP|240 Vac, 2 HP|120 Vac; 3-phase 10 HP|240 Vac, 20 HP|460 Vac; PD. B300, P300



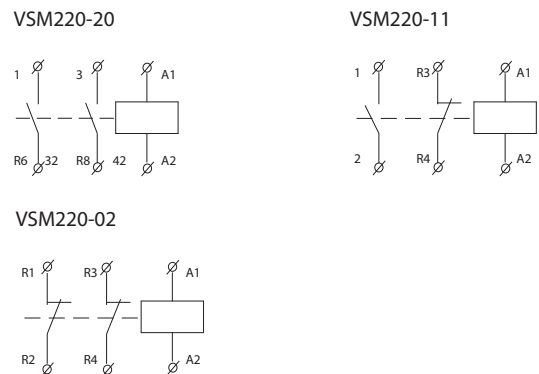
- Special version of installation contactors with not only basic functions but also with manual control
- For switching electric circuits, especially for resistive loads and 3-phase induction motors
- Number of contacts **VSM220 - 2, VSM425 - 4**
- Description of individual positions of manual control:
 - AUTO: common function as with installation contactors without manual control
 - 1: shifting from AUTO to 1: operational contacts are closed and back contacts are open until there is another impulse to a contactor coil
 - 0: contacts are open (operational contact) or closed (stand-by contact) regardless voltage
- Optical indicator of state ON - OFF
- It is produced in configuration of making and breaking contacts:
 - VSM220:** 20, 11, 02
 - VSM425:** 40, 31, 22, 04
- Protection IP20 - on request we deliver covers that ensure protection IP40.
- It is possible to connect auxiliary contacts VSK to contactors VSM220, VSM425

EAN code see page 59

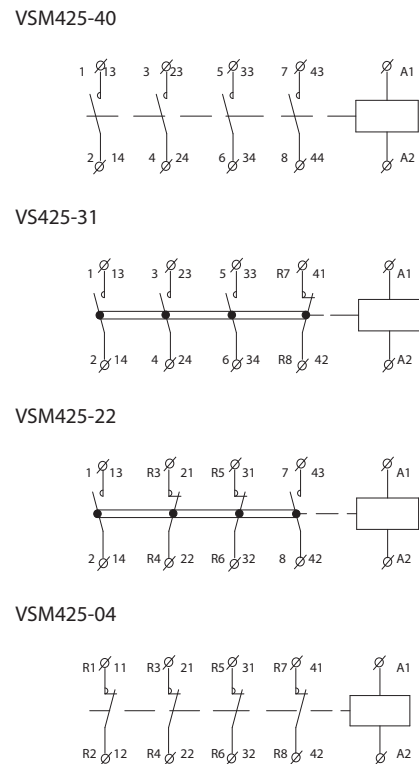
Technical parameters	VSM220	VSM425
Rated insulation voltage (Ui):	230 V	440 V
Rated thermo-current I _{th} (in AC):	20 A	25 A
Voltage range:	50/60 Hz	50/60 Hz
Switched operation		
AC-1 for 400 V:	x	16 kW, 3 phase
AC-1 for 230 V:	4 kW, 1 phase	9 kW, 3 phase
AC-3 for 400 V:	x	4 kW, 3 phase
AC-3 for 230 V:	1.3 kW only NO, 1 phase	2.2 kW, 3 phase
AC-7a for 400 V:	x	16 kW, 3 phase
AC-7a for 230 V:	4 kW, 1 phase	9 kW, 3 phase
AC-7b for 400 V:	x	4 kW, 3 phase
AC-7b for 230 V:	1.3 kW only NO, 1 phase	2.2 kW, 3 phase
AC-15 for 400 V:	4 A	4 A
AC-15 for 230 V:	6 A	6 A
DC1 U _e = 24 V:	20 A	25 A
DC1 U _e = 110 V:	6 A	6 A
DC1 U _e = 220 V:	0.6 A	0.6 A
Loadability of modular contactors see page 58		
The max. number of switching for max. load:	600 switch/hr.	600 switch/hr.
Electrical life in 230/400 V		
AC-1- resistive load :	200.000	200.000
AC-3 - power load:	300.000	500.000
AC-5a - high-intensity discharge lamp:	100.000 by 30 μF	100.000 by 36 μF
AC-5b - incandescent lamps:	100.000 by 1.5 kW	100.000 by 1.5 kW
AC-7a - resistive household devices:	200.000	200.000
AC-7b - inductive household devices:	300.000	500.000
Minimal load:	≥ 17 V, ≥ 50 mA	≥ 17 V, ≥ 50 mA
Short circuit protection with the fuse char. aM:	20 A	25 A
Coordination Type according EN 60 947-4-1:	2	2
Electrical strenght:	4 kV	4 kV
Contacts - max. cable size		
Solid conductor:	AWG 7 (10 mm ²)	AWG 7 (10 mm ²)
Stranded conductor:	6 mm ²	6 mm ²
Maximal torque:	1.2 Nm	1.2 Nm
Coil - max. cable size		
Solid conductor:	AWG 10 (2.5 mm ²)	AWG 10 (2.5 mm ²)
Stranded conductor:	2.5 mm ²	2.5 mm ²
Max. torque:	0.6 Nm	0.6 Nm
Operating		
Coil control voltage:	AC 12 V, 24 V, 120 V, 230 V	AC 12 V, 24 V, 42 V, 230 V
Coil permanent supply +/- 10 %:	2.8 VA/1.2 W	5.5 VA/1.6 W
Coil gear supply +/- 10 %:	12 VA /10 W	33 VA/25 W
Mounting side-by-side:	max. 2 contactors*	max. 2 contactors*
Operational temperature:	-5 .. +55 °C (23 .. 131 °F)	
Storing temperature:	-30 .. +80 °C (-22 .. 176 °F)	
Weight:	140 g (4.9 oz.)	260 g (9.17 oz.)
Dimensions:	17.5 x 85 x 60 mm (0.7" x 3.35" x 2.4")	35 x 85 x 60 mm (1.4" x 3.35" x 2.4")
Standards:	IEC 60947-4-1, IEC 60947-5-1, IEC 61095, EN 60947-4-1, EN 61095, EN 60947-1	

* Note: If several contactors are mounted close together a gap of 9 mm must be maintained between every other contactor.

Connection VSM220 VSM220 - only AC supply voltage



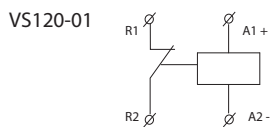
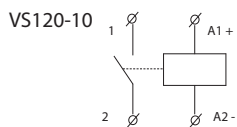
Connection VSM425 VSM425 - only AC supply voltage



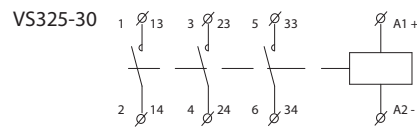
Auxiliary contacts VSK-11 and VSK-20

Datas of auxiliary contacts for VSK-11 and VSK-20 see page 57.

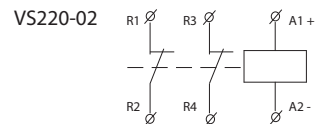
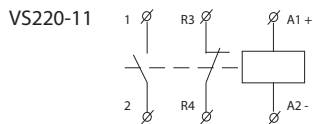
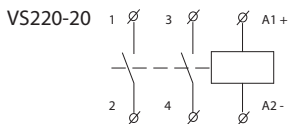
VS120



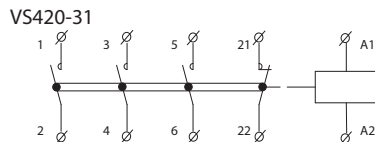
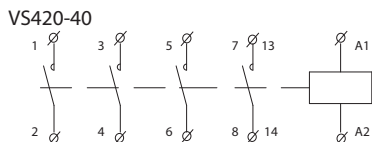
VS325



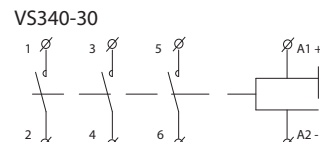
VS220



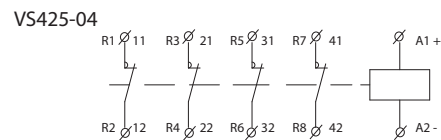
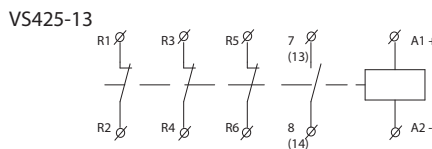
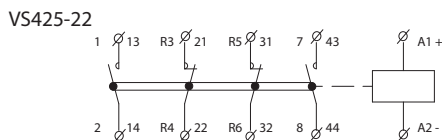
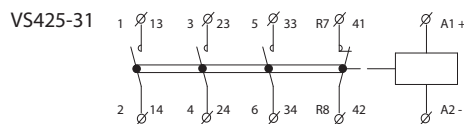
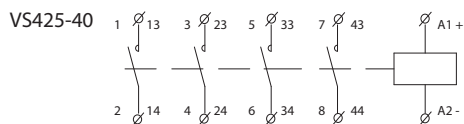
VS420



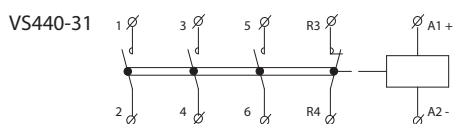
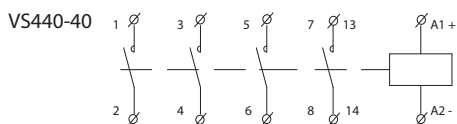
VS340



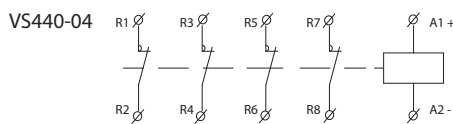
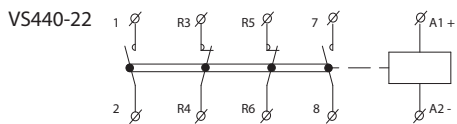
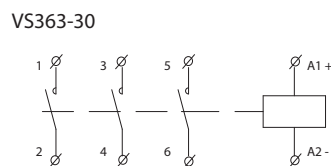
VS425



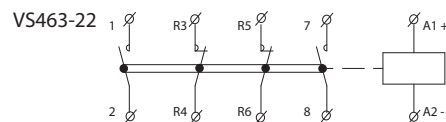
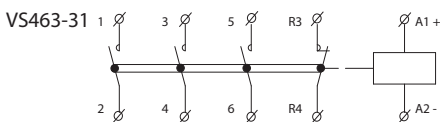
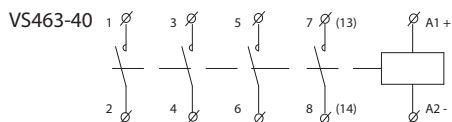
VS440



VS363



VS463



Auxiliary contacts for VS425, VS440, VS463 and VSM220, VSM425

Datas of auxiliary contacts for VSK-11 and VSK-20

Ambient temperature:	-5 .. +55 °C (23 .. 131 °F)
Rated insulation voltage (Ui):	500 V
Dielectric strength:	4 kV
Rated current 230 V (AC 15):	6 A
Rated current 400 V (AC 15):	4 A
Max. switching frequency:	6 A
The max. number of switching for max. load:	600 sep./hod.
Minimal load:	≥ 12 V, ≥ 10 mA
Short circuit protection with the fuse char. aM:	6 A
Solid/Stranded conductor (max):	2.5 mm ² /2.5 mm ² (AWG 10)
Maximal torque:	0.8 Nm
Weight:	10 g (0.35 oz.)
Dimensions:	10 x 85 x 60 mm (0.4" x 3.35" x 2.4")

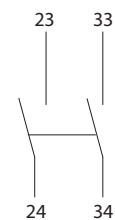
Connection of auxiliary contact VSK-11 and VSK-20

EAN code see page 59

VSK-11



VSK-20



TYPE OF LIGHT	OUTPUT (W)	I (A)	Number of lights on one contactor's contact							
			VS120	VS220	VS420	VS425	VS440	VS463	VSM220	VSM425
Incandescent lamps	60	0.26	33	33	33	33	65	85	33	33
	100	0.43	20	20	20	20	40	50	20	20
	200	0.87	10	10	10	10	20	25	10	10
	500	2.17	3	3	3	3	8	10	3	3
	1000	4.35	1	1	1	1	4	5	1	1
Flourescent lamps	18	0.37	22	22	22	24	90	140	22	24
	24	0.35	22	22	22	24	90	140	22	24
	36	0.43	17	17	17	20	65	95	17	20
	58	0.67	14	14	14	17	45	70	14	17
Flourescent lamps lead-lag circuit	18	0.11	2 x 30	2 x 30	2 x 30	2 x 40	2 x 100	2 x 150	2 x 30	2 x 40
	24	0.14	2 x 24	2 x 24	2 x 24	2 x 31	2 x 78	2 x 118	2 x 24	2 x 31
	36	0.22	2 x 17	2 x 17	2 x 17	2 x 24	2 x 65	2 x 95	2 x 17	2 x 24
	58	0.35	2 x 10	2 x 10	2 x 10	2 x 14	2 x 40	2 x 60	2 x 10	2 x 14
Flourescent lamps parallel correction	18	0.12	7	7	7	8	48	73	7	8
	24	0.15	7	7	7	8	48	73	7	8
	36	0.2	7	7	7	8	48	73	7	8
	58	0.32	4	4	4	5	31	47	4	5
Flourescent lamps with electronic ballast units (EVG)	1 x 18	0.09	25	25	25	35	100	140	25	35
	1 x 36	0.16	15	15	15	20	52	75	15	20
	1 x 58	0.25	14	14	14	19	50	72	14	19
	2 x 18	0.17	12	12	12	17	50	70	12	17
	2 x 36	0.32	7	7	7	10	26	38	7	10
	2 x 58	0.49	7	7	7	9	25	36	7	9
High-pressure mercury-vapour lamps uncorrected	50	0.61	14	14	14	18	38	55	14	18
	80	0.8	10	10	10	13	29	42	10	13
	125	1.15	7	7	7	9	20	29	7	9
	250	2.15	4	4	4	5	10	15	4	5
	400	3.25	2	2	2	3	7	10	2	3
	700	5.4	1	1	1	2	4	6	1	2
	1000	7.5	1	1	1	1	3	4	1	1
High-pressure mercury-vapour lamps parallel correction	50	0.28	4	4	4	5	31	47	4	5
	80	0.41	4	4	4	5	27	41	4	5
	125	0.65	3	3	3	4	22	33	3	4
	250	1.22	1	1	1	2	12	18	1	2
	400	1.95	1	1	1	1	9	13	1	1
	700	3.45	-	-	-	-	5	7	-	-
	1000	4.8	-	-	-	-	4	5	-	-
Halogen metal vapour lamps uncorrected	35	0.53	18	18	18	22	43	60	18	22
	70	1	10	10	10	12	23	32	10	12
	150	1.8	5	5	5	7	12	18	5	7
	250	3	3	3	3	4	7	10	3	4
	400	3.5	3	3	3	3	6	9	3	3
	1000	9.5	1	1	1	1	2	3	1	1
	2000	16.5	-	-	-	-	1	1	-	-
Halogen metal-vapour lamps parallel correction	35	0.25	5	5	5	6	36	50	5	6
	70	0.45	2	2	2	3	18	25	2	3
	150	0.75	1	1	1	1	11	15	1	1
	250	1.5	-	-	-	1	6	9	-	1
	400	2.5	-	-	-	1	6	8	-	1
	1000	5.8	-	-	-	-	2	3	-	-
High-pressure sodium-vapour lamps uncorrected	150	1.8	5	5	5	6	17	22	5	6
	250	3	3	3	3	4	10	13	3	4
	400	4.7	2	2	2	2	6	8	2	2
	1000	10.3	-	-	-	1	3	3	-	1
	150	0.83	1	1	1	1	11	16	1	1
High-pressure sodium-vapour lamps parallel correction	250	1.5	-	-	-	1	6	10	-	1
	400	2.4	-	-	-	-	4	6	-	-
	1000	6.3	-	-	-	-	2	3	-	-
	18	0.35	22	22	22	27	71	90	22	27
Low-pressure sodium-vapour lamps uncorrected	35	1.5	7	7	7	9	23	30	7	9
	55	1.5	7	7	7	9	23	30	7	9
	90	2.4	4	4	4	5	14	19	4	5
	135	3.5	3	3	3	4	10	13	3	4
	180	3.3	3	3	3	4	10	13	3	4
Low-pressure sodium-vapour lamps parallel correction	18	0.35	6	6	6	7	44	66	6	7
	35	0.31	1	1	1	1	11	16	1	1
	55	0.42	1	1	1	1	11	16	1	1
	90	0.63	1	1	1	1	8	12	1	1
	135	0.94	-	-	-	-	4	7	-	-
	180	1.16	-	-	-	-	5	8	-	-

EAN codes for VS



VS120
 VS120-01 24V AC/DC: 8595188129848
 VS120-01 230V AC/DC: 8595188123105

 VS120-10 24V AC/DC: 8595188129367
 VS120-10 230V AC/DC: 8595188123112

VS220
 VS220-02 24V AC/DC: 8595188129381
 VS220-02 120V AC/DC: 8595188138628
 VS220-02 230V AC/DC: 8595188121422

 VS220-11 24V AC/DC: 8595188129374
 VS220-11 48V AC/DC: 8595188129398
 VS220-11 120V AC/DC: 8595188130790
 VS220-11 230V AC/DC: 8595188121408

 VS220-20 24V AC/DC: 8595188125253
 VS220-20 48V AC/DC: 8595188129411
 VS220-20 120V AC/DC: 8595188129428
 VS220-20 230V AC/DC: 8595188121392

VS420
 VS420-31 24V AC: 8595188129442
 VS420-31 120V AC: 8595188129466
 VS420-31 230V AC: 8595188121446

 VS420-40 12V AC: 8595188129459
 VS420-40 24V AC: 8595188129435
 VS420-40 48V AC: 8595188138581
 VS420-40 230V AC: 8595188121439

VS463
 VS463-22 24V AC/DC: 8595188129794
 VS463-22 230V AC/DC: 8595188121514

 VS463-31 24V AC/DC: 8595188129596
 VS463-31 120V AC/DC: 8595188137904
 VS463-31 230V AC/DC: 8595188121507

 VS463-40 24V AC/DC: 8595188129589
 VS463-40 48V AC/DC: 8595188160612
 VS463-40 120V AC/DC: 8595188140652
 VS463-40 230V AC/DC: 8595188121491

EAN codes for VSM

VSM220
 VSM220-02 24V AC: 8595188129817
 VSM220-02 230V AC: 8595188128100

 VSM220-11 24V AC: 8595188129800
 VSM220-11 230V AC: 8595188128094

 VSM220-20 12V AC: 8595188138369
 VSM220-20 24V AC: 8595188128117
 VSM220-20 120V AC: 8595188160223
 VSM220-20 230V AC: 8595188128087

VSM425
 VSM425-04 24V AC: 8595188129831
 VSM425-04 230V AC: 8595188128155

 VSM425-22 24V AC: 8595188129336
 VSM425-22 230V AC: 8595188128148

 VSM425-31 24V AC: 8595188129824
 VSM425-31 230V AC: 8595188128131

 VSM425-40 12V AC: 8595188160049
 VSM425-40 24V AC: 8595188128162
 VSM425-40 230V AC: 8595188128124

EAN codes for VSK and covers

VSK-11: 8595188121613
 VSK-20: 8595188121606

EAN codes for VS



VS120
 VS120-10UL 230V AC/DC: 8595188189880
 VS120-10UL 120V AC/DC: 8595188189897
 VS120-10UL 24V AC/DC: 8595188189903

 VS120-01UL 230V AC/DC: 8595188189910
 VS120-01UL 120V AC/DC: 8595188189927
 VS120-01UL 24V AC/DC: 8595188189934

VS220
 VS220-20UL 230V AC/DC: 8595188189828
 VS220-20UL 120V AC/DC: 8595188189835
 VS220-20UL 24V AC/DC: 8595188189842

 VS220-11UL 230V AC/DC: 8595188189859
 VS220-11UL 120V AC/DC: 8595188189866
 VS220-11UL 24V AC/DC: 8595188189873

 VS220-02UL 230V AC/DC: 8595188189941
 VS220-02UL 120V AC/DC: 8595188189958
 VS220-02UL 24V AC/DC: 8595188189965

VS325
 VS325-30UL 230V AC/DC: 8595188190039
 VS325-30UL 120V AC/DC: 8595188190046
 VS325-30UL 24V AC/DC: 8595188190053

VS425
 VS425-40UL 230V AC/DC: 8595188189972
 VS425-40UL 120V AC/DC: 8595188189989
 VS425-40UL 24V AC/DC: 8595188189996

 VS425-31UL 230V AC/DC: 8595188190008
 VS425-31UL 120V AC/DC: 8595188190015
 VS425-31UL 24V AC/DC: 8595188190022

 VS425-22UL 230V AC/DC: 8595188190060
 VS425-22UL 120V AC/DC: 8595188190077
 VS425-22UL 24V AC/DC: 8595188190084

 VS425-04UL 230V AC/DC: 8595188190091
 VS425-04UL 120V AC/DC: 8595188190107
 VS425-04UL 24V AC/DC: 8595188190114

VS340
 VS340-30UL 230V AC/DC: 8595188190183
 VS340-30UL 120V AC/DC: 8595188190190
 VS340-30UL 24V AC/DC: 8595188190206

VS440
 VS440-40UL 230V AC/DC: 8595188190121
 VS440-40UL 120V AC/DC: 8595188190138
 VS440-40UL 24V AC/DC: 8595188190145

 VS440-31UL 230V AC/DC: 8595188190152
 VS440-31UL 120V AC/DC: 8595188190169
 VS440-31UL 24V AC/DC: 8595188190176

 VS440-22UL 230V AC/DC: 8595188190213
 VS440-22UL 120V AC/DC: 8595188190220
 VS440-22UL 24V AC/DC: 8595188190237

 VS440-04UL 230V AC/DC: 8595188190244
 VS440-04UL 120V AC/DC: 8595188190251
 VS440-04UL 24V AC/DC: 8595188190268

VS363
 VS363-30UL 230V AC/DC: 8595188190336
 VS363-30UL 120V AC/DC: 8595188190343
 VS363-30UL 24V AC/DC: 8595188190350

VS463
 VS463-40UL 230V AC/DC: 8595188190275
 VS463-40UL 120V AC/DC: 8595188190282
 VS463-40UL 24V AC/DC: 8595188190299

 VS463-31UL 230V AC/DC: 8595188190305
 VS463-31UL 120V AC/DC: 8595188190312
 VS463-31UL 24V AC/DC: 8595188190329

 VS463-22UL 230V AC/DC: 8595188190367
 VS463-22UL 120V AC/DC: 8595188190374
 VS463-22UL 24V AC/DC: 8595188190381

Lamps Type	Power	Current	Capacity	Maximum number of lamps per pole			
	P (W)	I (A)	C (μF)	BR-216-10/11/20	BR-220-20	BR-232-20	
LED lamps Power supplies for LEDs	-	-	-	max. 2 A per pole	max. 6 A per pole	max. 12 A per pole	
Incandescent lamps and halogen lamps	15	0,07	-	133	133	233	
	25	0,11	-	80	80	140	
	40	0,17	-	50	50	88	
	60	0,26	-	33	33	58	
	75	0,33	-	27	27	47	
	100	0,44	-	20	20	35	
	150	0,65	-	13	13	23	
	200	0,87	-	10	10	18	
	300	1,3	-	7	7	12	
Fluorescent lamps with external electromagnetic ballasts - uncorrected	500	2,17	-	4	4	7	
	1000	4,35	-	2	2	4	
	18	0,37	-	43	43	43	
	36	0,43	-	37	37	37	
	58	0,67	-	24	24	24	
	Fluorescent lamps with external electromagnetic ballasts - parallel corrected	18	0,19	4,5	18	22	33
		36	0,29	4,5	18	22	33
		58	0,46	7	11	14	21
	Lead-lag circuit for fluorescent lamps with external electromagnetic ballasts - series corrected	2x18	0,26	2,7	62	62	62
2x36		0,48	4,5	33	33	33	
2x58		0,78	7	21	21	21	
Fluorescent lamps with external electronic ballasts	18	0,09	-	33	67	133	
	2x18	0,17	-	18	35	71	
	36	0,16	-	19	38	75	
	2x36	0,31	-	10	19	39	
	58	0,25	-	12	24	48	
	2x58	0,48	-	6	13	25	
	80	0,4	-	8	15	30	
	2x80	0,76	-	4	8	16	
High pressure mercury vapour lamps with external electromagnetic ballasts - uncorrected	50	0,6	-	17	27	27	
	80	0,8	-	13	20	20	
	125	1,2	-	8	13	13	
	250	2,2	-	5	7	7	
	400	3,3	-	3	5	5	
	700	5,4	-	2	3	3	
	1000	7,5	-	1	2	2	
High pressure mercury vapour lamps with external electromagnetic ballasts - parallel corrected	50	0,3	7	11	14	21	
	80	0,4	8	10	13	19	
	125	0,6	10	8	10	15	
	250	1,2	18	4	6	8	
	400	1,8	25	3	4	6	
	700	3,4	40	2	3	4	
Metal halide lamps with external electromagnetic ballasts - uncorrected	1000	4,8	60	1	2	3	
	35	0,5	-	16	32	32	
	70	1	-	8	16	16	
	150	1,8	-	4	9	9	
	250	3	-	3	5	5	
	400	4,6	-	2	3	3	
Metal halide lamps with external electromagnetic ballasts - parallel corrected	1000	9,7	-	1	2	2	
	2000	12,2	-	0	1	1	
	35	0,23	6	13	17	25	
	70	0,42	12	7	8	13	
	150	0,77	20	4	5	8	
	250	1,26	32	3	3	5	
High pressure sodium vapour lamps with external electromagnetic ballasts - uncorrected	400	2	45	2	2	3	
	1000	5	85	0	1	2	
	2000	10,5	125	0	0	1	
	150	1,8	-	7	9	9	
High pressure sodium vapour lamps with external electromagnetic ballasts - parallel corrected	250	3	-	4	5	5	
	400	4,4	-	3	4	4	
	1000	10,3	-	1	1	1	
	150	0,77	20	4	5	8	
High pressure sodium vapour lamps with external electronic ballasts	250	1,26	32	3	3	5	
	400	2	45	2	2	3	
	1000	5,1	100	0	0	1	
	150	0,72	-	4	8	17	
Low pressure sodium vapour lamps with external electromagnetic ballasts - uncorrected	250	1,3	-	2	5	9	
	400	2	-	2	3	6	
	1000	5	-	0	1	2	
	18	0,4	-	25	40	40	
	35	0,6	-	15	27	27	
	55	0,6	-	15	27	27	
Low pressure sodium vapour lamps with external electromagnetic ballasts - parallel corrected	90	0,9	-	10	18	18	
	135	0,9	-	10	18	18	
	180	0,9	-	10	18	18	
	18	0,35	5	16	20	30	
	35	0,28	20	4	5	8	
	55	0,35	20	4	5	8	
Low pressure sodium vapour lamps with external electromagnetic ballasts - parallel corrected	90	0,55	26	3	4	6	
	135	0,8	40	2	3	4	
	180	1	40	2	3	4	
	180	1	40	2	3	4	

Switching power supplies DC, unregulated

Voltage 12 V



PS1M-15/12V
Input: AC 100 - 240 V
output: DC 12 V stab.
load: 1.25 A/15 W.
- short circuit protection
- overload protection
- overvoltage protection
page 44



PS2M-24/12V
Input: AC 100 - 240 V
Output: DC 12 V stab.
Load: 2 A/24 W.
- short circuit protection
- overload protection
- overvoltage protection
page 44



PS3M-54/12V
Input: AC 100-240 V
Output: DC 12V stab.
Load: 4.5 A/54 W.
- short circuit protection
- overload protection
- overvoltage protection
page 44



PS4M-85/12V
Input: AC 100-240 V
Output: DC 12 V stab.
Load: 7.1 A/85 W.
- short circuit protection
- overload protection
- overvoltage protection
page 44

Voltage 24 V



PS1M-15/24V
Input: AC 100 - 240 V
Input: DC 24 V stab.
load: 0.625 A/15 W.
- short circuit protection
- overload protection
- overvoltage protection
page 44



PS2M-30/24V
Input: AC 100 - 240 V
Input: DC 24 V stable
load: 1.25 A/30 W.
- short circuit protection
- overload protection
- overvoltage protection
page 44



PS3M-60/24V
Input: AC 100-240 V
Input: DC 24 V stab.
load: 2.5 A/60 W.
- short circuit protection
- overload protection
- overvoltage protection
page 44



PS4M-92/24V
Input: AC 100 - 240 V
Input: DC 24 V stab.
load: 3.83 A/92 W
- short circuit protection
- overload protection
- overvoltage protection
page 44

Type	Design	Supply voltage	Galvanically isolated	Output					Output protection against			Description	Page
				Analog	Switching	Stabilized DC	Output voltage	Loadability	Overcurrent	Short circuit	Temperature		
PS1M-15/12V	1M-DIN	AC 100 - 240 V	X	X	●	●	DC 12 V	1.25 A	●	●	X	Fixed output voltage DC 12 V. Power: 15 W.	44
PS1M-15/24V	1M-DIN	AC 100 - 240 V	X	X	●	●	DC 24 V	0.625 A	●	●	X	Fixed output voltage DC 24 V. Power: 15 W.	
PS2M-24/12V	2M-DIN	AC 100 - 240 V	X	X	●	●	DC 12 V	2 A	●	●	X	Fixed output voltage DC 12 V. Power: 24 W.	
PS2M-30/24V	2M-DIN	AC 100 - 240 V	X	X	●	●	DC 24 V	1.25 A	●	●	X	Fixed output voltage DC 24 V. Power: 30 W.	
PS3M-54/12V	3M-DIN	AC 100 - 240 V	X	X	●	●	DC 12 V	4.5 A	●	●	X	Fixed output voltage DC 12 V. Power: 54 W.	
PS3M-60/24V	3M-DIN	AC 100 - 240 V	X	X	●	●	DC 24 V	2.5 A	●	●	X	Fixed output voltage DC 24 V. Power: 60 W.	
PS4M-85/12V	4M-DIN	AC 100 - 240 V	X	X	●	●	DC 12 V	7.1 A	●	●	X	Fixed output voltage DC 12V. Power: 85 W-	
PS4M-92/24V	4M-DIN	AC 100 - 240 V	X	X	●	●	DC 24 V	3.83 A	●	●	X	Fixed output voltage DC 24 V. Power: 92 W.	

■ protection against short circuit in primary winding



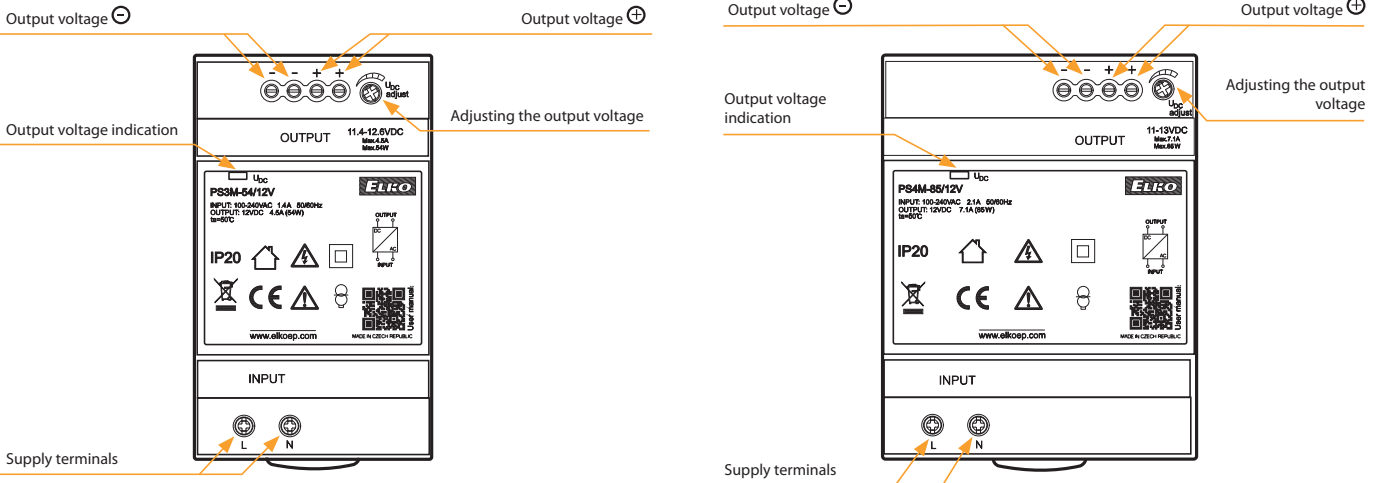
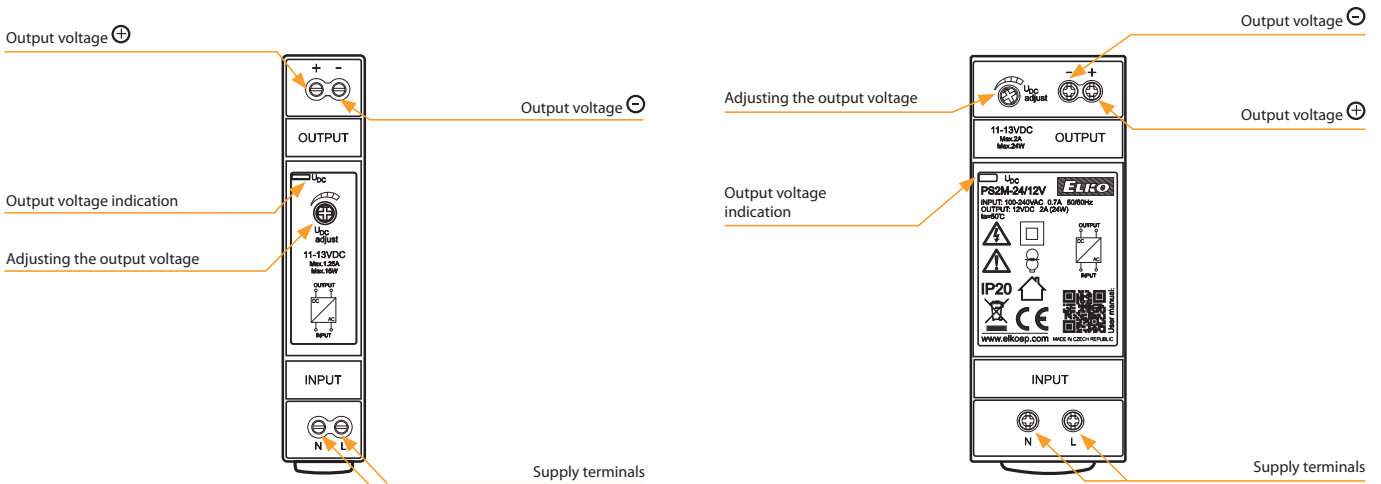
- Rated output voltage 12 or 24V DC with the possibility of regulation.
- High efficiency of up to 90%.
- Low ripple & noise.
- Protection: Over load , Over voltage and Short circuit.
- Continuously adjustable output voltage to adapt to the specific application, e.g. the need to compensate for the voltage drop caused by the length of the line.

EAN code
 PS1M-15/12V: 8595188180474
 PS1M-15/24V: 8595188180481
 PS2M-24/12V: 8595188180498
 PS2M-30/24V: 8595188180504
 PS3M-54/12V: 8595188180511
 PS3M-60/24V: 8595188180528
 PS4M-85/12V: 8595188180535
 PS4M-92/24V: 8595188180542

Technical parameters	PS1M-15/12V	PS1M-15/24V	PS2M-24/12V	PS2M-30/24V	PS3M-54/12V	PS3M-60/24V	PS4M-85/12V	PS4M-92/24V
Input								
Voltage range:	AC 100 - 240 V (50/60 Hz)							
Tolerance:	± 10%							
Efficiency:	85%	86%	88%	89%	88%	90%	88%	90%
Burden without load (max.):	0.3W/4VA	0.5W/4VA	0.3W/8VA	0.4W/8VA	0.3W/7VA	0.5W/6.5VA	0.4W/11VA	0.1W/12VA
Burden with full load (max.):	16W/30VA	17.5W/32VA	30W/50VA	33W/60VA	60W/95VA	70W/111VA	95W/150VA	105W/160VA
Inrush current:*	max. 25A at 115V AC/60Hz max. 45A at 240V AC/50Hz				max. 30A at 115V AC/60Hz max. 60A at 240V AC/50Hz		max. 35A at 115V AC/60Hz max. 70A at 240V AC/50Hz	
Output								
Rated voltage:	12V DC	24V DC	12V DC	24V DC	12V DC	24V DC	12V DC	24V DC
Vol. setting range:	11 - 13V	23 - 25V	11 - 13V	23 - 25V	11.4 - 12.6V	22.8 - 25.2V	11 - 13V	23 - 25V
Rated current:	1.25A	0.625A	2A	1.25A	4.5A	2.5A	7.1A	3.83A
Rated power:	15W	15W	24W	30W	54W	60W	85.2W	92W
Ripple & Noise:	120mV	150mV	120mV	150mV	120mV	150mV	120mV	150mV
Output indication:	blue LED		blue LED		green LED		blue LED	
Tolerance of output voltage:	5 %							
Overload protection:	from 130 % - 200% rated output power							
Overvoltage protection:	from 110 % - 145% rated output power							
Overcurrent protection:	from 110 % - 180% rated output power							
Short circuit protection:	temporarily disconnecting the output							
Other information								
Operating temperature:	-20 .. +50°C (-4 .. 122 °F)							
Operating humidity:	20% ~ 90% RH non-condensing							
Storage temperature:	-40 .. +80°C (-40 .. 176 °F)							
Dielectric strength:	3kV AC							
Isolation resistance:	100M Ω/500V DC/25°C (77°F)/70% RH							
Overvoltage category:	III.							
Pollution degree:	2							
Max. cable size:	max. 1x 2.5 mm ² , max. 2x 1.5 mm ² solid wire/with sleeve max. 1x 2,5 mm ²							
Terminal torque:								
input terminals	0.5 Nm		0.3 Nm		0.3 Nm		0.3 Nm	
output terminals	0.5 Nm							
Protection degree:	IP20							
MTBF:	200 000 hours minimum, full load at 25°C ambient temperature							
Mounting:	DIN rail EN 60715							
Dimensions:	90 x 18 x 58 mm (3.5" x 0.71" x 2.3")		90 x 35 x 58 mm (3.5" x 1.4" x 2.3")		90 x 52.5 x 58 mm (3.5" x 2.1" x 2.3")		90 x 70 x 58 mm (3.5" x 2.8" x 2.3")	
Weight:	78 g (2.8 oz.)		120 g (4.2 oz.)		190 g (6.7 oz.)		270 g (9.5 oz.)	
Standards:	IEC60950-1, UL508, TUV EN61558-2-16							

* the stated values are valid for the full load from the source

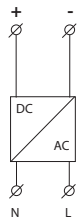
Description



Connection

PS1M-15/12V
(PS1M-15/24V)

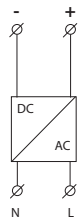
DC 12 V/1.25 A
(DC 24 V/0.625 A)



AC 100 - 240 V
50 Hz/60 Hz

PS2M-24/12V
(PS2M-30/24V)

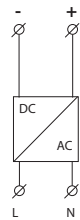
DC 12 V/2 A
(DC 24 V/1.25 A)



AC 100 - 240 V
50 Hz/60 Hz

PS3M-54/12V
(PS3M-60/24V)

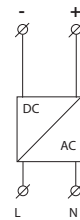
DC 12 V/4.5 A
(DC 24 V/2.5 A)



AC 100 - 240 V
50 Hz/60 Hz







PS4M-85/12V
(PS4M-92/24V)

DC 12 V/7.1 A
(DC 24 V/3.83 A)



AC 100 - 240 V
50 Hz/60 Hz

Explanation of symbols

TYPE OF LOAD (symbols)	bulbs, halogen lamps	low-voltage el.bulbs 12/24V wound transformers	low-voltage el.bulbs 12/24V electronic transformers	ESL dimmable compact fluorescent lamps	Dimmable LED bulbs (triac dimmer)	Dimmable LED bulbs (dimmer with MOSFET)
	 R	 L	 C	 ESL	 LED ¹	 LED ²

Demonstrated symbols are informative

Explanation:



R, L, C,
ESL, LED

Dimmer with designated load:

R - resistive

L - inductive

C - capacitive

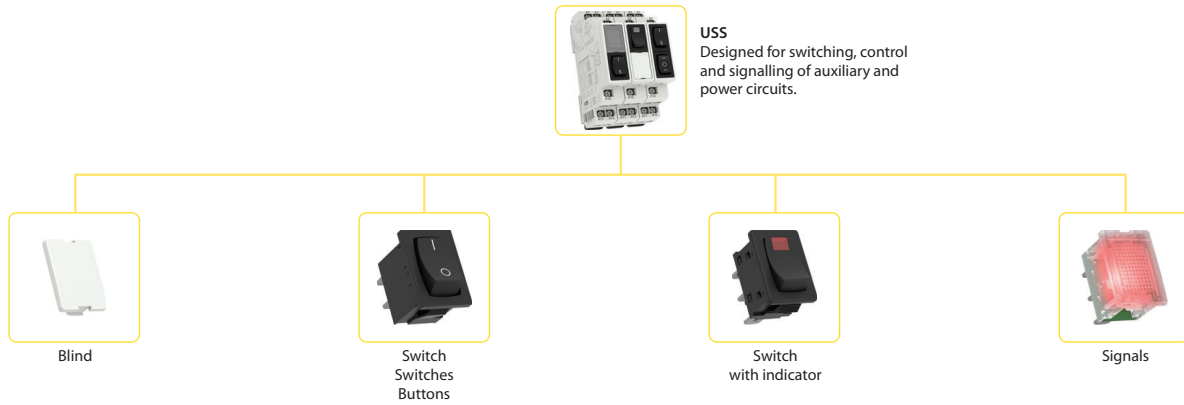
ESL - energy saving bulbs

LED¹ - dimmable LED bulbs, designed for dimmers with phase-controlled rising edge (triac dimmers)

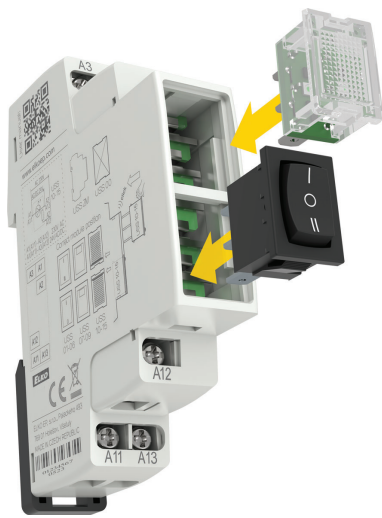
LED² - dimmable LED bulbs designed for dimmers with phase or phase-to-phase phase control (dimmers with MOSFET).

IPxx protection - under normal conditions: normal conditions are understood as such conditions of operating an electrical device, installation and power supply network for which the entire device is designed, produced and installed. Upon these normal conditions of use and upon normal maintenance, all protective devices must be effective throughout the entire expected service life of the product.

Recommendation for mounting modular dimmers: leave a gap of min. 0.5 module (approx. 9 mm / 0.4") on side of the device to ensure better cooling of the device.



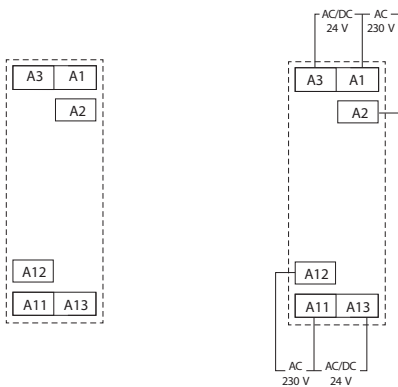
USS | Controlling and signaling modules



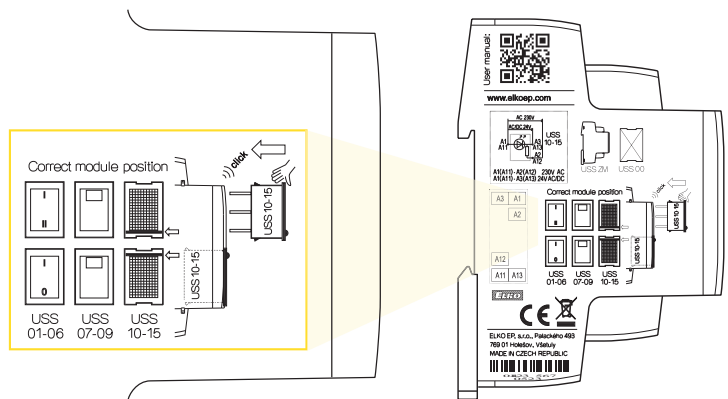
- Independent switch units designed for flexible controlling and switching of power circuits.
- USS - "Do It Yourself" = it is possible to "click into" different types of switches and signalling units into the basic module.
- Units are delivered as components and configured by the user.
- 16 types of units: switches, push buttons, signal lights of different colours including flashing lights units are replaceable also for future (for example when an application is changed, extended, etc...).
- Units are also replaceable in the future (for example when an application is changed, extended, etc...).
- It is possible to place up to two units into one MODULE (for example 2x switch, 2x signalling lights or combinations) = saves space in switch-board panels.
- 1-MODULE (90 x 17.6 x 64 mm/3.5" x 0.7" x 2.5"), DIN rail mounting.
- Operating temperature -20 °C to +55 °C (-4 °F to 131 °F).
- M3 screw with clamp terminals.

Connection

Connection of signaling light



Installing the USS into the module






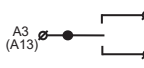

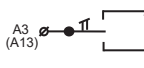

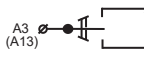

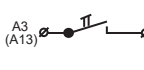

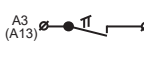


Examples of mounting


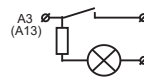

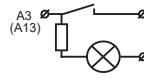

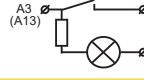


TYPE DESIGNATION	EAN CODE	CONNECTION	RATED CURRENT/VOLTAGE (FOR SWITCHES) SUPPLY VOLTAGE (FOR SIGNALING LIGHTS)	DIMENSIONS	DESCRIPTION
USS-ZM	8595188124577	MODULE	-	19 x 17.6 x 64 mm (0.75" x 0.69" x 2.5")	Basic MODULE (housing with terminals and contacts)
USS-00	8595188124614	BLIND FLANGE	-	21 x 15 x 7 mm (0.83" x 0.59" x 0.28")	Used to fill in an empty position in the front panel


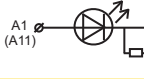

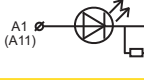








Switches, push buttons

USS-01		8595188124621		6 A/250 V AC	21 x 15 x 20 mm (0.83" x 0.59" x 0.79")	Switch
USS-02		8595188124638		10 A/250 V AC	21 x 15 x 20 mm (0.83" x 0.59" x 0.79")	Alternation switch
USS-03		8595188124645		10 A/250 V AC	21 x 15 x 20 mm (0.83" x 0.59" x 0.79")	Switch with central position
USS-04		8595188124652		6 A/250 V AC	21 x 15 x 20 mm (0.83" x 0.59" x 0.79")	Switch + push with central position
USS-05		8595188124669		6 A/250 V AC	21 x 15 x 20 mm (0.83" x 0.59" x 0.79")	Push button with central position
USS-06/S		8595188124676		10 A/250 V AC	21 x 15 x 20 mm (0.83" x 0.59" x 0.79")	Push button NO
USS-06/R		8595188136372		10 A/250 V AC	21 x 15 x 20 mm (0.83" x 0.59" x 0.79")	Push button NC

Switches with glow lamp

USS-07		8595188124683		6 A/250 V AC	21 x 15 x 20 mm (0.83" x 0.59" x 0.79")	Switch with glow lamp (red)
USS-08		8595188124690		6 A/250 V AC	21 x 15 x 20 mm (0.83" x 0.59" x 0.79")	Switch with glow lamp (green)
USS-09		8595188124706		6 A/250 V AC	21 x 15 x 20 mm (0.83" x 0.59" x 0.79")	Switch with glow lamp (yellow)

Signaling light

USS-10		8595188124331		A1-A2, AC 230 V A1-A3, AC/DC 24 V	21 x 15 x 14 mm (0.83" x 0.59" x 0.55")	Signaling LED (red)
USS-11		8595188124348		A1-A2, AC 230 V A1-A3, AC/DC 24 V	21 x 15 x 14 mm (0.83" x 0.59" x 0.55")	Signaling LED (green)
USS-12		8595188124355		A1-A2, AC 230 V A1-A3, AC/DC 24 V	21 x 15 x 14 mm (0.83" x 0.59" x 0.55")	Signaling LED (yellow)
USS-13		8595188124362		A1-A2, AC 230 V A1-A3, AC/DC 24 V	21 x 15 x 14 mm (0.83" x 0.59" x 0.55")	Signaling LED (white)
USS-14	 BLINK	8595188124898		A1-A2, AC 230 V A1-A3, AC/DC 24 V	21 x 15 x 14 mm (0.83" x 0.59" x 0.55")	Signaling LED FLASHING (red)
USS-15		8595188124379		A1-A2, AC 230 V A1-A3, AC/DC 24 V	21 x 15 x 14 mm (0.83" x 0.59" x 0.55")	Signaling LED (blue)

1-phase

AC/DC



HRN-31, HRN-31/2

Multifunction, supply and monitored voltage in range of AC/DC 48-276 V, 1x (HRN-31) / 2x (HRN-31/2) output for Umax and Umin with adjustable levels. page 51



HRN-32/2

As HRN-31/2 but individual output for each level (Umax/Umin). page 51



HRN-39, HRN-39/2

Multifunction, supply and monitored voltage in range of AC/DC 24-150 V, 1x (HRN-39) / 2x (HRN-39/2) output for Umax and Umin with adjustable levels. page 51



PMR1-31, PMR1-31/2

Same as HRN-31 and HRN-31/2, but in PLUG-IN design. page 53



PMR1-39, PMR1-39/2

Same as HRN-39 and HRN-39/2, but in PLUG-IN design. page 53

DC



HRN-36, HRN-36/2

Multifunction, supply and monitored voltage in range of DC 6-30 V, 1x (HRN-36) / 2x (HRN-36/2) output for Umax and Umin with adjustable levels. page 51



PMR1-36, PMR1-36/2

Same as HRN-36 and HRN-36/2, but in PLUG-IN design. page 53



HRN-56/208

Adjustable level Umin. page 55



HRN-56/240

Adjustable level Umin. page 55



HRN-56/400

Adjustable level Umin. page 55



HRN-56/480

Adjustable level Umin. page 55



HRN-56/575

Adjustable level Umin. page 55



HRN3-81

Fixed range (208-480 V), asymmetry (2-10 % +OFF), 1x output contact, TRUE RMS. page 58



HRN3-70

Adjustable range (190-500 V), asymmetry (2-10 % +OFF), undervoltage (80-95 % from the range), restart delay (1-300 s), selectable memory, 2x output contact, TRUE RMS. page 56



PMR3-70

Same as HRN3-70, but in PLUG-IN design and with 1x output contact. page 56



HRN3-80

Adjustable range (208-480 V), asymmetry (2-10 % +OFF), undervoltage (80-95 % from the range), 1x output contact, TRUE RMS. page 58

Type	Design	Supply from	Galvanically isolated	Features				Phase			Setting			Description	Page		
				Phases	Monitored range	>U	<U	≈U	Failure	Sequence	Asymmetry	Delay	Restart delay			Hysteresis	Memory
HRN-31 HRN-31/2	1-M	monitored voltage	x	1	AC/DC 48 - 276 V	●	●	●	x	x	x	●	x	●	●	All types have 9 functions in total. 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).	51
HRN-32/2	1-M	monitored voltage	x	1	AC/DC 48 - 276 V	●	●	●	x	x	x	●	x	●	●		
HRN-36 HRN-36/2	1-M	monitored voltage	x	1	DC 6 - 30 V	●	●	●	x	x	x	●	x	●	●		
HRN-39 HRN-39/2	1-M	monitored voltage	x	1	AC/DC 24 - 150 V	●	●	●	x	x	x	●	x	●	●	Old types replacement: HRN-33 > HRN-31 HRN-34 > HRN-36 HRN-35 > HRN-32/2 HRN-37 > HRN-39	53
PMR1-31 PMR1-31/2	8-PIN	monitored voltage	x	1	AC/DC 48 - 276 V	●	●	●	x	x	x	●	x	●	●		
PMR1-36 PMR1-36/2	8-PIN	monitored voltage	x	1	DC 6 - 30 V	●	●	●	x	x	x	●	x	●	●		
PMR1-39 PMR1-39/2	8-PIN	monitored voltage	x	1	AC/DC 24 - 150 V	●	●	●	x	x	x	●	x	●	●	HRN-32/2: separated output contact for overvoltage and undervoltage	
HRN-56/208 HRN-56/240 HRN-56/400	1-M	monitored voltage	x	3	AC 3 x 125 - 276 V AC 3 x 144 - 276 V AC 3 x 240 - 460 V	x	●	x	●	●	x	●	x	x	x	Thanks to the power supply from all three phases, the relay is operational even if one phase fails.	55
HRN-56/480 HRN-56/575	3-M	monitored voltage	x	3	AC 3 x 228 - 550 V AC 3 x 345 - 660 V	x	●	x	●	●	x	●	x	x	x		
HRN3-70	3-M	monitored voltage	x	3	AC 3 x 190 - 500 V	x	x	● (fixed)	●	●	● (+ OFF)	●	●	x	●	Selectable nominal voltage from 190 to 500 V. Adjustable restart delay from 1 to 300 s. Two output contacts, changeover 16 A. * (o-fixed) = over voltage value is fixed (110% from selected range).	56
PMR3-70		monitored voltage	x	3	AC 3 x 190 - 500 V	x	x	● (fixed)	●	●	● (+ OFF)	●	●	x	●		
HRN3-80	1-M	monitored voltage	x	3	AC 3 x 208 - 480 V	x	●	x	●	●	● (+ OFF)	●	x	x	x	Selectable nominal voltage from 208 to 480 V.	58
HRN3-81	1-M	monitored voltage	x	3	AC 3 x 208 - 480 V	x	x	x	●	●	● (+ OFF)	●	x	x	x	Works in range from 208 to 480 V.	58



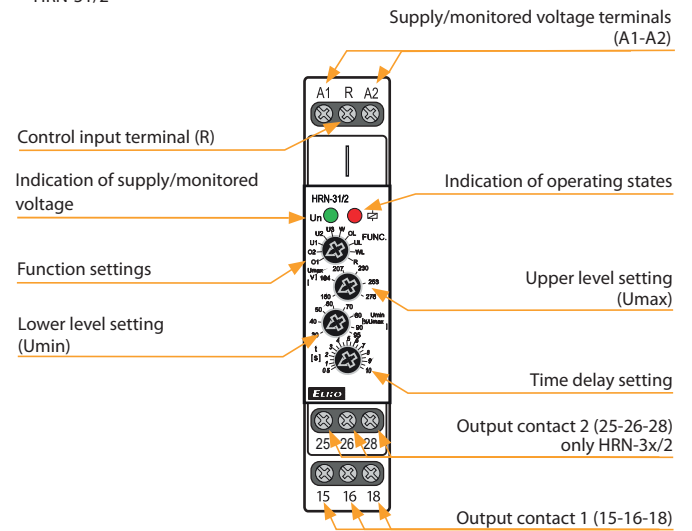
EAN code
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 HRN-31/2: 8595188184380
 HRN-32/2: 8595188185394
 HRN-36: 8595188184953
 HRN-36/2: 8595188182553
 HRN-39: 8595188184960
 HRN-39/2: 8595188184939

Technical parameters	HRN-31 HRN-31/2	HRN-32/2	HRN-36 HRN-36/2	HRN-39 HRN-39/2
Supply and measuring				
Supply/monitored terminals:	A1-A2			
Supply/monitored voltage:	AC/DC 48 – 276 VAC/DC 48 – 276 V (AC 50-60 Hz)	AC 50-60 Hz	DC 6 – 30 V	AC/DC 24 – 150 V (AC 50-60 Hz)
Consumption (max.):	2.5 VA/0.55 W 2.7 VA/0.65 W	2.7 VA/0.65 W	0.35 W 0.5 W	2.5 VA/0.55 W 2.7 VA/0.65 W
Upper level setting (Umax):	AC 160 – 276 V	AC 160 – 276 V	DC 12 – 30 V	AC 80 – 150 V
Lower level setting (Umin):	30 – 95 %Umax	30 – 95 %Umax	50 – 95 %Umax	30 – 95 %Umax
Max. permanent voltage:	AC 276 V	AC 276 V	DC 36 V	AC 276 V
Peak overload (1 s):	AC 290 V	AC 290 V	DC 48 V	AC 290 V
Time delay (d):	300 ms			
Time delay (t):	adjustable, 0.5 – 10 s			
Accuracy				
Setting accuracy (mech.):	5 % – mechanical setting			
Repeat accuracy:	< 1 %			
Temperature dependency:	< 0.1 %/°C (°F)			
Hysteresis	5 % (functions O1, U1, W)			
(fault to OK):	Umax – Umin (functions O2, U2, U3)			
Output				
Contact type:	1x changeover 2x changeover	1x changeover for each level	1x changeover 2x changeover	1x changeover 2x changeover
Contact material:	AgNi			
Current rating:	16 A/AC1; 1 HP 240 Vac, 1/2 HP 120 Vac; PD. B300			
Breaking capacity:	4000 VA/AC1, 384 W/DC1			
Switching voltage:	250 V AC/24 V DC			
Power dissipation (max.):	HRN-3x (1.2 W) HRN-3x/2 (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:	AC 4 kV (supply – output)			
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. 1x 2.5, 2x 1.5/ max. 1x 2.5 (AWG 14)			
Dimensions:	90 x 17.6 x 64 mm (3.5" x 0.7" x 2.5")			
Weight:	60 g (2.11 oz)	80 g (2.82 oz)	59 g (2.08 oz)	60 g (2.11 oz)
Standards:	EN 60255-1, EN 60255-26, EN 60255-27			

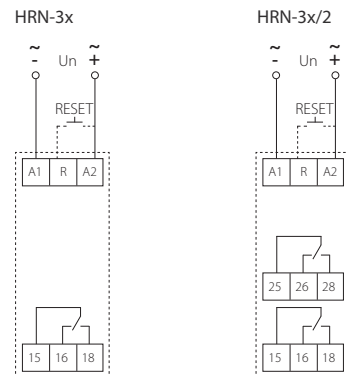
- It is used to monitor the value of alternating or direct voltage in 1-phase circuits.
- Supply voltage from monitored voltage.
- Monitors voltage exceeding the upper voltage level (Umax) and falling below the lower voltage level (Umin) – according to the selected function.
- Smooth adjustment of both voltage levels – the lower level Umin is set in % of the upper level Umax.
- Adjustable time delay (to eliminate short-term voltage drops and spikes).
- Option to select functions with fault state memory (Latch).
- The fault state memory can be reseted by the control input (R).
- Measures true root mean square value of the voltage - TRUE RMS.
- Type HRN-32/2 has an independent output contact for each voltage level.

Description

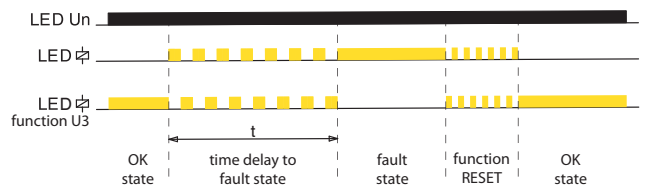
HRN-31/2



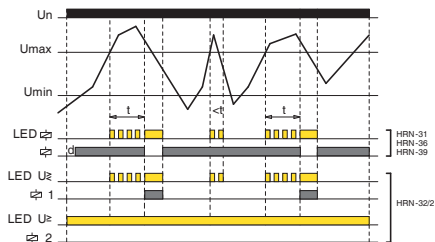
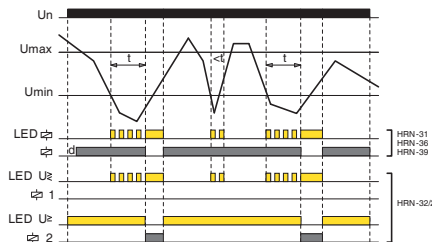
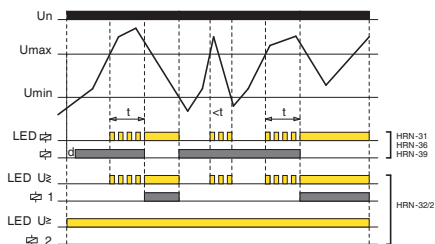
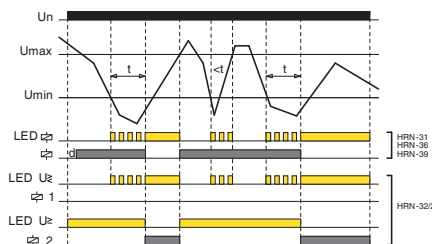
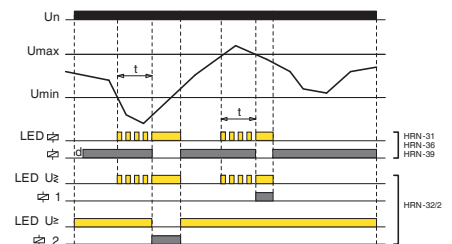
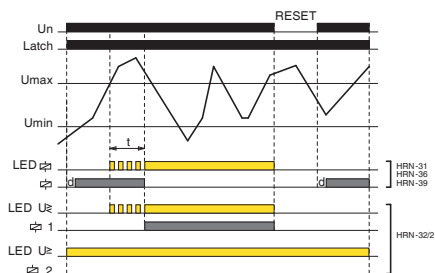
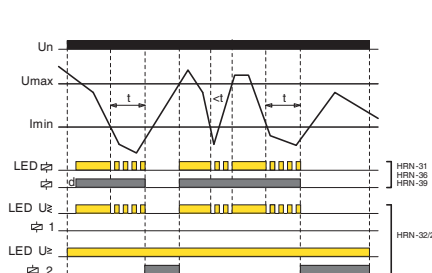
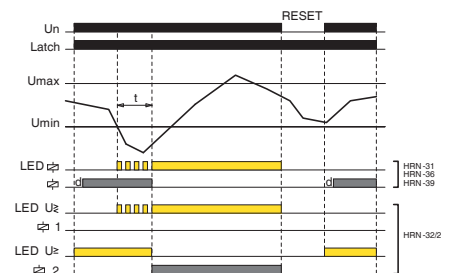
Connection



Indication of operating states



Function

O1 OVER (hysteresis 5%)**U1** UNDER (hysteresis 5%)**UL** UNDER + Latch**O2** OVER (hysteresis to U_{min})**U2** UNDER (hysteresis to U_{max})**W** WINDOW (hysteresis 5%)**OL** OVER + Latch**U3** UNDER (hysteresis to U_{max})**WL** WINDOW + Latch**OVER:**

If the value of the monitored voltage is lower than the set upper level „ U_{max} “, the output contact is closed. If the „ U_{max} “ is exceeded, the output contact will open after the set delay (fault state).

If the voltage falls below the fixed hysteresis (O1 function) or the set lower level „ U_{min} “ (O2 function), the output contact will close again.

If the OL function (OVER + Latch) is selected, when the upper voltage level „ U_{max} “ is exceeded, the output contact remains open even when the voltage returns from the fault state.

Fault memory reset can be done in three ways:

- Short-term interruption of supply voltage
- Using the control input (R)
- By setting the function switch to position R (RESET) or any function without memory fault

The RESET state lasts for 3 s after switching the function switch from the R position to a function with a memory fault (UL, OL, WL).

When moving to any other function from the R position, this delay does not apply.

UNDER:

If the value of the monitored voltage is higher than the set lower level „ U_{min} “, the output contact is closed. When the voltage drops below the „ U_{min} “, output contact opens after the set delay (fault state).

If the voltage exceeds the fixed hysteresis (function U1) or the set upper level „ U_{max} “ (function U2, U3), the output contact closes again.

If the UL function (UNDER + Latch) is selected, when the voltage drops below the lower level „ U_{min} “, the output contact remains open even when returning from the fault state. Fault memory reset can be done as in the previous case.

WINDOW:

If the value of the monitored voltage is lower than upper level „ U_{max} “ and at the same time higher than lower level „ U_{min} “, the output contact is closed. If the „ U_{max} “ is exceeded or drops below the „ U_{min} “, output contact opens after the set delay (fault state).

To return from the fault state, a fixed hysteresis is applied.

If the WL function (WINDOW + Latch) is selected, the fault state is again stored in memory and output contact stays open, even when returning from the fault state. Fault memory reset can be done as in the previous cases.



- It is used to monitor the value of alternating or direct voltage in 1-phase circuits.
- Supply voltage from monitored voltage.
- Monitors voltage exceeding the upper voltage level (Umax) and falling below the lower voltage level (Umin) – according to the selected function.
- Smooth adjustment of both voltage levels – the lower level Umin is set in % of the upper level Umax.
- Adjustable time delay (to eliminate short-term voltage drops and peaks).
- Option to select functions with fault state memory (Latch).
- The fault state memory can be reseted with a button on the panel (RESET).
- Measures true root mean square value of the voltage - TRUE RMS.

EAN code
 PMR1-31: (8595188188654)
 PMR1-31/2: (8595188185363)
 PMR1-36: (8595188188661)
 PMR1-36/2: (8595188188678)
 PMR1-39: (8595188188685)
 PMR1-39/2: (8595188188692)

Technical parameters	PMR1-31 PMR1-31/2	PMR1-36 PMR1-36/2	PMR1-39 PMR1-39/2
Supply and measuring			
Supply/monitored terminals:	2-7		
Supply/monitored voltage:	AC/DC48 – 276 V (AC 50-60 Hz)	DC 6 – 30 V -	AC/DC24 – 150 V (AC 50-60 Hz)
Consumption (max.):	2.5 VA/0.55 W 2.7 VA/0.65 W	0.35 W 0.5 W	2.5 VA/0.55 W 2.7 VA/0.65 W
Upper level setting (Umax):	AC 160 – 276 V	DC 12 – 30 V	AC 80 – 150 V
Lower level setting (Umin):	30 – 95 %Umax	50 – 95 %Umax	30 – 95 %Umax
Max. permanent voltage:	AC 276 V	DC 36 V	AC 276 V
Peak overload (1 s):	AC 290 V	DC 48 V	AC 290 V
Time delay (d):	300 ms		
Time delay (t):	adjustable, 0.5 – 10 s		

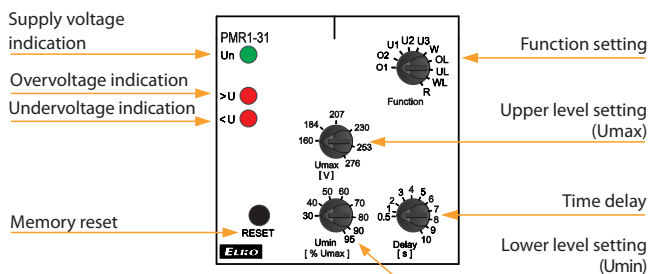
Accuracy	
Setting accuracy (mech.):	5 % – mechanical setting
Repeat accuracy:	< 1 %
Temperature dependency:	< 0.1 %/°C (°F)
Hysteresis (fault to OK):	5 % (functions O1, U1, W) Umax – Umin (functions O2, U2, U3)

Output			
Contact type:	1x changeover 2x changeover	1x changeover 2x changeover	1x changeover 2x changeover
Contact material:	AgNi		
Current rating:	16 A/AC1; 1 HP 240 Vac, 1/2 HP 120 Vac; PD. B300		
Breaking capacity:	4000 VA/AC1, 384 W/DC1		
Switching voltage:	250 V AC/24 V DC		
Power dissipation (max.):	PMR1-3x (1.2 W) PMR1-3x/2 (2.4 W)		
Mechanical life:	10.000.000 ops.		
Electrical life (AC1):	100.000 ops.		

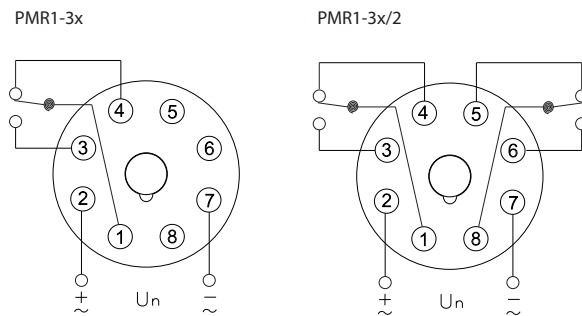
Other information	
Operating temperature:	-20 .. 55 °C (-4 .. 131 °F)
Storage temperature:	-30 .. 70 °C (-22 .. 158 °F)
Dielectric strength:	AC 4 kV (supply – output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP40 front panel / IP20 terminals
Overvoltage category:	III.
Pollution degree:	2
Dimensions:	48 x 48 x 79 mm (1.89" x 1.89" x 3.11")
Weight:	94 g (3.32 oz) 94 g (3.32 oz) 94 g (3.32 oz) 105 g (3.7 oz) 105g (3.7 oz) 105g (3.7 oz)
Standards:	EN 60255-1, EN 60255-26, EN 60255-27

Description

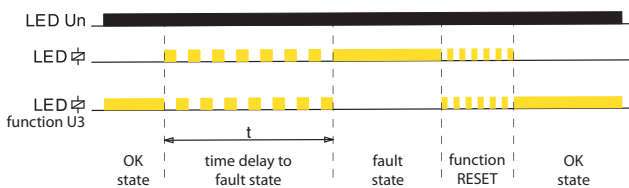
PMR1-31

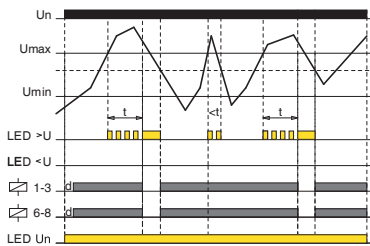
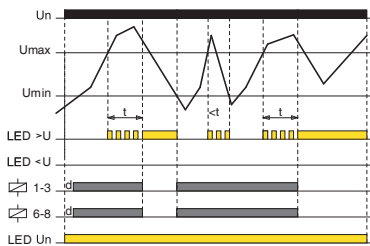
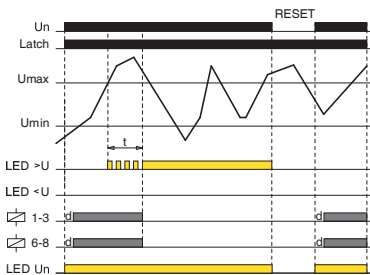
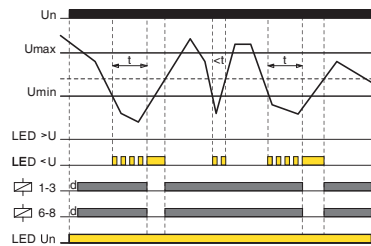
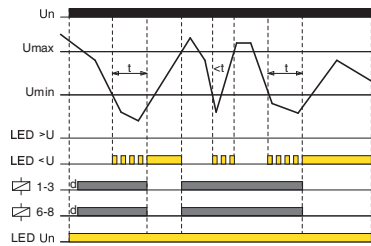
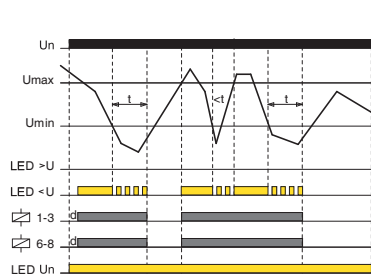
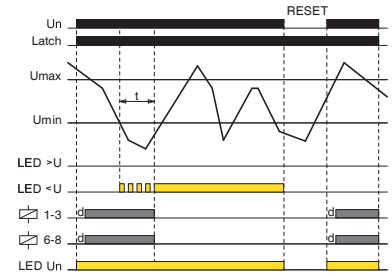
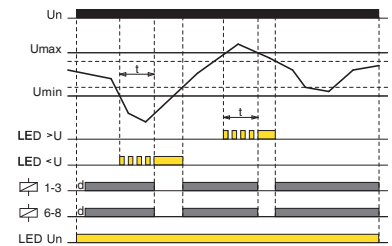
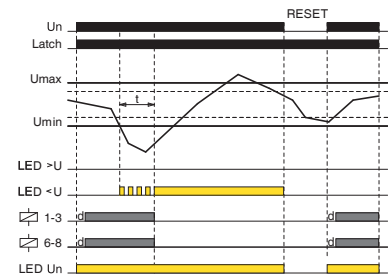


Connection



Indication of operating states



O1 OVER (hysteresis 5%)**O2 OVER (hysteresis to Umin)****OL OVER + Latch****U1 UNDER (hysteresis 5%)****U2 UNDER (hysteresis to Umax)****U3 UNDER (hysteresis to Umax)****UL UNDER + Latch****W WINDOW (hysteresis 5%)****WL WINDOW + Latch****OVER:**

If the value of the monitored voltage is lower than the set upper level „Umax“, the output contact is closed. If the „Umax“ is exceeded, the output contact will opens after the set delay (fault state).

If the voltage falls below the fixed hysteresis (O1 function) or the set lower level „Umin“ (O2 function), the output contact will closes again.

If the OL function (OVER + Latch) is selected, when the upper voltage level „Umax“ is exceeded, the output contact remains open even when the voltage returns from the fault state.

Fault memory reset can be done in three ways:

- Using memory reset button on the panel
- Short-term interruption of supply voltage
- By setting the function switch to position R (RESET) or any function without memory fault

The RESET state lasts for 3 s after switching the function switch from the R position to a function with a memory fault (UL, OL, WL).

When moving to any other function from the R position, this delay does not apply.

UNDER:

If the value of the monitored voltage is higher than the set lower level „Umin“, the output contact is closed. When the voltage drops below the „Umin“, output contact opens after the set delay (fault state).

If the voltage exceeds the fixed hysteresis (function U1) or the set upper level „Umax“ (function U2, U3), the output contact closes again.

If the UL function (UNDER + Latch) is selected, when the voltage drops below the lower level „Umin“, the output contact remains open even when returning from the fault state. Fault memory reset can be done as in the previous case.

WINDOW:

If the value of the monitored voltage is lower than upper level „Umax“ and at the same time higher than lower level „Umin“, the output contact in closed. If the „Umax“ is exceeded or drops below the „Umin“, output contact opens after the set delay (fault state).

To return from the fault state, a fixed hysteresis is applied.

If the WL function (WINDOW + Latch) is selected, the fault state is again stored in memory and output contact stays open, even when returning from the fault state. Fault memory reset can be done as in the previous cases.



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 delay t1 (500 ms), adjustable delay t2 (0.1 - 10 s) and fixed delay t3 (max. 1 s).

Technical parameters	HRN-56				
	208	240	400	480	575
Supply/monitoring 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				
Time delay t3:	max. 1 s				

Output	
Number of contacts:	1x changeover/SPDT (AgNi/Silver Alloy)
Current rating:	8 A/AC1; 1/3 HP 240 Vac, 1/4 HP 120 Vac; PD. B300
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.

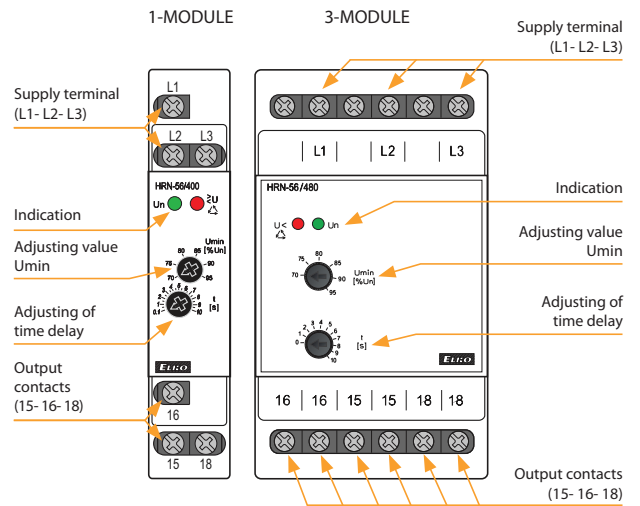
Other information	
Operating temperature:	-20 .. +55 °C (-4 .. 131 °F)
Storage temperature:	-30 .. +70 °C (-22 .. 158 °F)
Dielectrical strength:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP40 from front panel/ IP10 terminals IP40 from front panel/ IP20 terminals
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm²):	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

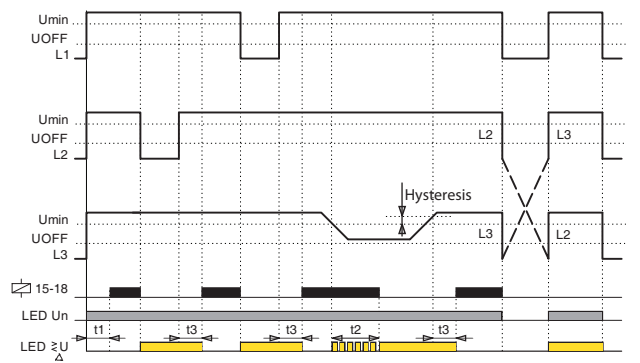
Relay in 3-phase main monitors correct phase sequence and phase failure. Green LED illuminates permanently and indicates energization. In case of phase failure red LED flashes and relay turns off. When changing to faulty state, time delay applies - delay setting is done by potentiometer on the front 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_{off} 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.

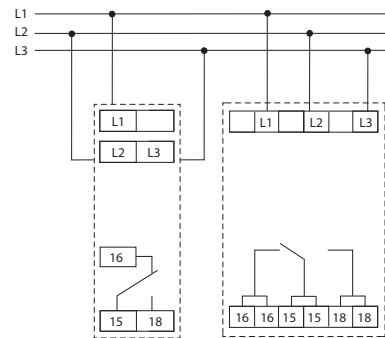
Description



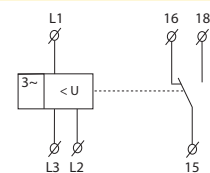
Function



Connection



Symbol



NEW

UL LISTED
E308660

EAN code
HRN3-70: 8595188188838
PMR3-70: 8595188185288

Technical parameters	HRN3-70	PMR3-70
Supply/monitored terminals:	L1-L2-L3	3-4-5
Supply/monitored voltage:	AC 3× 190 – 500 V (50-60 Hz)	
Consumption (max.):	2 VA/1 W	
Upper level (U _{max}):	110 %Un	
Lower level (U _{min}):	80 – 95 %Un	
Asymmetry:	adjustable, 2 – 10 %Un + OFF	
Max. permanent voltage:	AC 3× 550 V	
Peak overload (1 s):	AC 3× 600 V	
Time delay (t1):	2 s	
Time delay (t2):	adjustable, 0,3 – 30 s	
Time delay (t3):	adjustable, 1 – 300 s	
Accuracy:		
Hysteresis (fault to OK):	5 %	
Output		
Contact type:	2× changeover (AgNi)	1× changeover (AgNi)
Current rating:	16 A/AC1; 1 HP 240 Vac, 1/2 HP 120 Vac; PD. B300	
Breaking capacity:	4000 A/AC1, 384 W/DC1	
Switching voltage:	250 V AC/24 V DC	
Power dissipation (max.):	2.4 W	1.2 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 1	AC 4 kV	AC 2.5 kV
supply – output 2	AC 4 kV	-
output 1 – output 2	AC 4 kV	-
Operating position:	any	
Mounting:	DIN rail EN 60715	into socket (8-pin)
Protection degree:	IP40 front panel / IP20 terminals	IP40
Oversvoltage category:	III.	
Pollution degree:	2	
Cross-wire section – solid/ stranded with ferrule (mm ²):	max. 1× 2.5, 2× 1.5/ max. 1× 2.5 (AWG 14)	max. 1× 4, 2× 2.5/ max. 1× 4 (AWG 12)
Dimensions:	90 × 52 × 66 mm	48 × 48 × 79 mm
Weight:	140 g (4.94 oz)	100 g (3.53 oz)
Standards:	EN 60255-1, EN 60255-26, EN 60255-27	

Range switch (Un)

The range switch has two ranges of phase-to-phase voltage values:

low (190 to 250V) and high (380 to 500V)

After connecting to the supply/monitored voltage, the device evaluates voltage size and selects the corresponding range of values. When switching between individual positions within the selected range, the green „LED Un“ will flash briefly.

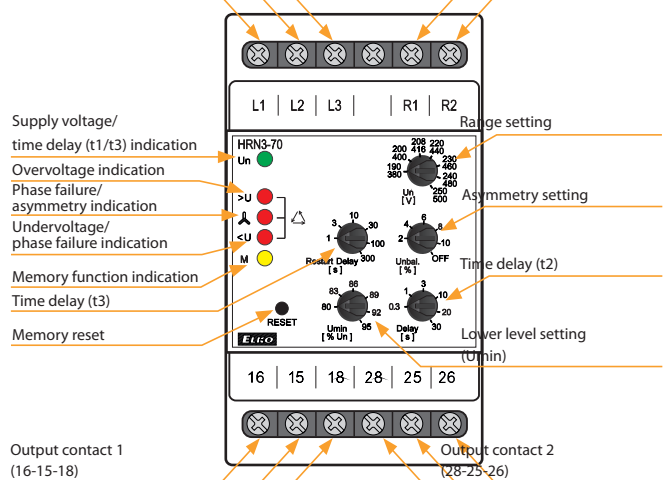
- It is used for monitoring of voltage, phase failure, sequence and asymmetry in 3-phase network.
- Wide range of monitored voltage with automatic selection of a low/high range.
- Fixed overvoltage level (U_{max}), adjustable undervoltage level (U_{min}).
- Adjustable time delay t2 (to eliminate short-term voltage drops and peaks).
- Adjustable time delay t3 (to eliminate short-term OK state).
- Adjustable asymmetry level with option to turn it OFF.
- Measures true root mean square value of the voltage - TRUE RMS.
- Fault memory reset can be done by RESET button on the panel or by an external opening contact.

Description

HRN3-70

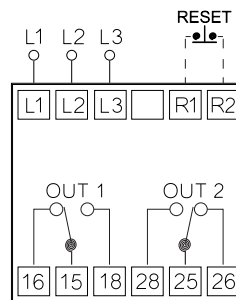
Supply/monitored terminals
(L1-L2-L3)

External reset terminals
of memory (R1-R2)

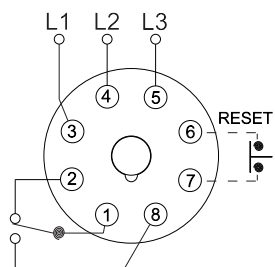


Connection

HRN3-70

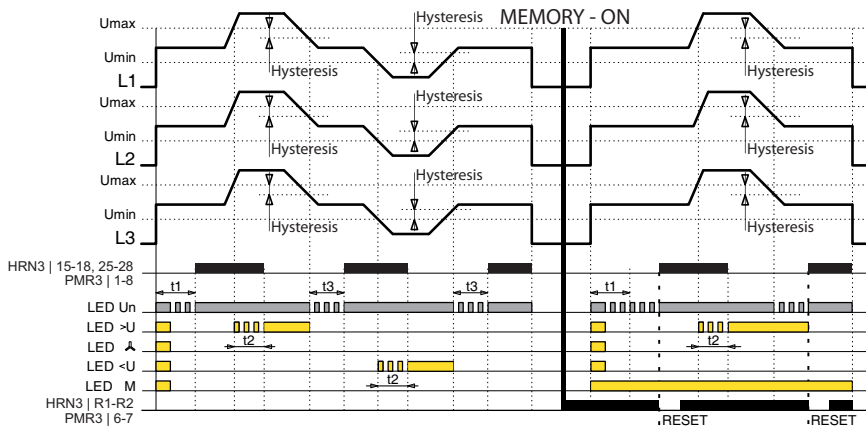


PMR3-70



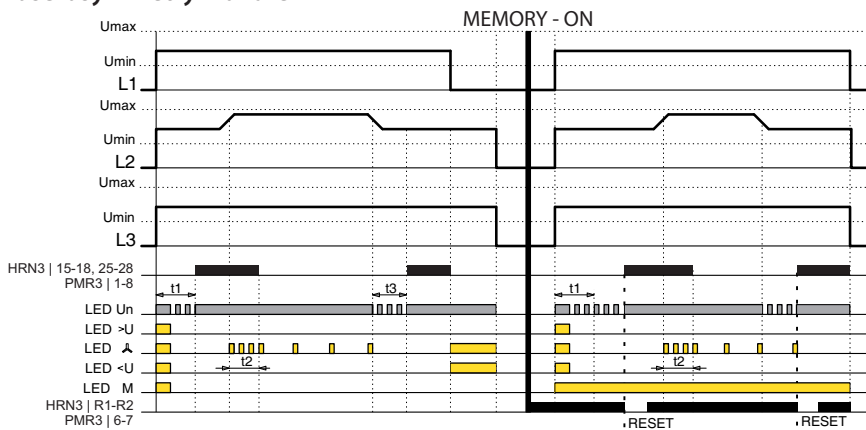
Function

Overvoltage - undervoltage

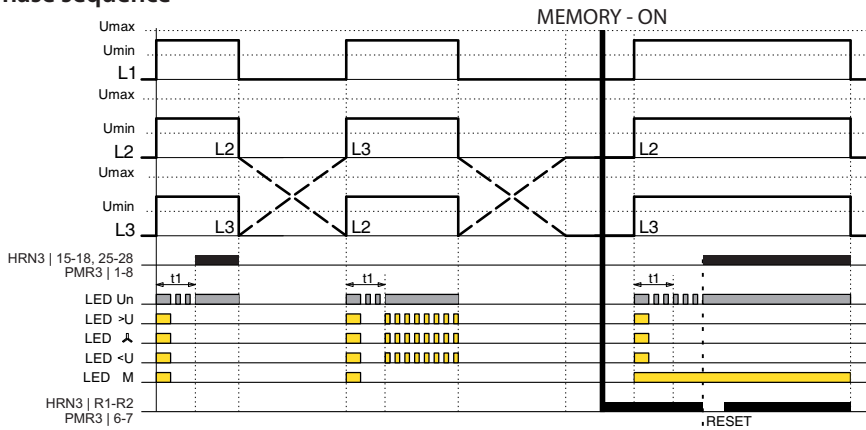


Graphs legend:
 L1, L2, L3 = 3-phase voltage
 RESET = memory reset
 t1 = time delay, after connecting to voltage
 t2 = time delay into fault state
 t3 = time delay to OK state
 15-18 = output contact 1 (HRN3)
 25-28 = output contact 2 (HRN3)
 1-8 = output contact (PMR3)
 LED >U = overvoltage indication
 LED \leq = undervoltage/phase failure indication
 LED Δ = phase failure/asymmetry indication
 LED M = memory function indication
 LED Un = supply/monitored voltage, time delay t1 and t3 indication

Phase asymmetry - failure



Phase sequence



After connecting the device to the supply voltage, all the LEDs on the panel will flash briefly.

If a 3-phase voltage is connected to the monitoring relay and all conditions are met (correct voltage magnitude, sequence and phase asymmetry), the output contacts close after the time delay t1 has elapsed. During the time delay, the green „LED Un“ flashes, after the end of the delay it lights up permanently (OK state).

- When the voltage exceeds or falls outside the „Umin“ and „Umax“ levels, after the time delay t2 the green and the corresponding red „LED \leq “ light up.

The output contacts are open (fault state). During the time delay, the red LED flashes.

- If the phase sequence is incorrect when the power is connected, after the time delay t1 the green „LED Un“ lights up + all 3 red „LED Δ “ flash simultaneously. The output contact is open (fault state). During the time delay, the green LED flashes.

- When the set phase asymmetry is exceeded, after the time delay t2 the green „LED Un“ lights up and the red „LED Δ “ flashes briefly.

The output contact is open (fault state). During the time delay, the red LED flashes rapidly.

- In the event of a phase failure, the output contacts open without a time delay t2 (fault state), the green „LED Un“ and the corresponding red „LED \leq “, light up.

- To return from the fault state to the OK state, the time delay t3 is always applied. During this time delay, the green „LED Un“ flashes.

Reset and fault state memory activation:

By connecting terminals R1-R2 or pins 6-7 in the PLUG-IN version via an external push button with a break contact (RESET), the fault state memory is activated. After turning on the power, the yellow „LED M“ on the device panel lights up. If a fault condition occurs, it is stored in memory. The red LED signalize fault just like in mode with fault state memory turned off. If the voltage values return to the set levels, the corresponding red LED will be permanently lit and at the same time the green „LED Un“ will start flashing. It is now possible to reset fault memory state, this closes the output contact and the red LED goes out (OK state). Fault memory reset (RESET) is performed either with an external pushbutton or with the pushbutton on device panel.

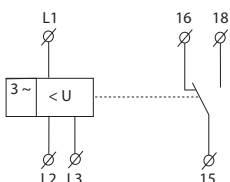


EAN code
HRN3-80: 8595188188814
HRN3-81: 8595188188821

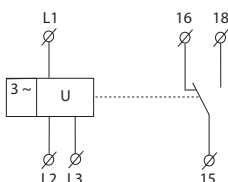
Technical parameters	HRN3-80	HRN3-81
Supply and measuring		
Supply/monitored terminals:	L1-L2-L3	
Supply/monitored voltage:	AC 3× 208 – 480 V (50-60 Hz)	
Consumption (max.):	2 VA/1 W	
Range setting:	adjustable	fixed
Lower level setting (Umin):	80 – 95 %Un	x
Asymmetry setting:	adjustable, 2 – 10 %Un + OFF	
Max. permanent voltage:	AC 3× 550 V	
Peak overload (1 s):	AC 3× 600 V	
Time delay (t1):	2 s	
Time delay (t2):	adjustable, 0,3 – 30 s	
Accuracy		
Setting accuracy (mech.):	5 %	
Repeat accuracy:	< 1 %	
Temperature dependency:	< 0.1 %/°C (°F)	
Hysteresis (fault to OK):	5 %	
Output		
Contact type:	1x changeover/SPDT (AgNi)	
Current rating:	16 A/AC1; 1 HP 240 Vac, 1/2 HP 120 Vac; PD. B300	
Breaking capacity:	4000 A/AC1, 384 W/DC1	
Switching voltage:	250 V AC/24 V DC	
Power dissipation (max.):	1.2 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:	AC 4 kV (supply – output)	
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 (mm ²):	max. 1× 2.5, 2× 1.5/ max. 1× 2.5 (AWG 14)	
Dimensions:	90 × 52 × 66 mm	
Weight:	66 g (2.32 oz)	64 g (2.26 oz)
Standards:	EN 60255-1, EN 60255-26, EN 60255-27	

Symbol

HRN3-80



HRN3-81

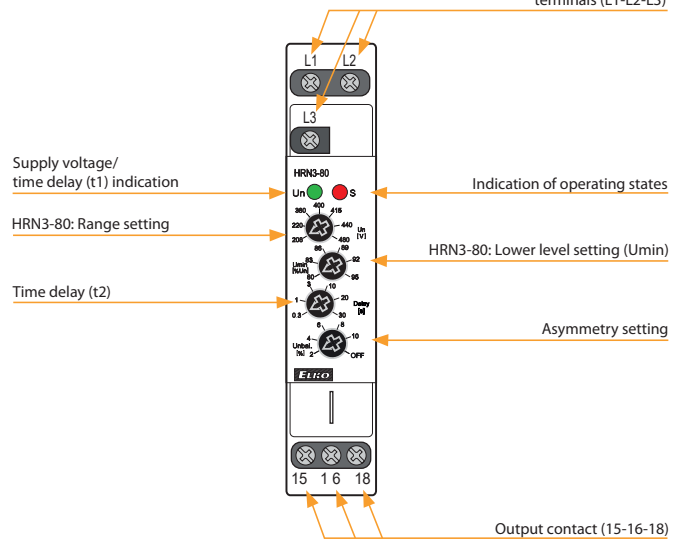


- The relay is designed to monitor undervoltage (HRN3-80), phase loss, sequence and asymmetry in 3-phase network.
- Power supply from monitored circuit.
- HRN3-80:** Monitors the drop below the lower voltage level (Umin).
- HRN3-80:** The lower level of Umin is set in % of the selected range.
- Wide range of monitored voltage 208 – 480 V.
- Adjustable time delay (to eliminate short-term voltage drops).
- Measures true root mean square value of the voltage - TRUE RMS.
- Adjustable level of asymmetry with the option to turn it off.

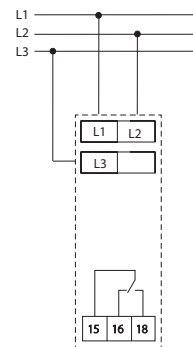
Description

HRN3-80

Supply/monitored voltage terminals (L1-L2-L3)

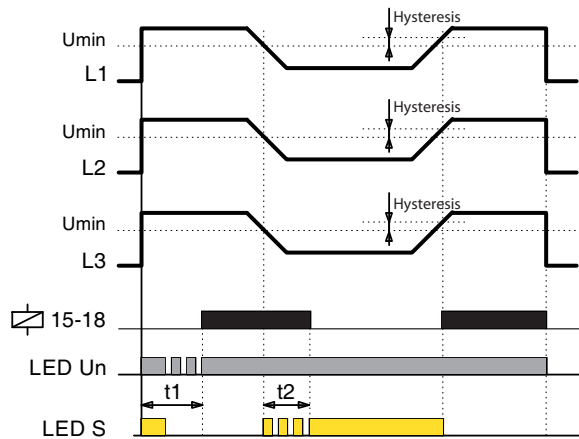


Connection



Function

Undervoltage:



After connecting the device to the supply voltage, both LEDs on the panel will flash briefly.

If 3-phase voltage is connected to the monitoring relay and all conditions are met (correct voltage level, phase sequence and asymmetry), the output contact closes after the time delay t_1 elapsed.

During the time delay, the green „LED Un“ flashes, at the end of the delay „LED Un“ lights up continuously (OK state).

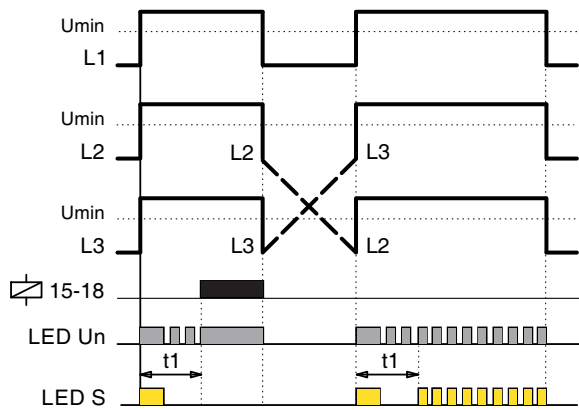
When the voltage drops below the lower level „Umin“ (HRN3-80 only), after the time delay t_2 has elapsed the green and red LEDs are lit. The output contact is open (fault state).

During the time delay t_2 , the red „LED S“ flashes quickly.

If the phase sequence is incorrect when the power supply is connected, after the time delay t_1 has elapsed the green and red LED flashes quickly. The output contact is open (fault state).

During the time delay t_1 , the green „LED Un“ flashes.

Phase sequence:



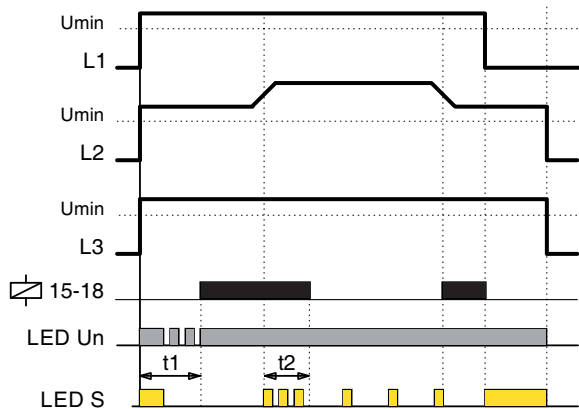
When the set phase asymmetry is exceeded, after the time delay t_2 has elapsed the green LED is lit and the red LED flashes briefly. The output contact is open (fault state).

During the time delay t_2 , the red „LED S“ flashes quickly.

In the event of phase failure, the output contact opens without a time delay t_2 (fault state), the green and red LEDs are lit.

The return from the fault state to the OK state occurs without a time delay.

Phase asymmetry, failure:



AC

**PRI-32**

Monitoring by current transformer (wire through an opening, galv. separated, without heat loss), adjust. current 1-20 A, multivoltage AC 24-240 and DC 24 V, output 8 A changeover. page 61

**PRI-34**

Multifunction current monitoring relay, measured by built-in current transformer, 5 rated currents (1 A-16 A), 1 A and 5 A range is suitable for external current transformer, AC/DC supply 24-240 V, output 8 A prep. page 62

**PRI-51**

Monitoring of current by in-built transformer, 7 ranges, range 5 A is suitable for current transformer, supply and output as PRI-32, difference from PRI-32: direct monitoring and finer ranges (higher sensitivity) = higher accuracy in measuring. page 64

Type	Design	Supply voltage	Galvanically separated	Monitored parameters					Setting			Description	Page
				Phases	Range	> I	< I	<> I	Delay	Hysteresis	Memory faultS		
PRI-32	1-M	AC 24-240 V DC 24 V	●	1	AC 1 - 20 A	●	x	x	x	x	x	Monitors the overflow of the current flowing through the guarded conductor, passed through the hole in the panel.	61
PRI-34/1A PRI-34/2A PRI-34/5A PRI-34/8A PRI-34/16A	1-M	AC/DC 24-240 V	x	1	AC 0.05 - 1 A AC 0.1 - 2 A AC 0.25 - 5 A AC 0.4 - 8 A AC 0.8 - 16 A	●	●	●	●	●	●	Monitors the current depending on the selected function. The power supply is not galvanically isolated from the monitored current terminals. It is possible to connect ext. current transformer.	62
PRI-51/0.5A PRI-51/1A PRI-51/0.1-10A PRI-51/2A PRI-51/5A PRI-51/8A PRI-51/16A	1-M	AC 24-240 V DC 24 V	●	1	AC 0.05 - 0.5 A AC 0.1 - 1 A AC 0.1-10 A AC 0.2 - 2 A AC 0.5 - 5 A AC 0.8 - 8 A AC 1.6 - 16 A	●	x	x	●	x	x	Monitors the excess current flowing through the conductor connected to the monitored terminals. The power supply is galvanically isolated from the monitored current terminals. It is possible to connect ext. current transformer.	64



EAN code
PRI-32: 8595188121965

Technical parameters **PRI-32**

Supply circuit

Supply terminals:	A1 - A2
Voltage range:	AC 24 - 240 V, DC 24 V (AC 50-60 Hz)
Burden:	max. 1.5 VA/1 W
Max. dissipated power (Un + terminals):	2 W
Operating range:	-15 %; +10 %

Measuring circuit

Current range:	1 - 20 A (AC 50-60 Hz)
Current adjustment:	potentiometer

Accuracy

Setting accuracy (mech.):	5 %
Repeat accuracy:	< 1 %
Temperature dependancy:	< 0.1 %/°C (°F)
Limit values tolerance:	5 %
Overload capacity:	max. 100 A/10 s

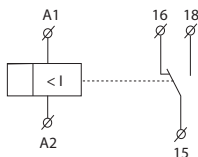
Output

Number of contacts:	1x changeover/SPDT (AgNi/Silver Alloy)
Current rating:	8 A/AC1; 1/3 HP 240 Vac, 1/4 HP 120 Vac; PD. B300
Breaking capacity:	2000 VA/AC1, 240 W/DC
Output indication:	red LED
Mechanical life:	60.000.000 ops.
Electrical life (AC1):	150.000 ops.

Other information

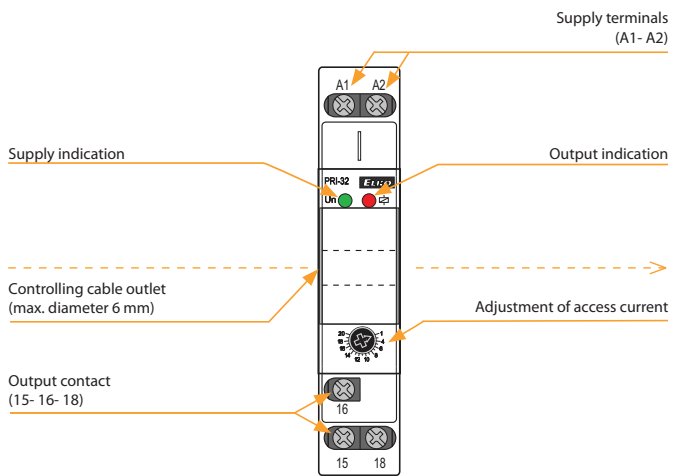
Operating temperature:	-20 .. 55 °C (-4 .. 131 °F)
Storage temperature:	-30 .. 70 °C (-22 .. 158 °F)
Dielectrical strength:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP40 from front panel/IP10 terminals
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm ²):	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 80.5 mm (3.5" x 0.7" x 3.2")
Weight:	75 g (2.6 oz.)
Standards:	EN 60255-1, EN 60255-26, EN 60255-27

Symbol

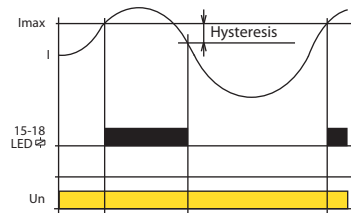


- Current transformer is a part of the product. Inside this transformer there is a wire which senses the volume of flowing current.
- This construction reduces thermal stress of product when compared with conventional solutions with inbuilt shunt, and increases current range up to 20 Amps, and galvanically separates monitored circuit.
- For heating bars in sliding rails, heating cables, indication of current flow, controlling of 1-phase motor consumption,...
- Supply is galvanically separated from measuring current.
- Current exceeding - current flowing through monitored wire must not exceed 100 A.

Description

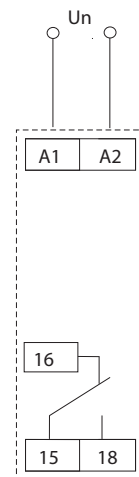


Function



Monitoring relay PRI-32 serves to monitor current level in single phase AC circuits. Due to its fluent adjustment of release current, it is predestined for applications with necessity of current flow indication, and can be used as precedence relay. Output relay is off in normal state. In case the set current level is exceeded, it switches. Multivoltage supply is an advantage.

Connection



NEW

UL LISTED
E308660

EAN code
 PRI-34/1A: 8595188188968
 PRI-34/2A: 8595188182829
 PRI-34/5A: 8595188182836
 PRI-34/8A: 8595188188975
 PRI-34/16A: 8595188182843

Technical parameters

PRI-34

Supply

Supply terminals:	A1 – A2
Supply voltage:	AC/DC 24 – 240 V (AC 50-60 Hz)
Consumption (max.):	3.8 VA/0.7 W
Supply voltage tolerance:	-15 %; +10 %

Measuring circuit

Current range:	PRI-34/1A In - 1A PRI-34/2A In - 2A PRI-34/5A In - 5A PRI-34/8A In - 8A PRI-34/16A In - 16A (AC 50-60 Hz)
Max. permanent current peak overload (1 s):	PRI-34/1A 2A/10A PRI-34/2A 4A/10A PRI-34/5A 10A/16A PRI-34/8A 16A/16A PRI-34/16A 17A/32A
Upper level setting (Imax):	10 – 100 %In
Lower level setting (Imin):	5 – 95 %In
Time delay (d):	300 ms
Time delay (t):	adjustable, 0.5 – 10 s

Accuracy

Setting accuracy (mech.):	5 %
Repeat accuracy:	< 1 %
Temperature dependency:	< 0.1 %/°C
Limit values tolerance:	5 %
Hysteresis (fault to OK):	5 % (function O1, U1, W) Imax – Imin (function O2, U2)

Output

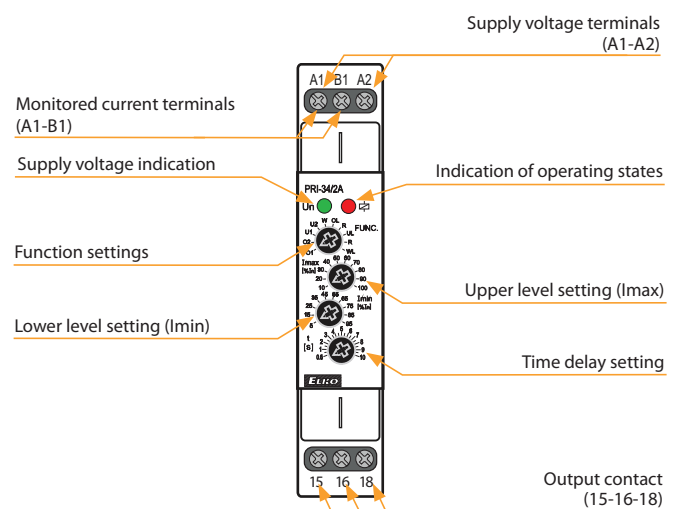
Contact type:	1x changeover (AgNi)
Current rating:	16 A/AC1; 1 HP 240 Vac, 1/2 HP 120 Vac; PD. B300
Breaking capacity:	4000 VA/AC1, 384 W/DC1
Switching voltage:	250 V AC/24 V DC
Power dissipation (max.):	1.2 W
Mechanical life:	10.000.000 ops.
Electrical life (AC1):	100.000 ops.

Other information

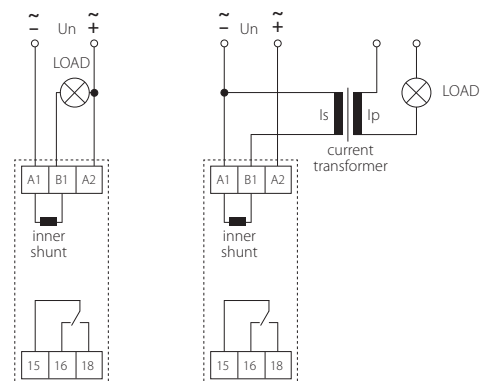
Operating temperature:	-20 .. +55 °C (-4 .. 131 °F)
Storage temperature:	-30 .. +70 °C (-22 .. 158 °F)
Dielectric strength:	AC 4 kV (supply – output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP40 front panel / IP20 terminals
Overvoltage category:	III.
Pollution degree:	2
Cross-wire section – solid/stranded with ferrule (mm ²):	max. 1x 2.5, 2x 1.5/ max. 1x 2.5 (AWG 14)
Dimensions:	90 × 17.6 × 64 mm (3.5" × 0.7" × 2.5")
Weight:	60 g (2.15 oz)
Standards:	EN 60255-1, EN 60255-26, EN 60255-27

- It is used to monitor the value of alternating current, e.g.: motors, heating cables, lamps and other devices.
- Power supply and monitoring circuits are not galvanically isolated.
- Monitors current exceeding the upper current level (Imax) and falling below the lower current level (Imin) – according to the selected function.
- Smooth adjustment of both current levels.
- Adjustable time delay (to eliminate short-term current drops and spikes).
- Option to select functions with fault state memory (Latch).
- Measures true root mean square value of the current - TRUE RMS.
- Possibility to extend the current range using an external current transformer.

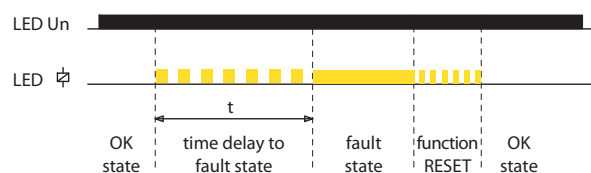
Description



Connection

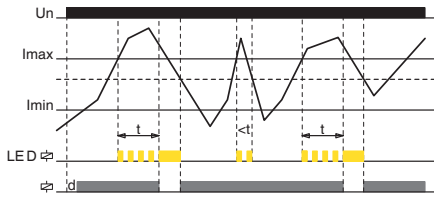


Indication of operating states

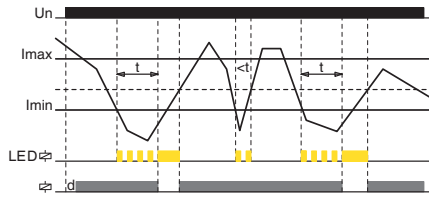


Function

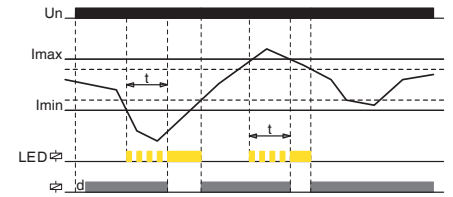
O1 OVER (hysteresis 5%)



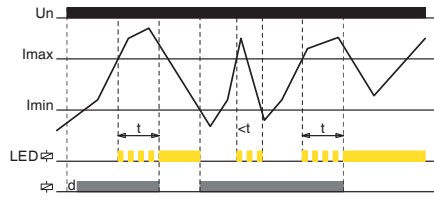
U1 UNDER (hysteresis 5%)



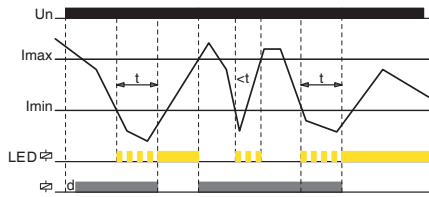
W WINDOW (hysteresis 5%)



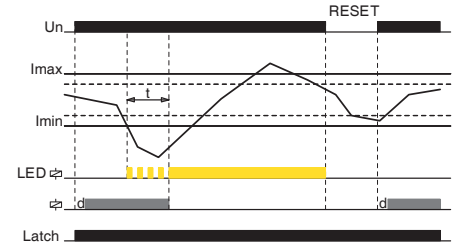
O2 OVER (hysteresis to Imin)



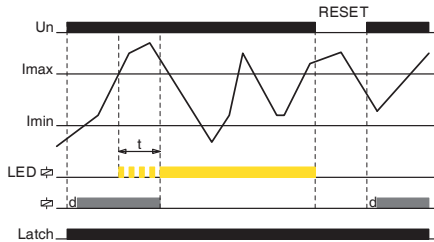
U2 UNDER (hysteresis to Imax)



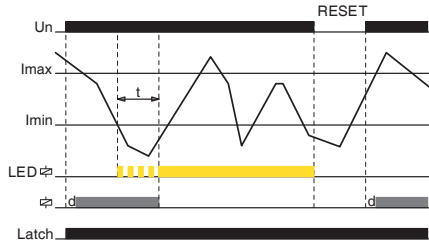
WL WINDOW + Latch



OL OVER + Latch



UL UNDER + Latch



Graphs legend:
 t = time delay to fault state
 d = delay 0.3 s after connection of power supply (Un)

OVER:

- If the value of the monitored current is lower than the set upper level „Imax“, the output contact is closed. If the „Imax“ is exceeded, the output contact will open after the set delay (fault state).
- If the current falls below the fixed hysteresis (function O1) or the set lower level „Imin“ (function O2), the output contact will closes again.
- If the OL function (OVER + Latch) is selected, when the upper current level „Imax“ is exceeded, the output contact remains open even when the current returns from the fault state.

Fault memory reset can be done in two ways:

- Short-term interruption of supply voltage.
- By setting the function switch to position R (RESET) or any function without memory fault.

The RESET state lasts for 3 s after switching the function switch from the R position to a function with memory fault (UL, OL, WL).

When moving to any other function from the R position, this delay does not apply.

UNDER:

- If the value of the monitored current is higher than the set lower level „Imin“, the output contact is closed. When the current drops below the „Imin“, output contact opens after the set delay (fault state).
- If the current exceeds the fixed hysteresis (function U1) or the set upper level „Imax“ (function U2), the output contact closes again.
- If the UL function (UNDER + Latch) is selected, when the current drops below the lower level „Imin“, the output contact remains open even when returning from the fault state. Fault memory reset can be done as in the previous case.

WINDOW:

- If the value of the monitored current is lower than upper level „Imax“ and at the same time higher than lower level „Imin“, the output contact in closed. If the „Imax“ is exceeded or drops below the „Imin“, output contact opens after the set delay (fault state).
- To return from the fault state, a fixed hysteresis is applied.
- If the WL function (WINDOW + Latch) is selected, the fault state is again stored in memory and output contact stays open, even when returning from the fault state. Fault memory reset can be done as in the previous cases.



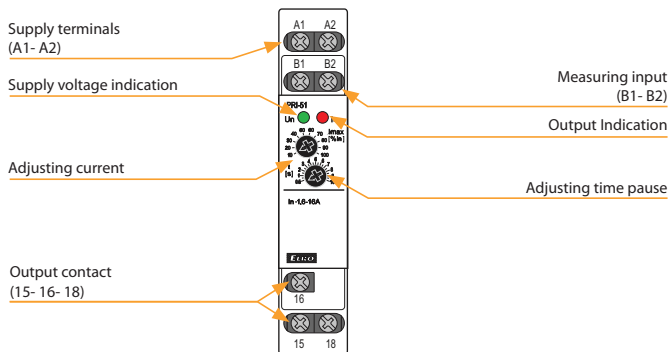
EAN code
 PRI-51/0.5A: 8595188142885
 PRI-51/1A: 8595188124904
 PRI-51/2A: 8595188124911
 PRI-51/5A: 8595188124928
 PRI-51/8A: 8595188124935
 PRI-51/0.1-10A: 8595188155717
 PRI-51/16A: 8595188124942

Technical parameters		PRI-51
Supply circuit		
Supply terminals:	A1 - A2	
Voltage range:	AC 24 - 240 V and DC 24 V (AC 50-60 Hz)	
Burden:	max. 25 VA/1.6 W	
Max. dissipated power (U _n + terminals):	2.5 W	
Supply voltage tolerance:	-15 %; +10 %	
Measuring circuit		
Load:	between B1 - B2	
Current range:	PRI-51/0.5 A: AC 0.05-0.5 A PRI-51/8 A: AC 0.8-8 A PRI-51/1 A: AC 0.1-1 A PRI-51/0.1-10 A: AC 0.1-10 A PRI-51/2 A: AC 0.2-2 A PRI-51/16 A: AC 1.6-16 A PRI-51/5 A*: AC 0.5-5 A (AC 50-60 Hz)	
Max. permanent current:	PRI-51/0.5 A: 2 A PRI-51/1 A: 4 A PRI-51/2 A: 8 A PRI-51/0.1-10 A: 10 A PRI-51/5 A, PRI-51/8 A, PRI-51/16 A: 17 A	
Inrush overload <1ms:	50 A	
Current adjustment:	potentiometer	
Time delay:	adjustable 0.5 - 10 s	
Accuracy		
Setting accuracy (mechanical):	5 %	
Repeat accuracy:	< 1 %	
Temperature dependency:	< 0.1 %/°C (°F)	
Limit values tolerance:	5 % (10 % for 0.05 - 0.5 A and 0.1 - 10 A range)	
Hysteresis (fault to OK):	5 %	
Mechanical life:	60.000.000 op.	
Electrical life (AC1):	150.000 op.	
Output		
Number of contacts:	1x changeover/SPDT (AgNi/Silver Alloy)	
Current rating:	8 A/AC1; 1/3 HP 240 Vac, 1/4 HP 120 Vac; PD. B300	
Breaking capacity:	2000 VA/AC1, 240 W/DC	
Output indication:	red LED	
Other information		
Operating temperature:	-20 .. 55 °C (-4 .. 131 °F)	
Storage temperature:	-30 .. 70 °C (-22 .. 158 °F)	
Dielectrical 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 ²):	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:	72 g (2.5 oz.)	
Standards:	EN 60255-1, EN 60255-26, EN 60255-27	

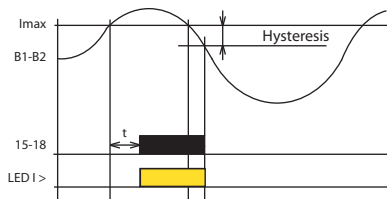
* applicable also for current transformer

- It serves for monitoring of heating in rail-switches, heating cables, consumption of 1-phase motors, indicates current flow.
- Flexible adjustment by potentiometer.
- Adjustable delay 0.5 - 10 s to eliminate short current peaks.
- It is possible to use for current scanning from current transformer.
- Supply is galvanically separated from measured current, it must be in the same phase.

Description



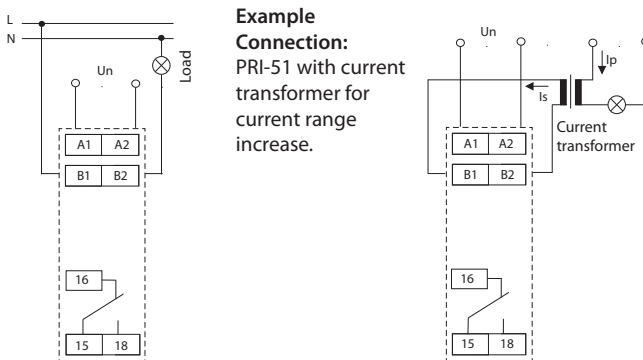
Function



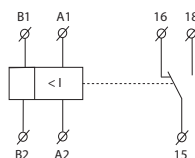
Monitoring relay PRI-51 serves to monitor current level in one-phase AC circuits. Gradual setting of actuating current of monitoring relay enables many different applications. Output relay is in normal state opened. After the set current level is reached, relay closes after the set delay (0.5 - 10 s). When returning from faulty to normal state there is a hysteresis (5 %). Multi-voltage of this relay is an advantage. It is possible to monitor load which doesn't have the same supply as monitoring relay PRI-51.

Range of PRI-51 can be increased by an external current transformer.

Connection



Symbol



Example of an order

Always specify all reference name of current relay according to required range, for example PRI-51/5.

Problematic choice of suitable relay contact for a particular load switched with a product is described below. Mostly we experience problems with incorrect choice of load (meaning incorrect relay for a particular load) which results in permanent switching of contact (sealing) or damage on relay contact – which then results in malfunction. What load can you use? Detailed types of load according to standard EN 60947 are described in charts below – categories of use.

Category of use	Typical use	EN
AC current, $\cos\phi = P/S$ (-)		
AC-1	Non-inductive or slightly inductive load, resistance furnace Includes all appliances supplied by AC current with power factor ($\cos \phi$) ≥ 0.95 Examples of usage: resistance furnace, industrial loads	60947-4
AC-2	Motors with slip-ring armature, switching off	60947
AC-3	Motors with short-circuit armature, motor switching when in operation This category applies to switching off motors with short-circuit armature while in operation. While switching, contactor switches current which is 5 up to 7 times rated current of motor.	60947-4
AC-4	Electro-motors with short-circuit armature: start up, braking by backset, changeover	60947
AC-5a	Switching of electrical gas-filled lights, fluorescent lights	60947-4
AC-5b	El. bulb switching Enables low contact loading due to resistance of cold fiber is many times smaller than the one of hot fiber.	60947-4
AC-6a	Switching of transformers	60947-4
AC-6b	Switching of capacitors	60947-4
AC-7a	Switching low inductive loads of home appliances and similar applications	60947
AC-7b	Load of motors for home appliances	60947
AC-8a	Switching of hermetically sealed motors of cooling compressors with manual reset switches against overload Hermetically sealed cooling compressors have to be placed in one box without external shaft or shaft padding and motor must operate with cooling liquid	60947
AC-8b	Switching of hermetically sealed motors of cooling compressors with manual reset switches against overload Hermetically sealed cooling compressors have to be placed in one box without external shaft or shaft padding and motor must operate with cooling liquid	60947
AC-12	Switching of semiconductor loads with separation transformers	60947-5
AC-13	Switching of semiconductor loads with separation transformers	60947-5-1
AC-14	Switching of low electro-magnetic loads (max.72 VA)	60947-5-1
AC-15	Management of alternating electro-magnetic loads This category applies to switching inductive loads with input for closed electro-magnetic circuit higher than 72 VA Use: switching coils of contactors	60947-5
AC-20	Connecting and disconnecting in unloaded states	60947-3
AC-21	Switching resistive loads, including low loading	60947-3
AC-22	Switching of mixed resistive and inductive loads, including low overloading	60947-3
AC-23	Switching of motor loads or other high inductive loads	60947-3
AC-53a	Switching of motors with short-circuit armature with semiconductor contactors	60947

Note: Category AC 15 replaces formerly used category AC 11

DC current, $t = L/R$ (s)

DC-1	Non-inductive or low inductive load, resistive furnaces	60947-4
DC-3	Shunt motors: start-up, braking by backset, reversion, resistive braking	60947-4-1
DC-5	Series motor: start-up, braking by backset, reversion, resistive braking	60947-4-1
DC-6	Non-inductive or low inductive loads, resistive furnaces – el. bulbs	60947-4-1
DC-12	Management of resistive loads and fixed loads with insulation by opto-electric element	60947-5-1
DC-13	Switching of electromagnets	60947-5-1
DC-14	Switching of electromagnetic loads in circuits with limiting resistor	60947-5-1
DC-20a(b)	Switching and breaking without load(a: frequent switching ,b: occasional switching)	60947-3
DC-21a(b)	Switching ohmic loads including limiting overloading (a: frequent switching ,b: occasional switching)	60947-3
DC-22a(b)	Switching of compound ohmic and inductive loads including limited overloads (e.g. shunt motors) (a: frequent switching, b: random switching)	60947-3
DC-23	Switching of highly inductive loads (e.g. series motors)	60947-3

How can you distinguish for which load is our product (relay) designated?

Our company records this information on a products and also in our catalog, instruction manual and other promotional and technical material (website etc.).

It is important to realize that it is not always possible to point out load because of lack of information about the device (user cannot measure \cos) or it is not possible because of inconsistency of parameters of switched device. Manufacturer of relays records always guaranteed parameters in ideal conditions which are done by a norm (temperature, pressure, humidity, etc.) and reality can be in a lot of cases different. Category of use (classification) of a particular relay is done by material of output contacts.



















Basic types of materials which are used for production of contacts for high-performance relay are:

- AgCd – suitable for switching ohmic loads. Before of harmfulness of Cd, this type of contact is remitted.
- AgNi – designated for switching resistive loads, good quality switching and conducting (contact doesn't oxidate) small currents/voltages, it is not designated for surge currents and loads with inductive component.
- AgSn or AgSnO₂ –suitable for switching loads with inductive component, not suitable for switching small currents/voltages, it is more resistive to surge currents, suitable for DC voltage switching, less suitable for switching loads of ohmic type.
- Wf (wolfram)-special contact designated for switching surge currents with inductive component.
- with gold (AgNi/Au)- Used for "improving" contacts for low currents/ voltages , prevents oxidation.



















Product loadability

Technical details



















COS-2; CRM-2H; CRM-2HE; CRM-2T; CRM-181J; CRM-91H; CRM-111H; CRM-91HE; CRM-101; CRM-183J / CRM-93H / CRM-93H-SL / CRM-113H (1. kontakt); CRM-121H; CRM-131H; HRH-8; HRN-31; HRN-31/2; HRN-32/2; HRN-36/2; HRN-36; HRN-39; HRN-39/2; HRN-41; HRN-42; HRN-43; HRN-43N; HRN3-70; HRN3-80; HRN3-81; PMR1-31; PMR1-31/2; PMR1-36; PMR1-36/2; PMR1-39; PMR1-39/2; PMR3-70; PDR-2; PRI-34; PRI-35; PRI-41; PRI-42; PTRM-216K; PTRM-216T; PTRM-216KP; PTRM-216TP; PTRM-216K; PTRM-216T; PTRM-216K; PTRM-216T; SJR-2; TER-4; TEV-1; TEV-2; TEV-3

type of load	 cos φ ≥ 0.95					 HAL.230V			
Material of contact AgNi, 16A	AC1 250V/16A	AC2 250V/5A	AC3 250V/3A	AC5a uncompensated 230V/3A (690VA)	AC5a compensated x	AC5b 800W	AC6a x	AC7b 250V/3A	AC12 250V/10A
type of load									
Material of contact AgNi, 16A	AC13 250V/6A	AC14 250V/6A	AC15 250V/6A	DC1 24V/16A	DC3 24V/6A	DC5 24V/4A	DC12 24V/16A	DC13 24V/2A	DC14 24V/2A



















CRM-71TO; CRM-4; CRM-47; HRH-7; MR-41; MR-42; SHT-1; SHT-1/2; SHT-13; SHT-13/2; SMR-B; SOU-1; RHT-1; TER-3A; TER-3B; TER-3C; TER-3D; TER-3E; TER-3F; TER-3G; TER-3H; VS116K; VS116U; VS316/24V; VS316/230V; VS116B / 230V

type of load	 cos φ ≥ 0.95					 HAL.230V			
Material of contact AgSnO ₂ , 16A	AC1 250V/16A	AC2 250V/5A	AC3 250V/3A	AC5a uncompensated 230V/3A (690VA)	AC5a compensated 230V/3A (690VA) till max output C=14UF	AC5b 1 000W	AC6a x	AC7b 250V/3A	AC12 x
type of load									
Material of contact AgSnO ₂ , 16A	x	250V/6A	250V/6A	24V/16A	24V/3A	24V/2A	24V/16A	24V/2A	x



















CRM-72TO; CRM-183J / CRM-93H / CRM-93H-SL / CRM-113H (2. + 3. kontakt); TER-7; VS308K; VS308U; CRM-161; HRH-5; HRN-54; HRN-54N; HRN-55; HRN-55N; HRN-56; HRN-57; HRN-57N; PRI-32; PRI-51; PRI-52; PRI-53; HRF-10; TER-9

type of load	 cos φ ≥ 0.95					 HAL.230V			
Material of contact AgNi, 8A	AC1 250V/8A	AC2 250V/3A	AC3 250V/2A	AC5a uncompensated 230V/1.5A (345VA)	AC5a compensated x	AC5b 300W	AC6a x	AC7b 250V/1A	AC12 250V/1A
type of load									
Material of contact AgNi, 8A	x	250V/3A	250V/3A	24V/8A	24V/3A	24V/2A	24V/8A	24V/2A	x



















RHV-1; SOU-3; TEV-4

type of load	 cos φ ≥ 0.95					 HAL.230V			
Material of contact AgSnO ₂ , 12A	AC1 250V/12A	AC2 250V/3.7A	AC3 250V/2.2A	AC5a uncompensated 230V/2.2 (510VA)	AC5a compensated 230V/2.2A (510VA) till max output C=14UF	AC5b 1 120W	AC6a x	AC7b 250V/2.2A	AC12 250V/7.5A
type of load									
Material of contact AgSnO ₂ , 12A	250V/4.5A	250V/4.5A	250V/4.5A	24V/12A	24V/4.5A	24V/3A	24V/12A	24V/1.5A	24V/1.5A



















HRH-6

type of load	 cos φ ≥ 0.95					 HAL.230V			
Material of contact AgNi, 10A	AC1 250V/10A	AC2 250V/3A	AC3 250V/2A	AC5a uncompensated 230V/2A (460VA)	AC5a compensated x	AC5b 500W	AC6a x	AC7b 250V/2A	AC12 250V/6A
type of load									
Material of contact AgNi, 10A	250V/3.8A	250V/3.8A	250V/3.8A	24V/10A	24V/3.8A	24V/2.5A	24V/10A	24V/1.3A	24V/1.3A

SOU-2

type of load	 cos φ ≥ 0.95								
	AC1	AC2	AC3	AC5a uncompensated	AC5a compensated	AC5b	AC6a	AC7b	AC12
Material of contact AgSnO ₂ , 8A	250V/8A	250V/5A	250V/4A	x	x	250W	250V/4A	250V/1A	250V/1A
type of load									
	AC13	AC14	AC15	DC1	DC3	DC5	DC12	DC13	DC14
Material of contact AgSnO ₂ , 8A	x	250V/4A	250V/3A	30V/8A	30V/3A	30V/2A	30V/8A	30V/2A	x

HRH-9

type of load	 cos φ ≥ 0.95								
	AC1	AC2	AC3	AC5a uncompensated	AC5a compensated	AC5b	AC6a	AC7b	AC12
Material of contact AgSnO ₂ , 10A	250V/10A	250V/5A	250V/4A	x	x	250W	250V/4A	250V/1A	250V/1A
type of load									
	AC13	AC14	AC15	DC1	DC3	DC5	DC12	DC13	DC14
Material of contact AgSnO ₂ , 10A	x	250V/4A	250V/3A	24V/10A	24V/3A	24V/2A	24V/10A	24V/2A	x

VS120; VS220; VSM220

type of load	AC-1, AC-7a, AC-21	AC-2	AC-3, AC-3e, AC-7b, AC23	AC-5a (230V)	AC-5b (230V)	AC-6a (230V)	AC-15 (230V)	DC-1 (24V, 48V)	DC-3 (24V, 48V)	DC-5 (24V, 48V)	DC-13 (24V, 48V)	LED	AC-6b, AC-7c (230V)
rated current	20A	12A	NO9A NC6A	8,8A	8,8A	4A	6A	20A, 15A	10A, 5A	10A, 4A	6A	2,4A per contact	switching capacity 30 uF

VS420

type of load	AC-1, AC-7a, AC-21	AC-2	AC-3, AC-3e, AC-7b, AC23	AC-5a (230V)	AC-5b (230V)	AC-6a (230V)	AC-15 (230V)	DC-1 (24V, 48V)	DC-3 (24V, 48V)	DC-5 (24V, 48V)	DC-13 (24V, 48V)	LED	AC-6b, AC-7c (230V)
rated current	20A	10A	5A	8,8A	8,8A	4A	6A	20A, 12A	10A, 5A	10A, 4A	6A	2,4A per contact	switching capacity 30 uF

VS425; VSM425

type of load	AC-1, AC-7a, AC-21	AC-2	AC-3, AC-3e, AC-7b, AC23	AC-5a (230V)	AC-5b (230V)	AC-6a (230V)	AC-15 (230V)	DC-1 (24V, 48V)	DC-3 (24V, 48V)	DC-5 (24V, 48V)	DC-13 (24V, 48V)	LED	AC-6b, AC-7c (230V)
rated current	25A	14A	8,5A	11,2A	8,8A	2,8A	6A	25A, 20A	15A, 8A	15A, 5A	6A	3,8A per contact	switching capacity 36 uF

VS440

type of load	AC-1, AC-7a, AC-21	AC-2	AC-3, AC-3e, AC-7b, AC23	AC-5a (230V)	AC-5b (230V)	AC-6a (230V)	AC-15 (230V)	DC-1 (24V, 48V)	DC-3 (24V, 48V)	DC-5 (24V, 48V)	DC-13 (24V, 48V)	LED	AC-6b, AC-7c (230V)
rated current	40A	25A	22A	20A	17,6A	10,8A	6A	40A, 25A	22A, 10A	20A, 8A	6A, 4A	11A per contact	switching capacity 220 uF

VS463

type of load	AC-1, AC-7a, AC-21	AC-2	AC-3, AC-3e, AC-7b, AC23	AC-5a (230V)	AC-5b (230V)	AC-6a (230V)	AC-15 (230V)	DC-1 (24V, 48V)	DC-3 (24V, 48V)	DC-5 (24V, 48V)	DC-13 (24V, 48V)	LED	AC-6b, AC-7c (230V)
rated current	63A	32A	30A	32A	22A	17,2A	6A	63A, 26A	25A, 11A	25A, 10A	6A, 4A	18A per contact	switching capacity 330 uF

Packing of 1-MODULE relay - 1 pc



Packing of 1-MODULE relay - 10 pcs



Packing of 1-MODULE relay with accessories



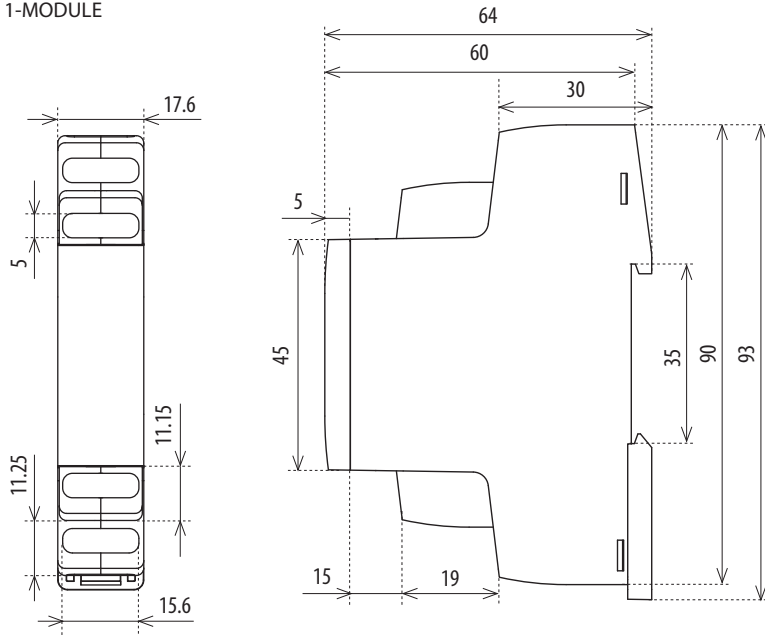
Packing of 2-MODULE relay - 1 pc



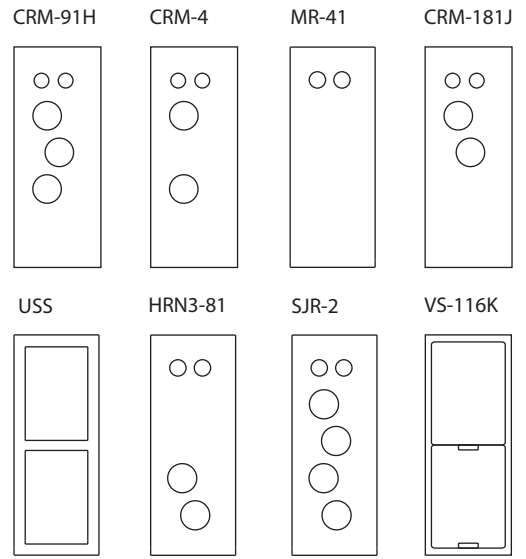
Packing of 3-MODULE relay - 1 pc



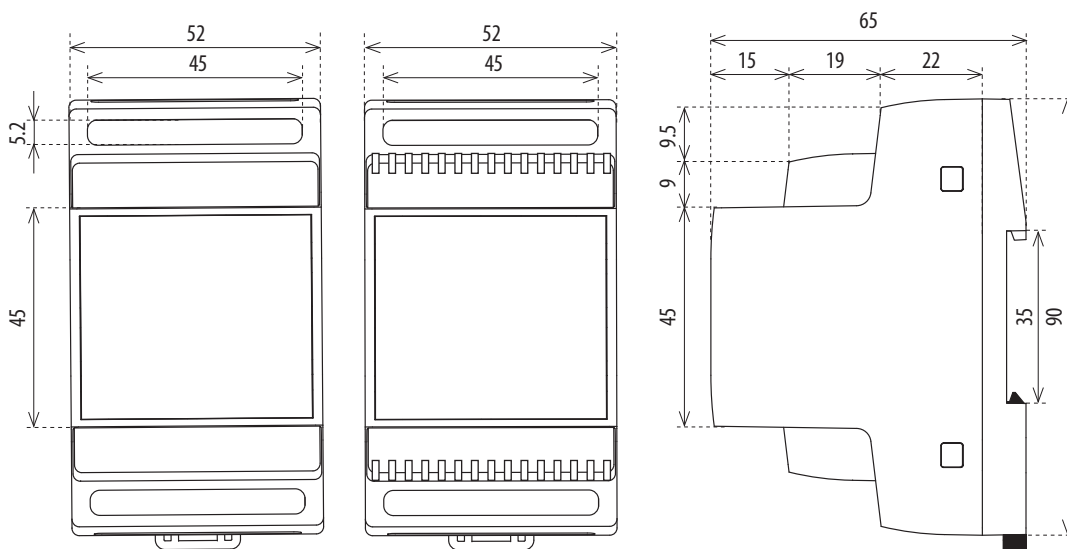
1-MODULE



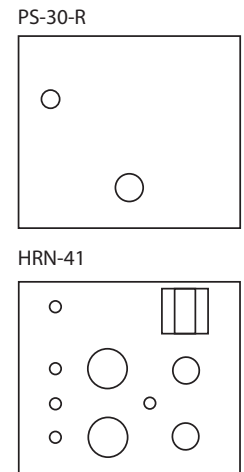
Front panels for 1-MODULE, examples of use:



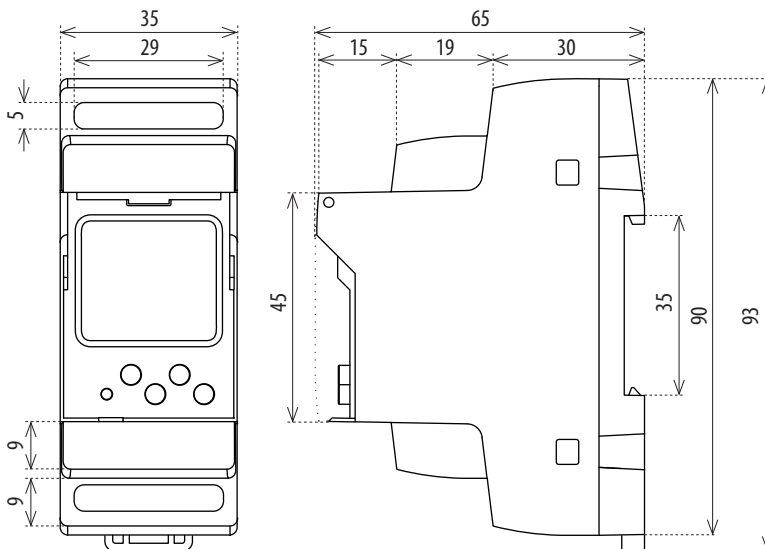
3-MODULE



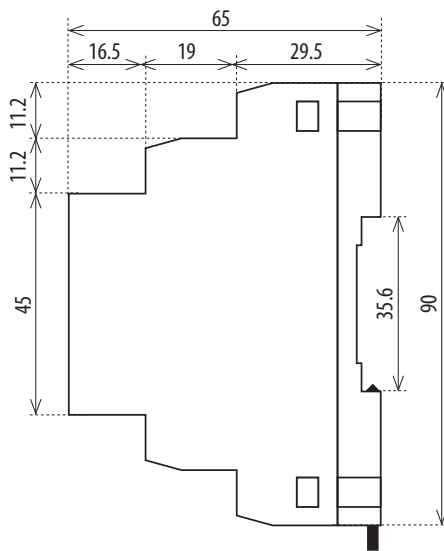
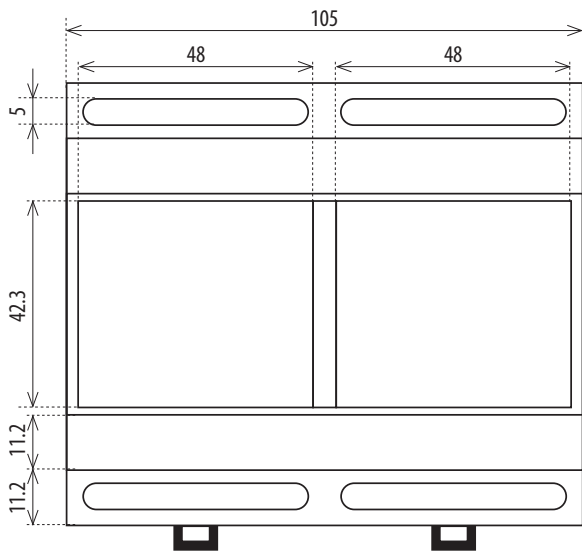
Front panels for 3-MODULE, examples of use:



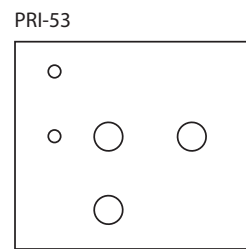
2-MODULE



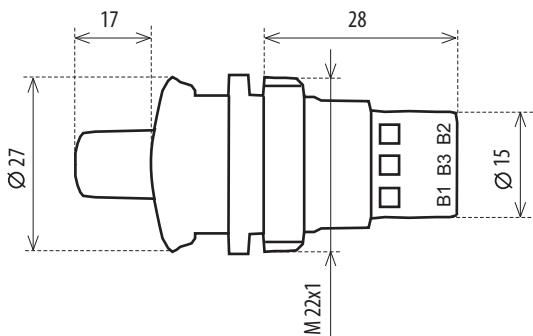
6-MODULE



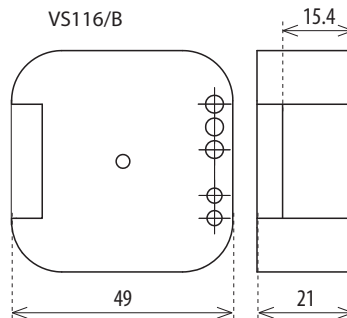
Front panels for 6-MODULE, examples of use:



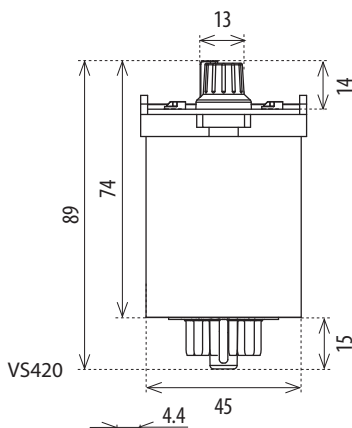
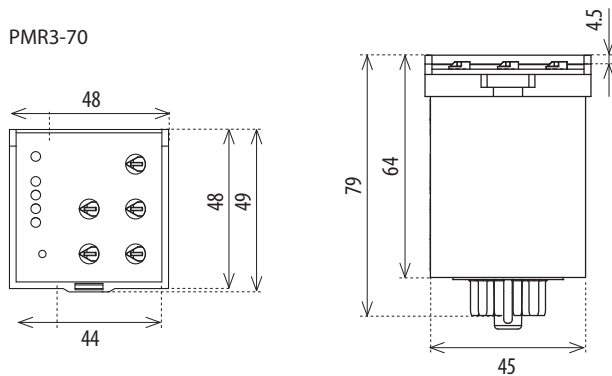
External potentiometer for CRM-2HE, CRM-91HE



VS116/B

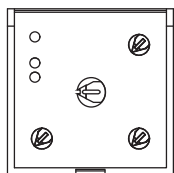


PMR3-70

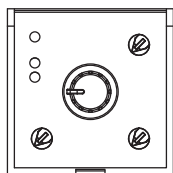


front panels PLUG-IN, examples of use:

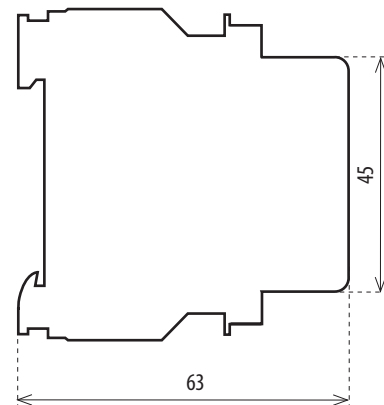
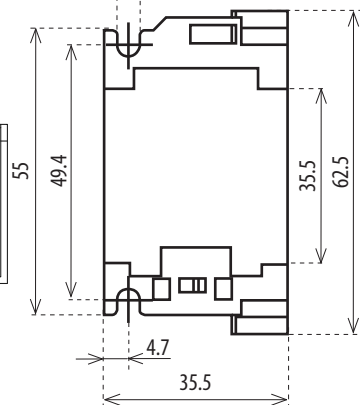
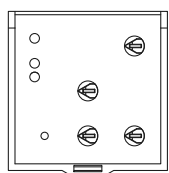
PTRx-216T



PTRx-216K

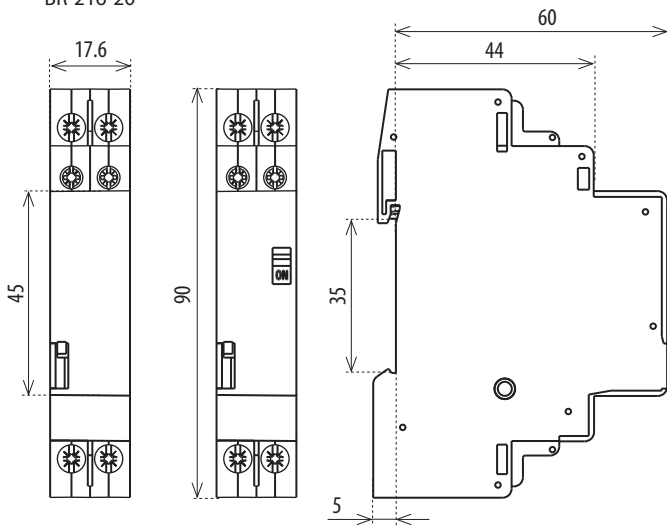


PMR1-3x



BR-216-10
BR-216-11
BR-216-20

BR-220-20
BR-232-20

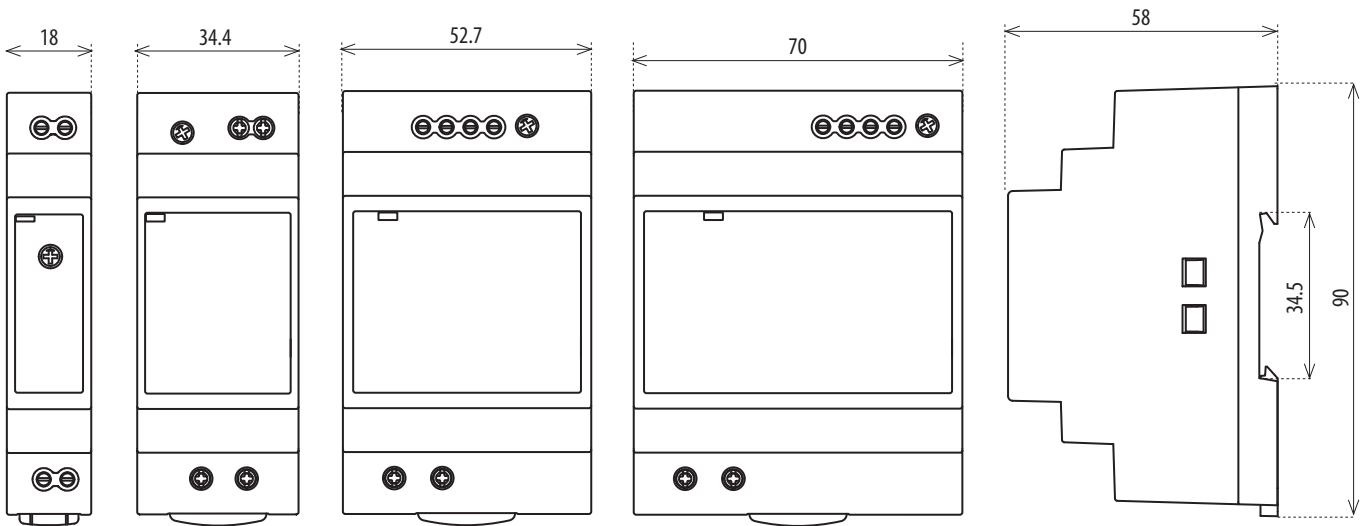


PS1M-15/12V
PS1M-15/24V

PS2M-24/12V
PS2M-30/24V

PS3M-54/12V
PS3M-60/24V

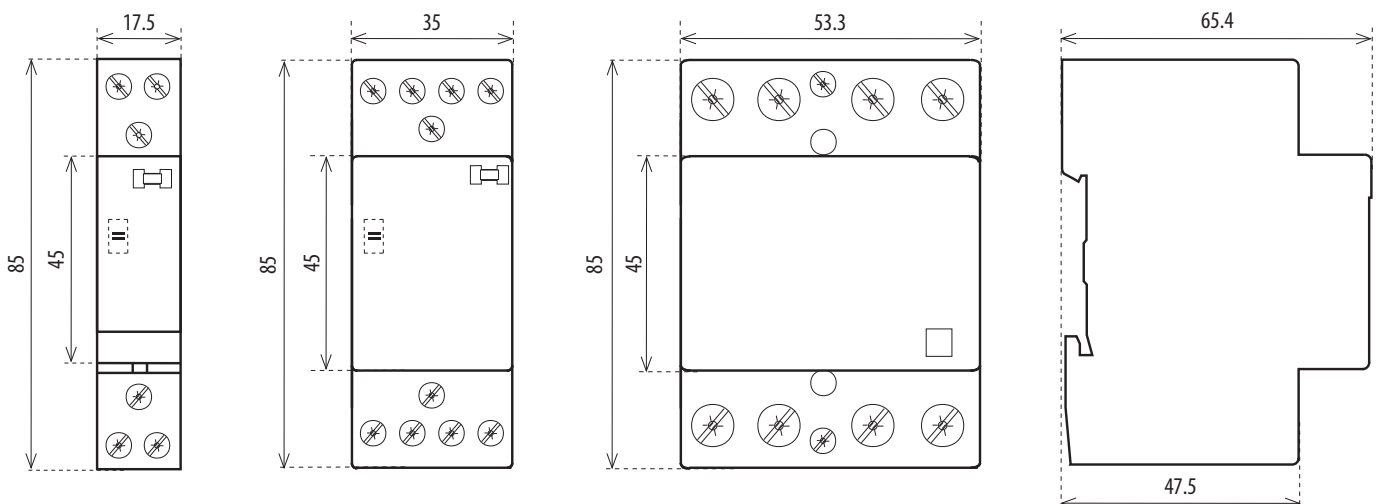
PS4M-85/12V
PS4M-92/24V



VS120
VS220
VSM220

VS425
VSM425

VS440
VS463

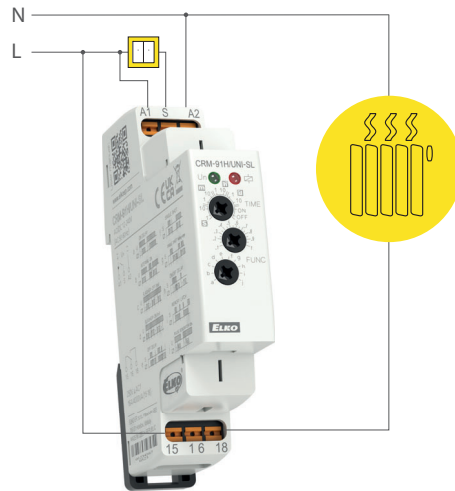


Multifunction time relay CRM-91H, CRM-93H, CRM-91-SL, CRM-93H-SL

- for electric appliances, where is necessary to change the exact timing - controlling of the illumination, heating, motors, machines, ventilators, contactors

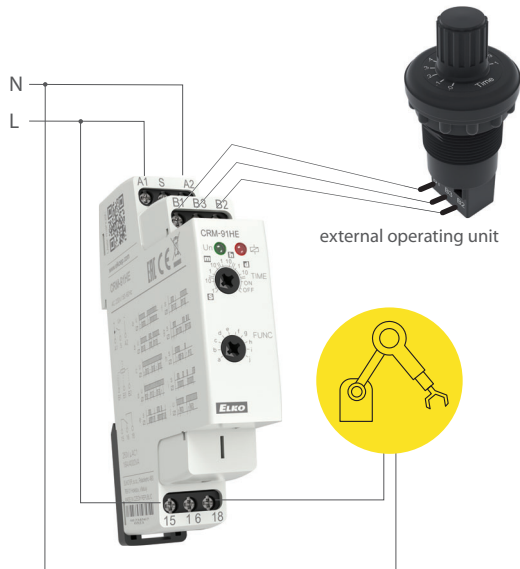


Multifunctionality always and everywhere



Multifunction time relay with external potentiometer CRM-91HE

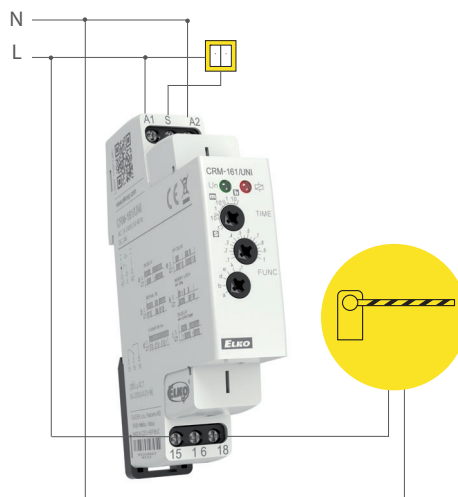
- time adjusting via external operating unit, operating on panel, switchboard doors



external operating unit

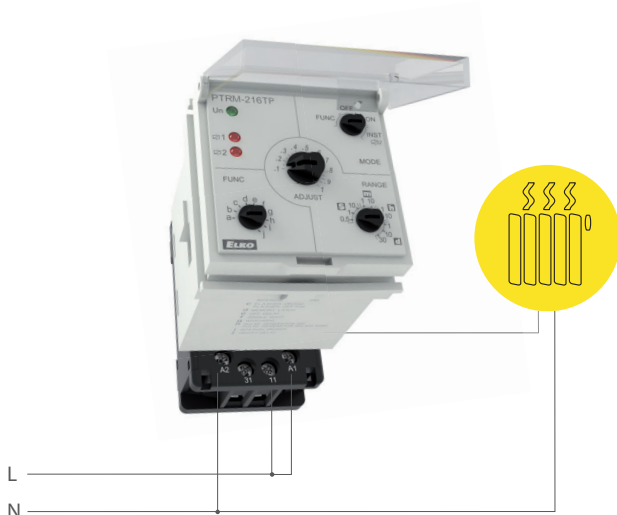
Multifunction time relay CRM-161

- for electronic appliances, light control, heating, motors, fans



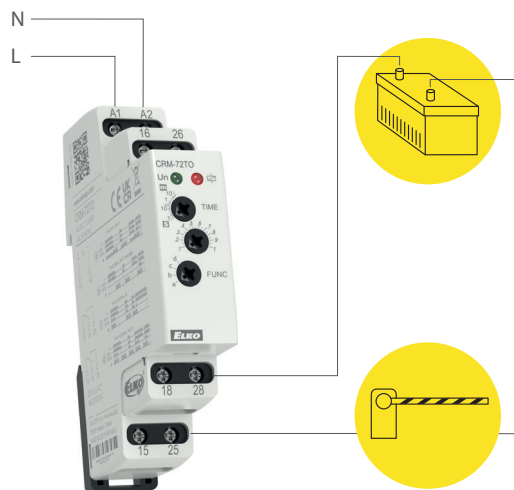
Time relay PLUG-IN type PTRM-216TP

- serves to control light signalization, heating, motor and fan control etc.



Delay OFF without supply voltage CRM-72TO

- delayed back-up switch off at current failure (emergency illumination, emergency respirator)



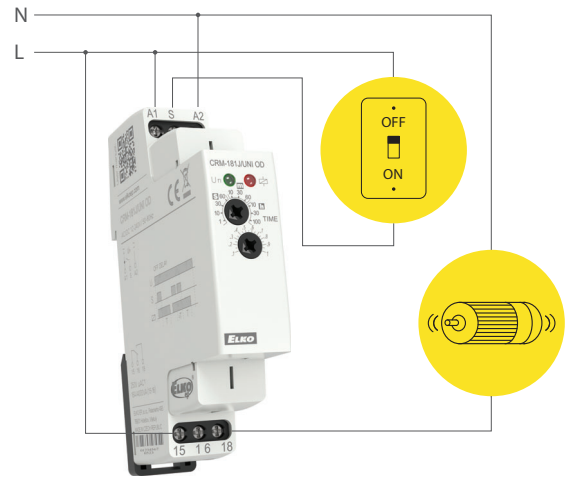
Asymmetric flasher CRM-2H

- regular rooms ventilation, cyclic humidity exhaustion, illumination controlling, circulation pump, flash, warning appliances, regular pump down, regular irrigation via electromagnetic valve



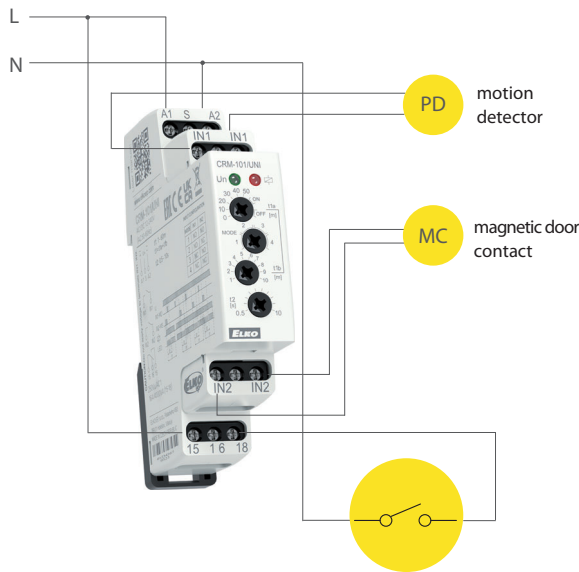
Singlefunction time relay CRM-181J

- time switch, using for run down the pump after switch off the heating, switching of ventilators



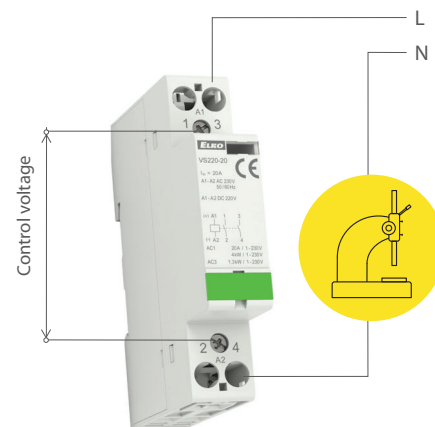
Room energy saving relay CRM-101

- replacement of the card switch (energy saving in the absence of guests)
- the relay controls e.g. the hotel room contactor by means of a magnetic door contact and a motion detector



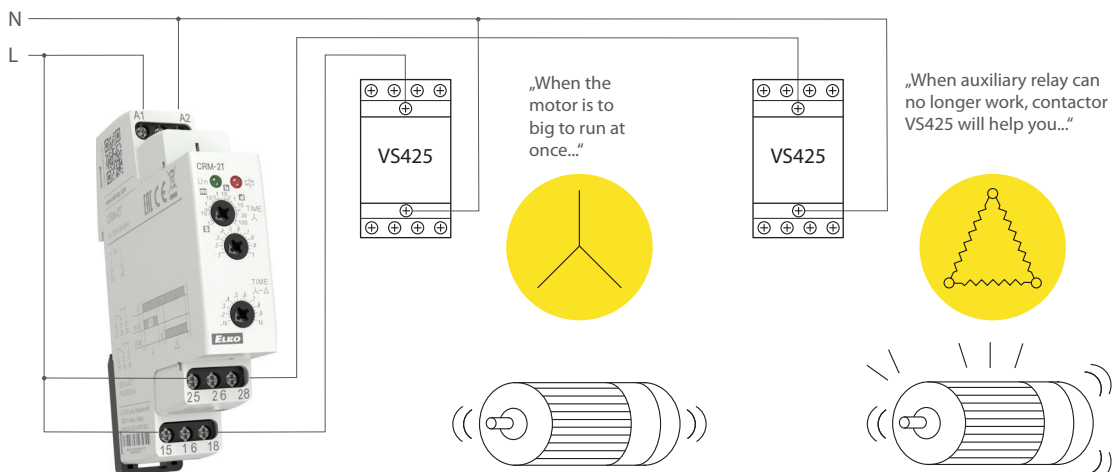
Modular contactor VS120, VS220, VS420, VS425

- to switch circuits for supply and control of heating, lights, air-conditioning and other el. devices.
Switches loads AC-1, AC-3, AC-7a, AC-7b, AC-15.



Delay on star/delta CRM-2T

- motor starting more than 3 kW, electronic switchover from mode start to mode operation with device CRM-2T, what assures exact timing



Mini contactor VS425

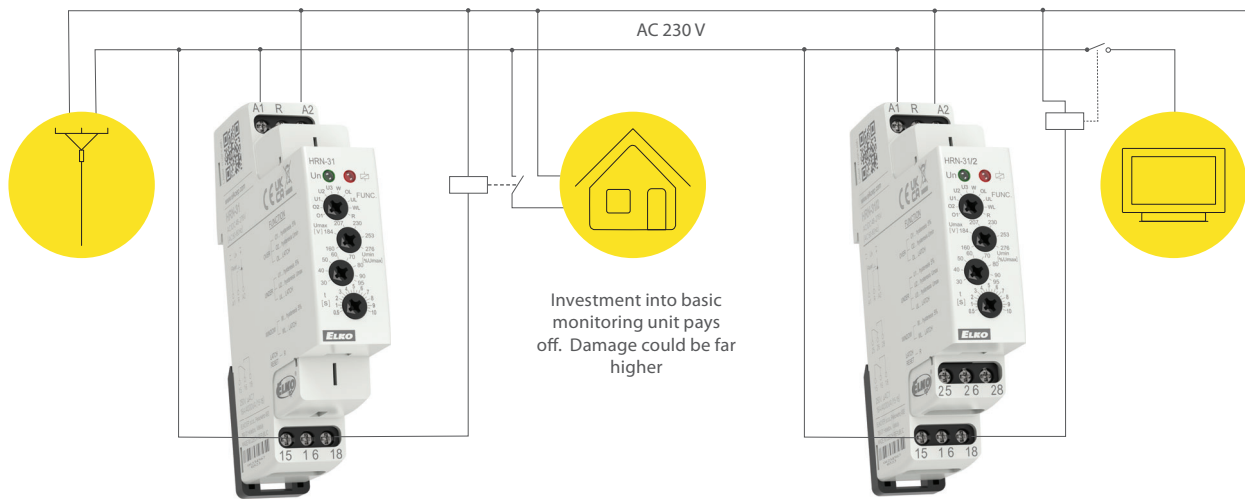
- switching of the higher loads, especially in other categories than AC1

Monitoring voltage relay HRN-31 (HRN-31/2)

- monitoring of mains voltage for appliances inclinable to supply tolerance

Monitoring voltage relay HRN-31 (HRN-31/2)

- protection of appliances against under-/overvoltage

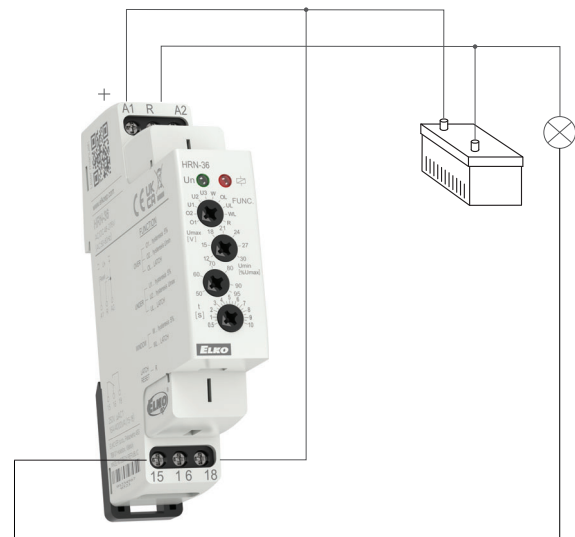
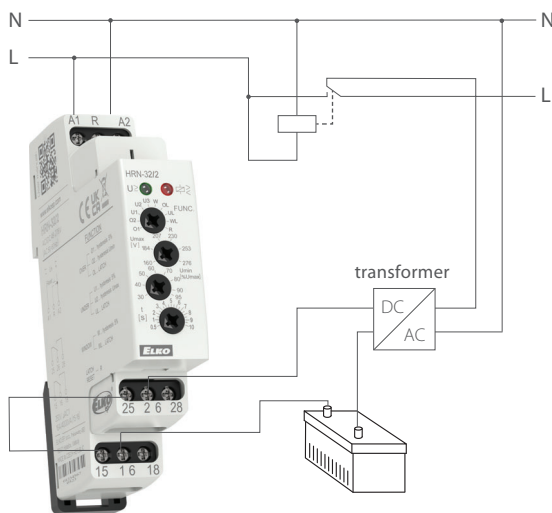


Monitoring voltage relay HRN-32/2

- start of back-up supply in case of failure

Monitoring voltage relay HRN-36

- load disconnected when voltage declines or battery is discharged

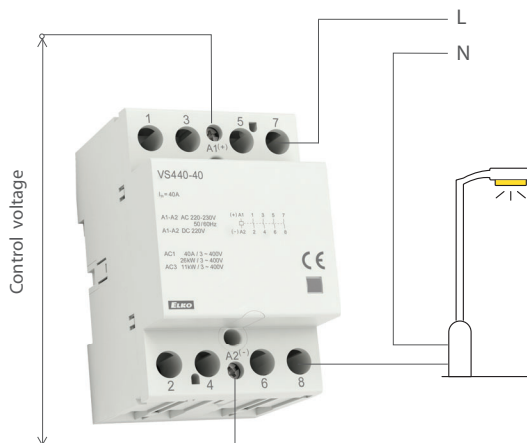


Modular contactors VS440, VS463

- to switch supply and control circuits for heating, air-conditioning and other el. devices, switching 3-phase motors
Switches loads A-1, AC-3, AC-7a, AC-7b, and AC-15

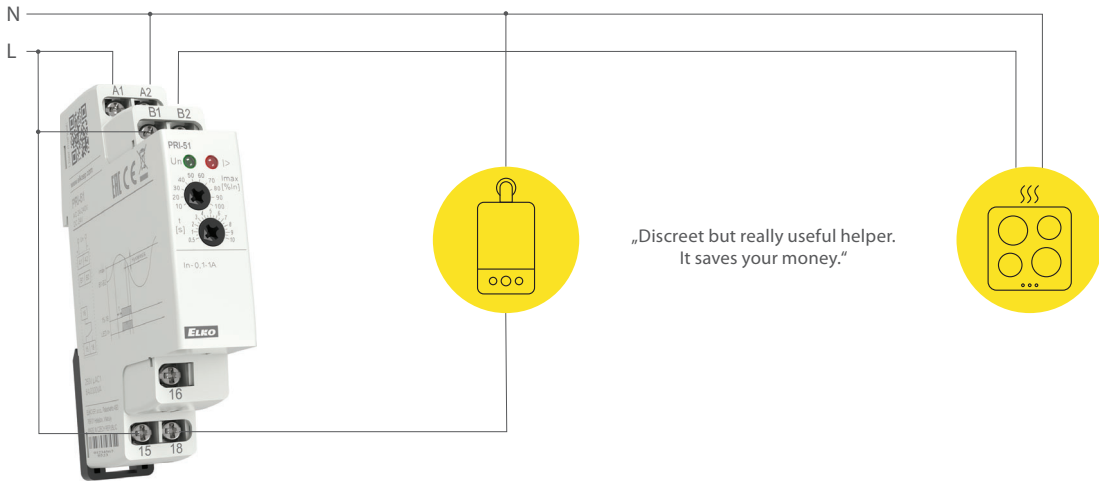
Power relays VS

- switching of higher load than is capacity of switched unit = repeater
- assistant light controlling, signalling, boilers, ...



Monitoring current relay PRI-51, PRI-32

- current-limiting relay (on one branch two appliances, which never work together), controlling systems, motors, heating, current indication, controlling of 1-phase motor run down, during the installation of main housing switchboard could be controlled via eye, if the cooker is not switched
- in connection with current transformers, it is possible to extend current ranges up to 600A, which makes more things possible



More Than Just Resellers

We innovate, develop and manufacture out products in-house



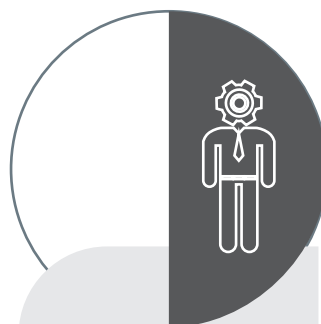
30 Years

On the Market



16 Years

ISO Certification



40

Developers



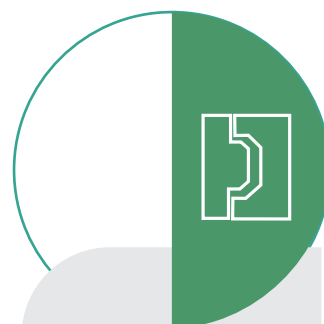
400

Employees



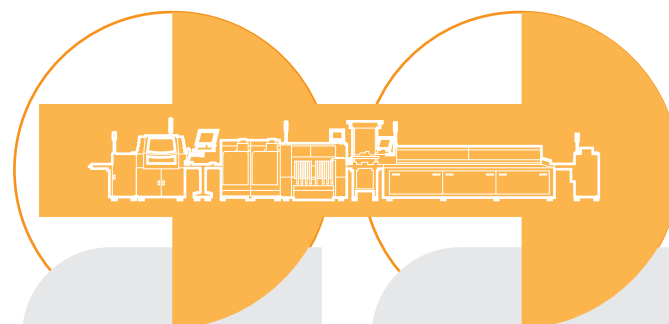
21 500 sq ft

Manufacturing
Space



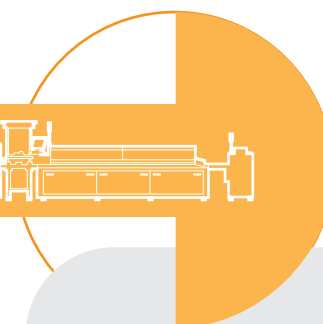
200

Proprietary Plastic
Mods



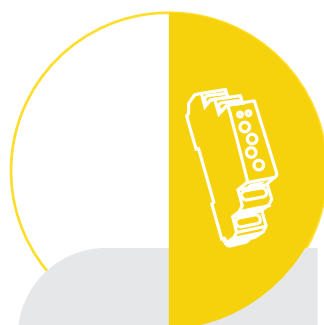
3

SMD Lines



1 Mil.

Components
per Day



600 000

Products
per Year



21 500 sq ft

Finalization
and Dispatch



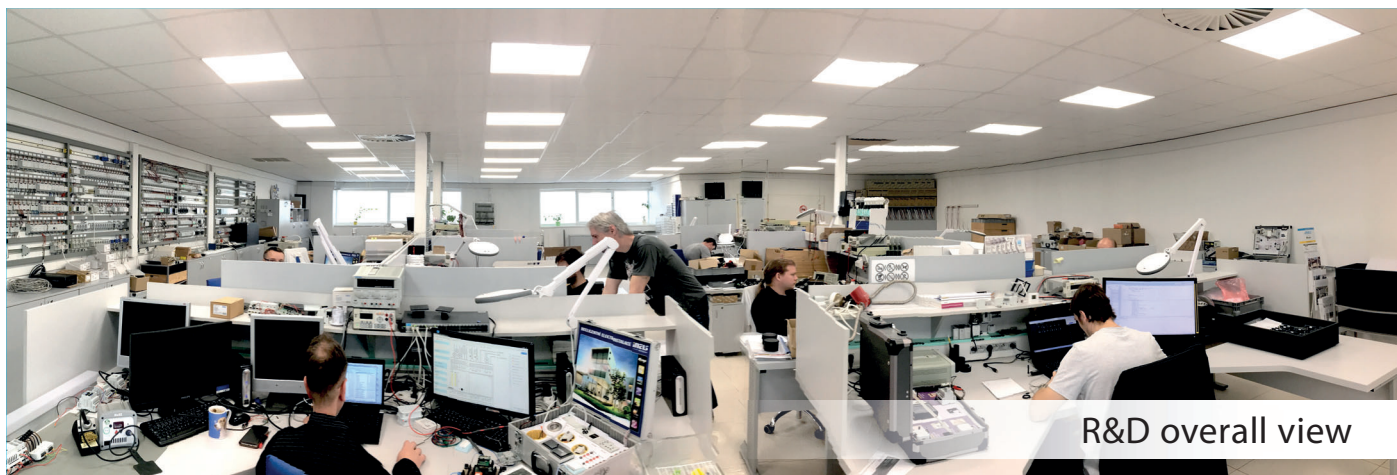
2 000

Warehousing
Spaces



3

Printing Lasers



R&D overall view



Manufacturing hall



Testing lab



Finalization and dispatch



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