TIME & MONITORING RELAYS

relay

TECHNICAL CATALOG

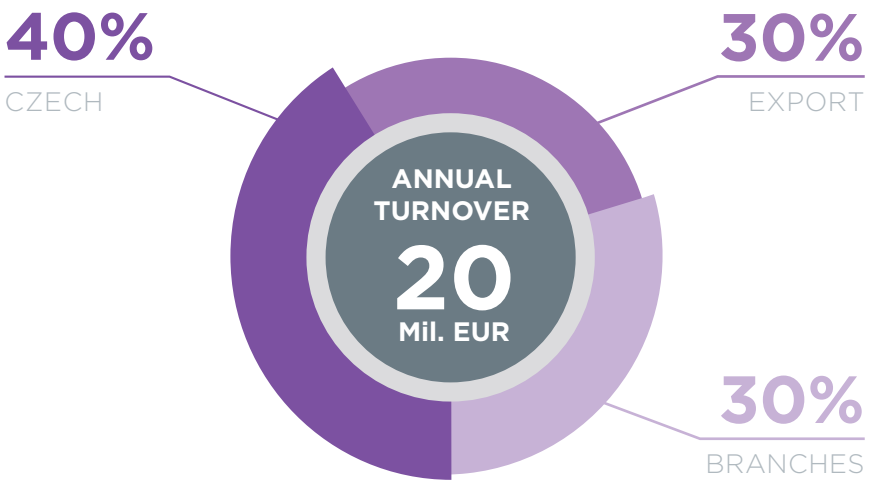
www.elkoepusa.com

ELKO EP, Holding

The company ELKO EP has been one of the leading European players in the field of residential and industrial electrical devices for more than 23 years. Since 2007, the company has been developing and producing its own system of Smart Home & Building Solutions called iNELS.

At present, ELKO EP employs nearly 300 people, exports to 70 countries around the world and already has 10 foreign branches. The company is justly proud to produce it´s own components, and to have its own development and innovation of new products. It is also able to offer its customers instantaneous distribution and rapid, flawless service. ELKO EP became the Company of the Year in 2012 and earned it´s place as one of the TOP 100 Czech companies.

Facts and Stats



3rd position
in Europe

10
BRANCHES
OVER THE WORLD

70
EXPORTING
COUNTRIES

300
EMPLOYEES

5,000
iNELS INSTALLATIONS

12,000,000
MANUFACTURED PRODUCTS

Product Lines of ELKO EP

RELAYS - Modular electronic devices
A wide range of electronic modular devices, which bring new possibilities to home and office control, monitoring and security, as well as to industrial process control: time relays, installation contactors, staircase automatic switches, time switch clocks, dimmers, thermostats, power supply units, control and signaling devices, GSM gates, etc.

iNELS RF CONTROL - Wireless control
A unique wireless control system providing you perfect control over your home! The RF Control system enables you to control functions such as heating, lighting, electrical appliances and window shutters, all with a single touch. No wall cutting, fast and easy installation, exclusive design of wireless wall switch buttons and other components.

iNELS BUS SYSTEM - The iNELS Intelligent electro-installation system will transform your house into a timeless intelligent household. It will take charge of heating and air-conditioning, regulation, lighting control and home appliance switching, while also providing perfect security for your home. Enjoy controlling your entire house via a TV screen thanks to iNELS Multimedia (iMM) or use the App for your smartphone or tablet.

AUDIO/VIDEO
In this group you can find products that bring you a new dimension of controlling music, video and home appliances. These are not just ordinary controllers but products which can be a perfect part of your electro-installation.

Relays references

ELKO EP is a world leader in the field of electronic relay development and manufacturing for residential and industrial electro-installations. We offer more than 150 types of relays that can be produced under well-known OEM brand names.

We develop and implement products according to customer specifications as well as launch new products under brand names.

CRM-91H – our best seller!

10 REASONS

.... why the CRM-91H/UNI is our best seller:

- universal supply 12-240 AC/DC
- components are from high quality suppliers (relay from Tyco with switching cycles over 30 million)
- contact current rating – 16A
- time range from 0.1 s to 10 days
- 10 frequently-used functions
- box from non-flammable material with UV protection (box will never fade)
- laser printing (even after 10 years, you will clearly see the parameters and options)
- certification which meets requirements of the World standards (UL, CE, PT, etc ...)
- 23 years of experience guarantees top quality - proved by satisfied customers such as Schneider Electric, Eaton, Dayton, Siemens, etc.
- double vendor inspection

Catalogue content

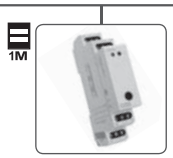
Modular electronic devices

Modular electronic devices

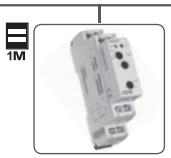
Time relays

Single-function

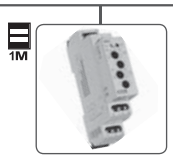
CRM-81J
3 functions and 6 time ranges, multivoltage supply, output 15 A changeover / SPDT.



CRM-83J
as CRM-81J but with 3x8A changeover output / SPDT.

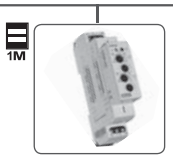


CRM-82TO
"true OFF" relay - delay off without supply, for back-up circuits.

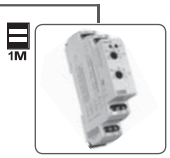


SJR-2
two-state delay unit (2x delay on), gradual switching of high loads.

CRM-2T
delay start-up of motors star / delta.



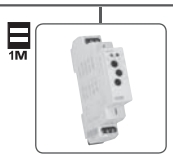
CRM-2H
asymmetric cycler, independent time setting ON/OFF.



CRM-2HE
as CRM-2H, but time setting by external potentiometers (for frequent setting).

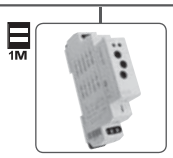
Multifunction

Analog

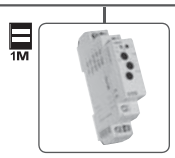


CRM-91H
10 functions, 10 time ranges, 1x output 15 A changeover / SPDT, multivoltage supply.

CRM-93H
as CRM-91 but output 3x8A chageover / SPDT.



CRM-9S
as CRM-91 but contactless output (triac 0.7A).

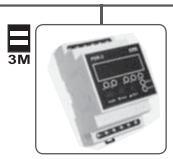


CRM-61
cost effective version of CRM-91H, 6 functions, 6 time ranges. Output 8A changeover / SPDT, supply AC 24-240 V, DC 24V.

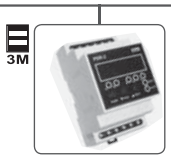
CRM-91HE
as CRM-91H but with time setting by external potentiometer (for frequent setting).

Potentiometer
potentiometer - external control unit for CRM-91HE and CRM-2HE, mounting into a switchboard, max connection length 10 m.

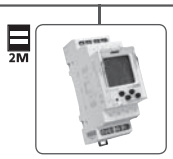
Digital



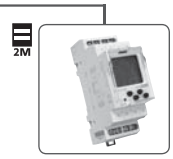
PDR-2A
4 digit display, 16 functions, 2 independent times 0.01s-100 hrs, 2 outputs 15 A changeover / SPDT START/STOP inputs.



PDR-2B
as PDR-2A but 10 functions for each output and time - meaning two relays in one device.

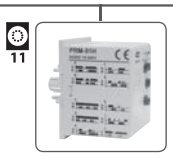


SHT-1, SHT-1/2
SHT-1: time switch with daily, weekly programming. 1-channel, output 15 A changeover / SPDT. SHT-1/2: as SHT-1, but 2-channel.

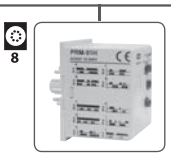


SHT-3, SHT-3/2
as SHT-1 but with daily, weekly, monthly, and annual programming up to 2095. SHT-3/2: as SHT-3, but 2-channel.

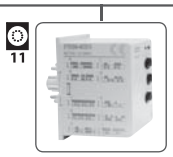
PLUG-IN



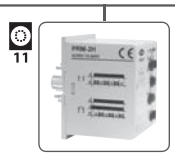
PRM-91H/11
as CRM-91H but into 11-pin socket, multivoltage supply, output contact 15 A.



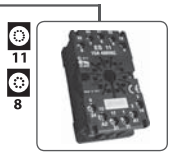
PRM-91H/8
as PRM-91H/11 but with 8-pin socket, output contact 15 A.



PRM-92H
as PRM-91H but with 2x changeover / SPDT 8A contacts, into 11-pin socket.

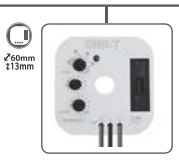


PRM-2H
as CRM-2H but with 11-pin socket, 2x changeover, 8A contact.

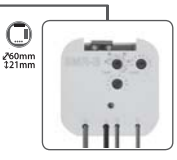


Socket to DIN rail
ES-11 (11 pin), ES-8 (8 pin).

MINI

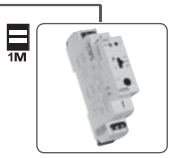


SMR-T
super multifunction relay for installation into a wiring box, 3 wire connection (without neutral).



SMR-B
output relay contact 15 A (possibility to switch also fluorescent lights).

Staircase switch



CRM-4
basic version, time 0.5-10 min, output contact 15 A, anti-blocking function.

Time relay review

Chart 1. Version - DIN rail mounting

	Type	CRM-81J/ZR	CRM-81J/ZN	CRM-81J/BL	CRM-83J/ZR	CRM-83J/ZN	CRM-83J/BL	CRM-82TO	CRM-91H	CRM-93H	CRM-91HE	CRM-2HE	CRM-9S	CRM-2H	CRM-4	CRM-61	SJR-2	PDR-2/A	PDR-2/B	SHT-1 (1/2)	SHT-3 (3/2)	PRM-91H	PRM-92H	PRM-2H	CRM-2T
DESIGN	1-MODULE	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●								●
	2-MODULE																			●	●				
	3-MODULE																	●	●						
	PLUG-IN																					●	●	●	
ADJUSTING	Rotary switch	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					●	●	●	●
	Button																	●	●	●	●				
	Sliding switch														●										
	External potentiometer										●	●													
FUNCTIONS	Delay OFF after switch off the Input supply							●																	
	Delay ON	●			●			●	●	●	●		●			●	●	●	●			●	●		
	Delay OFF		●			●			●	●	●		●			●		●	●			●	●		
	Symmetrical cycler starting with delay								●	●	●		●					●	●			●	●		
	Delay OFF after impulse OFF			●			●		●	●	●		●			●		●	●			●	●		
	Symmetrical cycler starting with impulse								●	●	●		●			●		●	●			●	●		
	Staircase switch								●	●	●		●		●			●	●			●	●		
	Impulse shift								●	●	●		●					●	●			●	●		
	Memory (impulse) relay								●	●	●		●									●	●		
	Impulse generator								●	●	●		●					●				●	●		
	Delay ON at switch on controlling contact															●		●	●						
	Asymmetric cycler starting with delay											●		●				●						●	
	Asymmetric cycler starting with impulse											●		●				●						●	
	Delay ON star / delta																	●							●
	Switching in real time																			●	●				
	Impuls relay in delay ON															●									
TIME	0.1 - 1 s	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●					●	●	●	●
	1 - 10 s	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●					●	●	●	●
	0.1 - 1 min	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●					●	●	●	●
	1 - 10 min	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●					●	●	●	●
	0.1 - 1 hrs	●	●	●	●	●	●		●	●	●	●	●	●		●	●					●	●	●	●
	1 - 10 hrs	●	●	●	●	●	●		●	●	●	●	●	●		●	●					●	●	●	●
	0.1 - 1 day								●	●	●	●	●	●			●					●	●	●	●
	1 - 10 days								●	●	●	●	●	●			●					●	●	●	●
	3 - 30 days											●		●										●	●
	10 - 100 days											●		●										●	●
	30 s - 10 min														●										
	99 h 59 min 59 s																	●	●						
	Day																			●	●				
	Week																			●	●				
	Month																				●				
	Year																				●				
SUPPLY VOLTAGE	12 - 240 V AC/DC	●	●	●	●	●	●	●	●	●	●	●		●			●	●	●	●	●	●	●	●	●
	12 - 240 V AC												●			●									
	120 V AC														●										
OUTPUT	1x changeover / SPDT 8 A															●									
	1x changeover / SPDT 15 A	●	●	●					●		●	●		●	●					●	●	●			
	2x changeover / DPDT 8 A							●															●	●	
	2x changeover / DPDT 15 A																●	●	●	(●)	(●)				●
	3x changeover / SPDT 8 A				●	●	●			●															
	Static output (triac)												●												

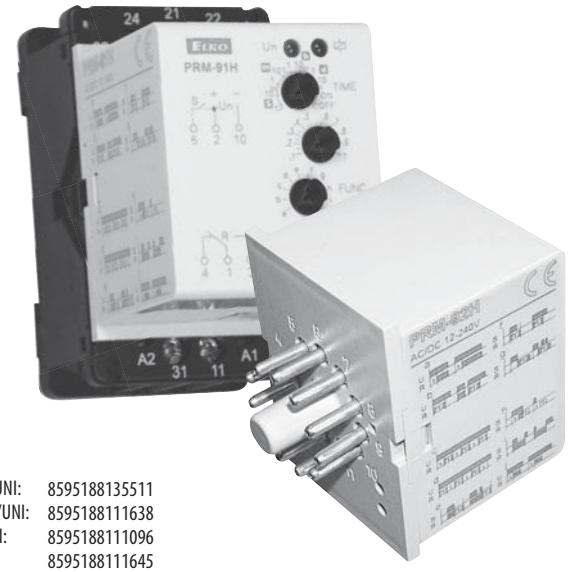
Chart 2. Version - mounting into an installation box

	Type	SMR-T	SMR-B
FUNCTIONS	a -delay off on entering edge	●	●
	b - delay off on downward edge	●	●
	c - delay off on downward edge	●	●
	d - cycler - flasher by impuls	●	●
	e - pulse shift	●	●
	f - delay on	●	●
	g- pulse relay	●	●
	h - impulse relay with delay	●	●
	i - cycler starting with gap	●	●
	j - delay on after switched off		●
TIME	0.1 - 1 s	●	●
	1 - 10 s	●	●
	0.1 - 1 min	●	●
	1 - 10 min	●	●
	0.1 - 1 h	●	●
	1 - 10 h	●	●
	0.1 - 1 day	●	●
	1 - 10 days	●	●
SUPPLY VOLTAGE	AC 120 V	●	●
NUMBER OF CONTACTS	1x triac	●	
	1x NO $AgSnO_2$		●

Plug-in time relay **PRM-91H, PRM-92H, PRM-2H**

11

8



EAN code

PRM-91H-8 /UNI:	8595188135511
PRM-91H-11 /UNI:	8595188111638
PRM-92H /UNI:	8595188111096
PRM-2H /UNI:	8595188111645

- Multifunction time relays are equivalents by module types of relay, designed to standardized plump 11 or 8 pin socket.
- Pin type enables easy changing, replacement older type of relays (pin-compatible) or easy changing auxiliary relay for time relays.

Multifunction time relay PRM-91H
- 8 or 11 pin type
- 10 time functions, time scale from 0.1 s to 10 days is divided into 10 ranges

Multifunction time relay PRM-92H
- 11 pin type
- 10 time functions, time scale from 0.1 s to 10 days is divided into 10 ranges

Asymmetric cycler PRM-2H
- 11 pin type
- 2 time functions, time scale from 0.1 s to 100 days is divided into 10 ranges

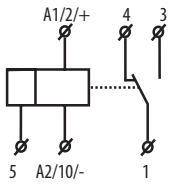
- Universal supply voltage AC/DC 12 - 240 V.
- Output indication: multif. red LED, flashing at certain states.
- PLUG-IN relays.

Technical Parameters	PRM-91H/8	PRM-91H/11	PRM-92H	PRM-2H
Number of functions:	10			2
Supply:	pins 2 and 7	pins 2 and 10	pins 2 and 10	pins 2 and 10
Voltage range:	AC/DC 12 - 240 V (AC 50 - 60 Hz)			
Burden:	AC 0.7 - 3 VA / DC 0.5 - 1.7 W			
Supply voltage tolerance:	-15 %; +10 %			
Supply indication:	green LED			
Time ranges:	0.1 s - 10 days			0.1 s - 100 days
Time setting:	rotaty switch and potentiometer			
Time deviation:	5 % - mechanical setting			
Repeat accuracy:	0.2 % - set value stability			
Temperature coefficient:	0.01 % / °F, at = 68 °F (0.01 % / °C, at = 20 °C)			
Output				
Number of contacts:	1x changeover / SPDT (AgNi / Silver Alloy)		2x changeover / DPDT (AgNi / Silver Alloy)	
Current rating:	Resistive load: 15A/240VAC/24VDC		8A/240VAC/24VDC	
	Inductive load: 1HP/240VAC, 1/2HP/120VDC		1/2HP/240VAC, 1/4HP/120VDC	
Inrush current:	30 A / < 3 s		10 A / < 3 s	
Min. breaking capacity DC:	500 mW			
Output indication:	multifunction red LED			
Mechanical life:	$3x10^7$			
Electrical life resistive load:	$0.7x10^5$			
Control				
Control. voltage:	in the supply voltage range			
Control power input:	AC 0.025 - 0.2 VA / DC 0.1 - 0.7 W			
Load between 5-10:	Yes			
Control terminals:	2 - 5			
Max. capacity of cable control:	0.1µF			
Impulse length:	min. 25 ms / max. unlimited			
Reset time:	max. 150 ms			
Other information				
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)			
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)			
Electrical strength:	2.5 kV			
Operating position:	any			
Mounting:	DIN rail EN 60715			
Protection degree:	IP 40 from front panel			
Overvoltage category:	III.			
Pollution degree:	2			
Dimensions:	2″ x 1.5″ x 2.1″ (50 x 38 x 53 mm)			
Weight:	2.01 oz. (57 g)	2.01 oz. (57 g)	2.05 oz. (58 g)	2.05 oz. (58 g)
Standards:	EN 61812-1, EN 61010-1			

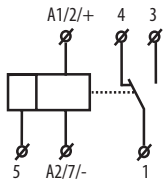
Symbol

PRM-91H

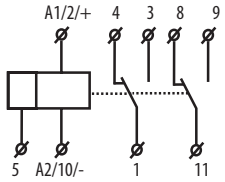
11 pin



8 pin

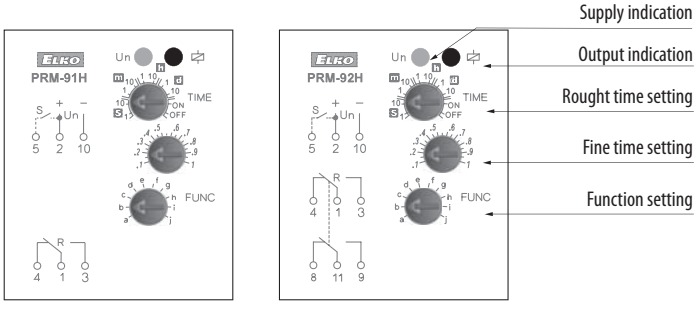


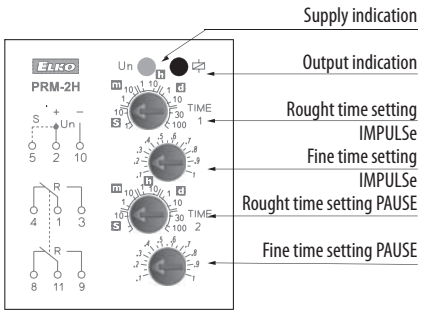
PRM-92H, PRM-2H



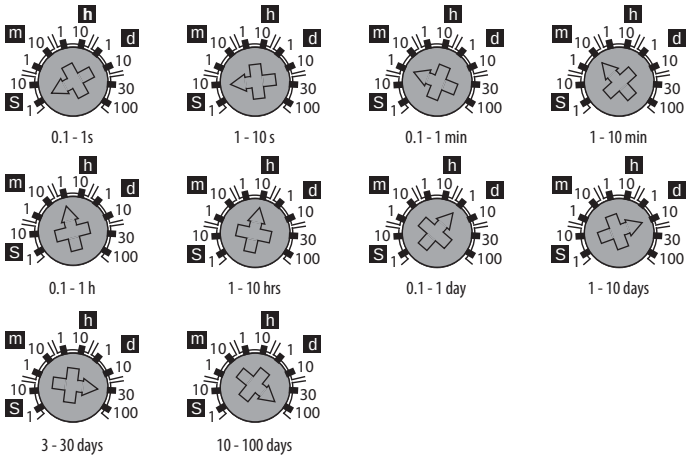
LEGEND TO DESCRIPTION
polarity - outputs / number on module / on socket

Description

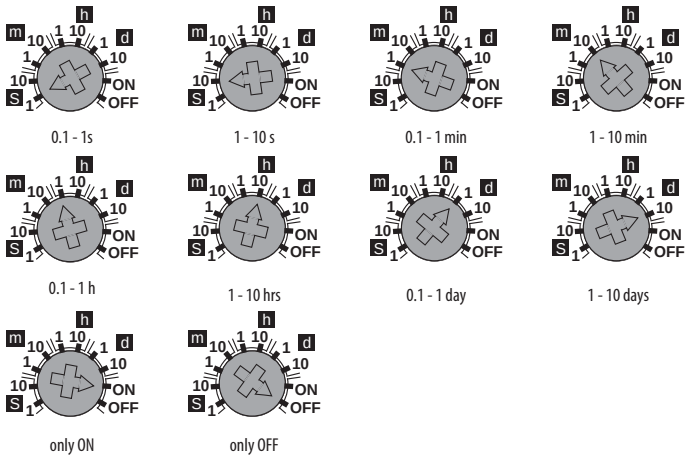




Time ranges PRM-2H



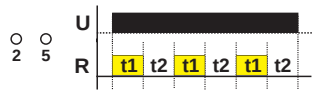
Time ranges PRM-91H, PRM-92H



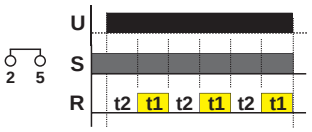
Functions PRM-2H

Choice Function in PRM-2H is done by connecting terminals 2 and 5.

Cycler beginning with pulse



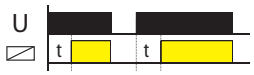
Cycler beginning with pause



Functions of PRM-91H, PRM-92H

On Delay (Power On)
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.

a



Off Delay
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.

b

Repeat Cycle (Starting Off)
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.

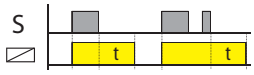
c

Repeat Cycle (Starting On)
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.

d

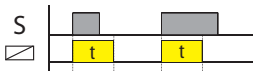
Off Delay (S Break)
Input voltage U must be applied continuously. When trigger switch S is closed, relay contacts R change state. When trigger switch S is opened, delay t begins. When delay t is complete, contacts R return to their shelf state. If trigger switch S is closed before time delay t is complete, 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.

e



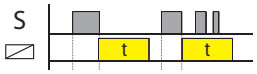
Single Shot
Upon application of input voltage U, the relay is ready to accept trigger signal S. Upon application of the trigger signal S, the relay contacts R transfer and the preset time t begins. During time-out, the trigger signal S is ignored. The relay resets by applying the trigger switch S when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

f



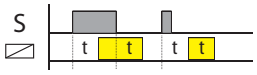
Single Shot Trailing Edge (Non-Retriggerable)
Upon application of input voltage U, the relay is ready to accept trigger signal S. Upon application of the trigger signal S, the relay contacts R transfer and the preset time t begins. At the end of the preset time t, the relay contacts R return to their 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.

g



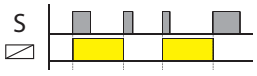
On/Off Delay
Input voltage U must be applied continuously. When trigger switch S is closed, time delay t begins. When time delay t is complete, relay contacts R change state and remain transferred until trigger switch S is opened. If input voltage U is removed, relay contacts R return to their shelf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

h



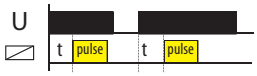
Latching relay
Input voltage U must be applied continuously. Output changes state with every trigger switch S closure. If input voltage U is removed, relay contacts R return to their shelf state.

i



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.

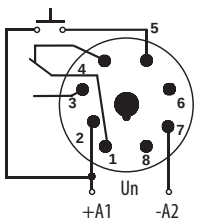
j



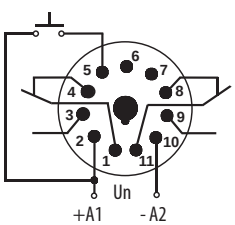
pulse = 0.5 s

Connection

PRM-91H/8



PRM-92H/11



Recommended socket for DIN rail

ES-11
11 pin

ES-8
8 pin

Single-function time relay **CRM-81J, CRM-83J**

1M

EAN code
CRM-81J according to type
CRM-83J according to type

- Single-function and single-time relay with fine time setting by a potentiometer (within the frames of a particular time range)
- Suitable for applications where function and time requirements are known
- Time switch, possible to be used for pump delay after switching heating off, switching of fans
- Choice of 3 functions:
  1) ZR - Delay ON
  2) ZN -Delay OFF
  3) BL - Repeat Cycle
- Functions can be controlled by supply voltage or time scale control input:
  (0.1 s - 1 s / 1 s - 10 s / 6 s - 60 s / 1 min - 10 min / 6 min - 60 min / 1 h - 10 hrs)
- Universal voltage range AC/DC 12 - 240 V
- Red LED output indicator
- 1-MODULE, DIN rail mounting

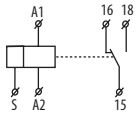
Technical parameters	CRM-81J	CRM-83J
Functions:	ZR - delay ON / ZN - delay OFF / BL- cycler 1:1	
Supply terminals:	A1 - A2	
Voltage range:	AC/DC 12 - 240 V (AC 50 - 60 Hz)	
Burden:	AC 0.7 - 3 VA / DC 0.5 - 1.7 W	
Supply voltage tolerance:	-15 %; +10 %	
Supply indication:	green LED	
Time ranges:	0.1 s - 10 h (in 6 ranges)	
Time setting:	potentiometer	
Time deviation:	5 % - mechanical setting	
Repeat accuracy:	0.2 % - set value stability	
Temperature coefficient:	0.01 % / °F, at = 68 °F (0.01% / °C, at =20 °C)	
Output		
Number of contacts:	1x changeover / SPDT (AgNi / Silver Alloy)	3x changeover / SPDT (AgNi / Silver Alloy)
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC Inductive load: 1HP / 240 V, 1/2 HP/120 V	8 A / 240 V AC / 24 V DC 1/2 HP / 240V, 1/4 HP / 120V
Inrush current:	30 A / < 3 s	10 A / < 3 s
Min. breaking capacity DC:	500 mW	
Output indication:	red LED	
Mechanical life:	$3x10^7$	
Electrical life resistive load:	$0.7x10^5$	
Control		
Consumption of input:	AC 0.025 - 0.2 VA / DC 0.1 - 0.7 W	
Load between S-A2:	Yes	
Control terminals:	A1-S	
Impulse length:	min. 25 ms / max. unlimited	
Reset time:	max. 150 ms	
Other information		
Power of control input:	-4 °F to 131 °F (-20 °C to 55 °C)	
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)	
Electrical strength:	4 kV (supply-output)	
Operating position:	any	
Mounting:	DIN rail EN 60715	
Protection degree:	IP 40 from front panel / IP 20 terminals	
Overvoltage category:	III.	
Pollution degree:	2	
Max. cable size (mm^2):	solid wire max.1x2.5 or 2x1.5 / with sleeve max.1x2.5 (AWG 12) (0.4 Nm)	
Dimensions:	3.5″ x 0.7″ x 2.5″ (90 x 17.6 x 64 mm)	
Weight:	2.2 oz. (62 g)	3 oz. (86 g)
Standards:	UL E308660 (for CRM-81J); EN 61812-1, EN 61010-1	

Time range

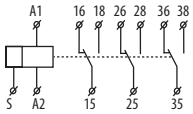
	1 s	10 s	1 min	10 min	1 hr	10 hrs
min	0.1 s	1 s	6 s	1 min	6 min	1 hr
max	1 s	10 s	60 s	10 min	60 min	10 hrs

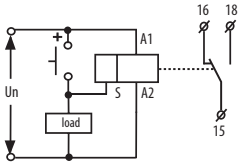
Symbol

CRM-81J



CRM-83J

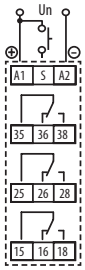




Connection

CRM-81J

CRM-83J



It is possible to connect the load between terminals S-A2 (e.g. contactor, pilot lamp or another device), without compromising the correct operation of the relay (the load is energized as long as the switch button is closed).

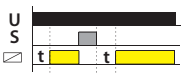
Example of an order

CRM-81J/UNI, ZR10s
1x changeover contact, voltage AC/DC 12-240 V, function: delay ON, time 1 - 10 s.

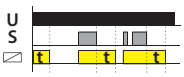
CRM-83J/UNI, BL1h
3x changeover contact, voltage AC/DC 12-240 V, function: cycler begin with impulse, time 6-60 min.

Functions

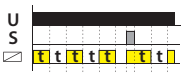
ZR - Delay ON



ZN - Delay OFF

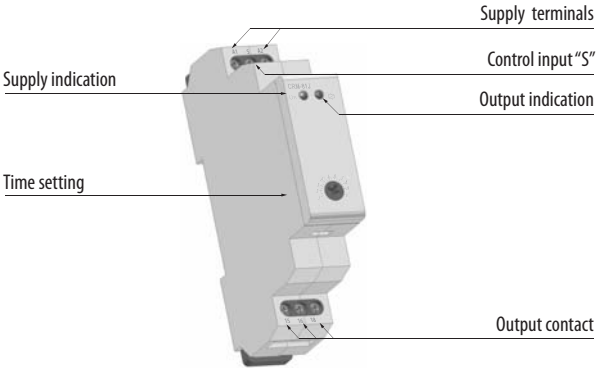


BL - Cycler 1:1



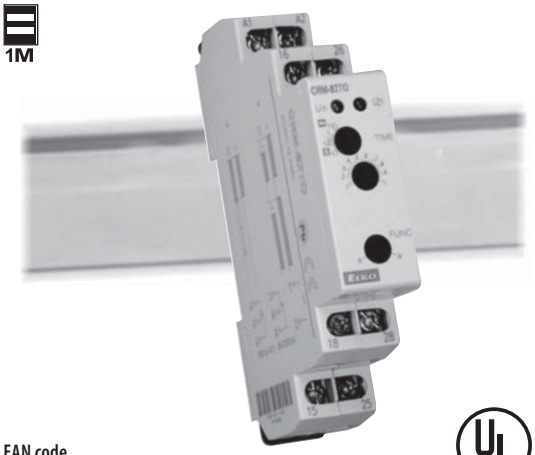
Note: the function ZR and ZN is controlled by supply voltage and control input ie. Once phase failure is detected and supply voltage is re applied, The relay automatically makes one cycle.

Description



Delay OFF without supply voltage **CRM-82TO**

1M

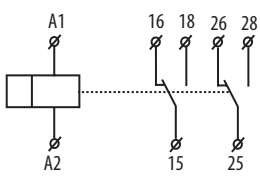


- True OFF“ relay - relay timing without supply voltage
- Example of use: back-up source for Delay OFF in case of voltage failure (e.g. emergency lighting, emergency respirator, or protection of el. controlled doors - in case of fire)
- 2 time functions adjustable by rotary switch:
  a - Delayed return after disconnecting of supply
  e - Delayed start
- Time range (adjustable by rotary switch and fine setting by potentiometer): 0.1 s - 10 min
- Universal supply voltage AC/DC 12 - 240 V
- 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)
- Clamp terminals
- 1-MODULE, DIN rail mounting

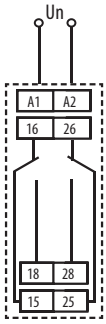
EAN code
CRM-82TO /UNI: 8595188137614

Technical parameters	CRM-82TO
Number of functions:	a - On Delay (Power On) / e - Off Delay (S Break)
Supply terminals:	A1 - A2
Voltage range:	AC/DC 12 - 240 V (AC 50 - 60 Hz)
Burden:	AC 0.7 - 3 VA / DC 0.5 - 1.7 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 % / °F, at = 68 °F (0.1 % / °C, at = 20 °C)
Output	
Number of contacts:	2x changeover / DPDT (AgNi / Silver Alloy)
Current rating:	Resistive load: 8 A / 240 V AC / 24 V DC Inductive load: 1/2 HP / 240 V, 1/4 HP / 120V
Inrush current:	10 A / < 3 s
Min. breaking capacity DC:	500 mW
Output indication:	red LED
Mechanical life:	$3x10^7$
Electrical life resistive load:	$0.7x10^5$
Other information	
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)
Electrical strength:	4 kV (supply-output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 10 terminals
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm^2):	solid wire max. 2x2.5 or 1x4, with sleeve max. 2x1.5 or 1x2.5 (AWG 12) (0.4 Nm)
Dimensions:	3.5˝ x 0.7˝ x 2.5˝ (90 x 17.6 x 64 mm)
Weight:	3.3 oz. (93 g)
Standards:	UL E 308660; EN 61812-1, EN 61010-1

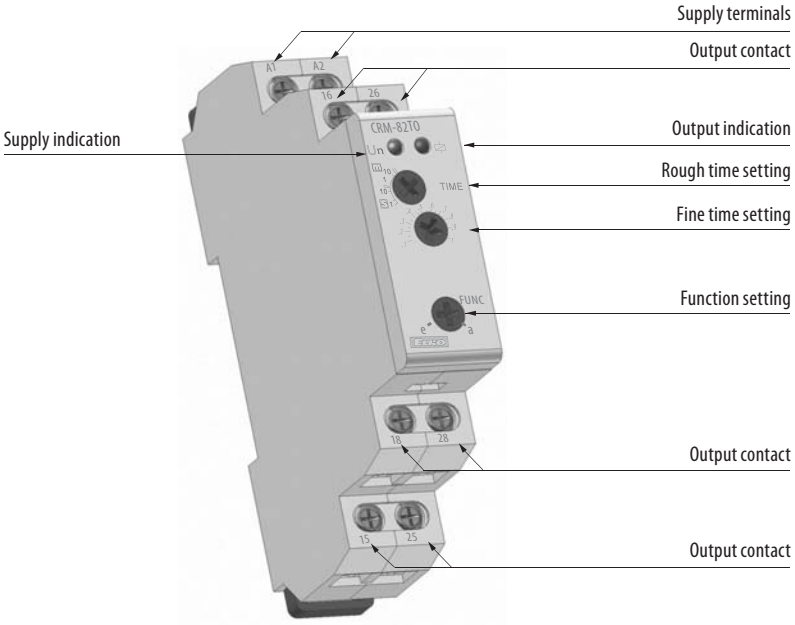
Symbol



Connection

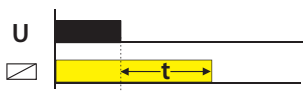


Description

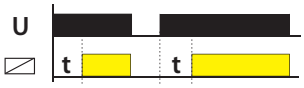


Function

a - Delay OFF (S break) the power supply is switched off (min. time is 0.5 s)



e - Off Delay (S break)



Doublestage delay unit **SJR-2**

1M

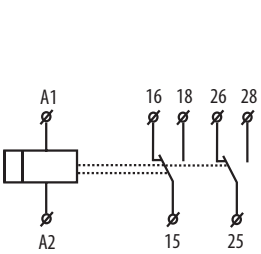
EAN code
SJR-2 /UNI: 8595188117401

- For gradual switching of high power (e.g. el.heating), prevents current strokes in the main
- Function: 2x Delay ON (2 time relays in one)
- Time scale 0.1s - 10 days divided into 10 time ranges:

  0.1s - 1s / 1s - 10s / 0.1min - 1min / 1min - 10min / 0.1h - 1h / 1h - 10hrs / 0.1 day - 1 day / 1 day - 10 days / ON / OFF
- Times t1 and t2 are independantly adjustable
- t1 and t2 are switched on after supply voltage connection
- Rough time setting via rotary switch
- Voltage range: AC/DC 12 - 240 V
- Output indication: multifunction red LED, flashing at certain states
- 1-MODULE, DIN rail mounting

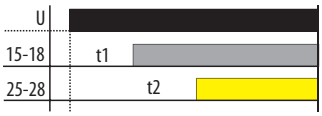
Technical parameters	SJR-2
Number of functions:	2x delay ON
Supply terminals:	A1 - A2
Voltage range:	AC/DC 12 - 240 V (AC 50 - 60 Hz)
Burden:	AC 0.7 - 3 VA / DC 0.5 - 1.7 W
Supply voltage tolerance:	-15 %; +10 %
Supply indication:	green LED
Time ranges:	0.1 s - 10 days
Time setting:	rotaty switch and potentiometer
Time deviation:	5 % - mechanical setting
Repeat accuracy:	0.2 % - set value stability
Temperature coefficient:	0.01 % / °F, at = 68 °F (0.01 % / °C, at = 20 °C)
Output	
Number of contacts:	2x changeover / DPDT (AgNi / Silver Alloy)
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC Inductive load: 1 HP / 240 V, 1/2 HP / 120V
Inrush current:	30 A / < 3 s
Min. breaking capacity DC:	500 mW
Output indication:	multifunction red LED
Mechanical life:	$3x10^7$
Electrical life resistive load:	$0.7x10^5$
Reset time:	max. 150 ms
Other information	
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)
Electrical strength:	4 kV (supply-output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 20 terminals
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm^2):	solid wire max.1x 2.5 or 2x1.5, with sleeve max. 1x2.5 (AWG 12) (0.4 Nm)
Dimensions:	3.5″ x 0.7″ x 2.5″ (90 x 17.6 x 64 mm)
Weight:	3.1 oz. (88 g)
Standards:	EN 61812-1, EN 61010-1

Symbol

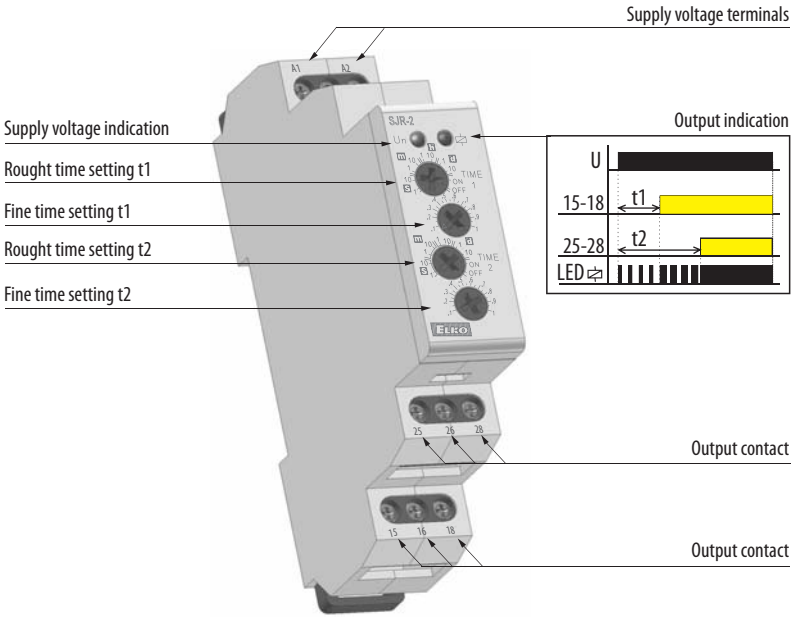


Connection

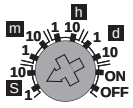
Function

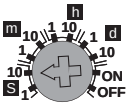


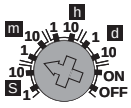
Description

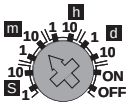


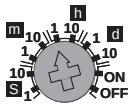
Time ranges

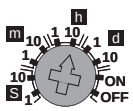


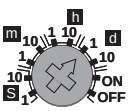


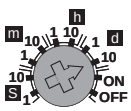


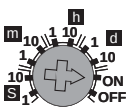


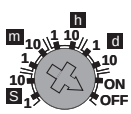






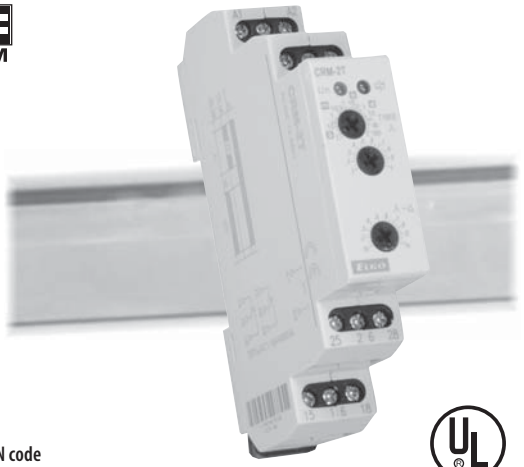






Delay ON star/delta **CRM-2T**

1M

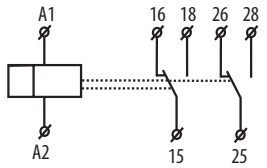


- It serves for delay ON of motors star / delta
- Time t1 (star) - time scale 0.1 s - 100 days devided into 10 time ranges
  - rough time setting by rotary switch
- Time t2 (delay) between ⅄ / △
  - time scale 0.1 s - 1 s
  - fine time setting by potentiometer
- Voltage range: AC/DC 12 - 240 V
- Output indication: multifunction red LED
- 1-MODULE, DIN rail mounting

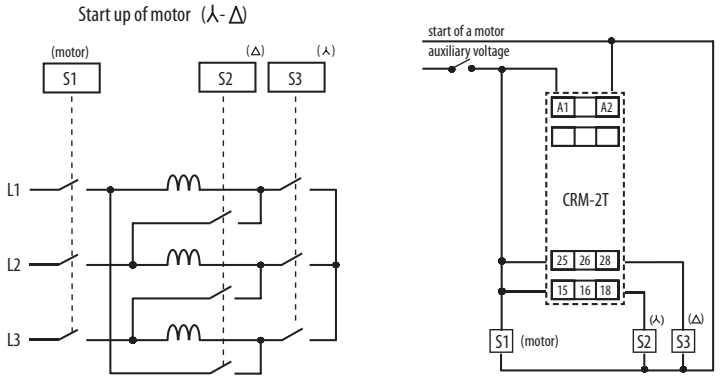
EAN code
CRM-2T /UNI: 8595188112437

Technical parameters	CRM-2T
Number of functions:	1
Supply terminals:	A1 - A2
Voltage range:	AC/DC 12 - 240 V/AC 50 - 60 Hz
Burden:	AC 0.7 - 3 VA / DC 0.5 - 1.7 W
Operating range:	-15 %; +10 %
Supply indication:	green LED
Time scale:	t1: 0.1 s - 100 days, t2: 0.1 s-1 s
Time setting:	potentiometer
Time deviation:	5% - mechanical setting
Repeat accuracy:	0.2 % - set value stability
Temperature coefficient:	0.01 % / °F, at = 68 °F (0.01 % / °C, at = 20 °C)
Output	
Number of contacts:	2x changeover / DPDT (AgNi / Silver Alloy)
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC Inductive load: 1 HP / 240 V, 1/2 HP / 120V
Inrush current:	30 A / < 3 s
Min. breaking capacity DC:	500 mW
Output indication:	multifunction red LED
Mechanical life:	$3x10^7$
Electrical life resistive load:	$0.7x10^5$
Reset time:	max. 150 ms
Other information	
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)
Electrical strength:	4 kV (supply-output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 20 terminals
Overvoltage category:	III.
Pollution degree:	2
Terminal wire capacity:	max.1x 2.5, 2x1.5, with sleeve max. 1x2.5 (AWG 12) (0.4 Nm)
Dimensions:	3.5″ x 0.7″ x 2.5″ (90 x 17.6 x 64 mm)
Weight:	3 oz. (84 g)
Standards:	UL E308660; EN 61812-1, EN 61010-1

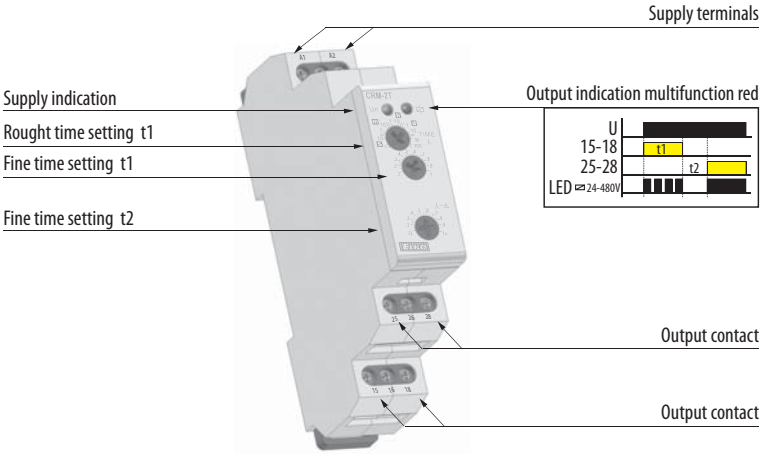
Symbol



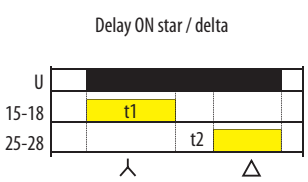
Connection



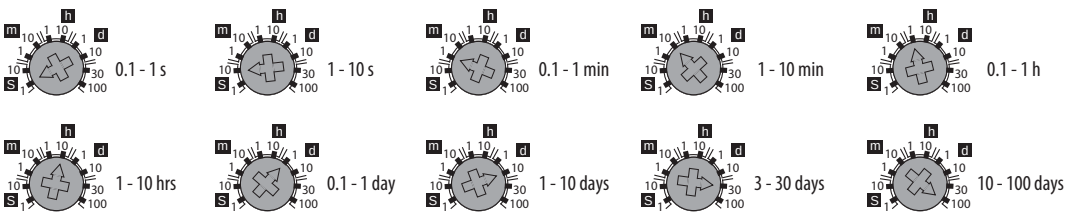
Description



Function

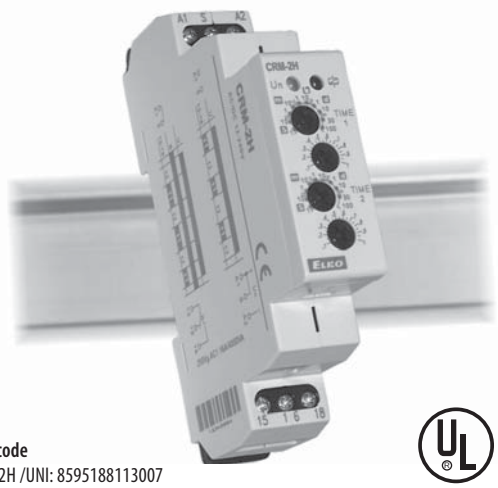


Time ranges t1



Asymmetric cycler **CRM-2H**

1M

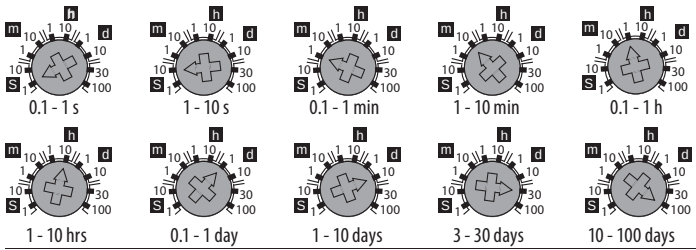


EAN code
CRM-2H /UNI: 8595188113007

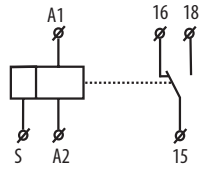
- Cycler with independent adjustable switch ON/OFF
- Used for regular room ventilation, cyclic dehumidification, light control, circulating pumps, illuminated advertising, etc.
- 2 time functions:
  1) Cycler beginning with pulse
  2) Cycler beginning with pause
- Function choice is done by an external jumper of terminals S-A1
- Time scale 0.1 s - 100 days devided into 10 time 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 hrs - 10 hrs / 0.1 day - 1 day / 1 day - 10 days / 3 days - 30 days / 10 days - 100 days)
- Rough time setting via rotary switch
- Voltage range: AC/DC 12 - 240 V
- Output indication: multifunction red LED
- 1-MODULE, DIN rail mounting

Technical parameters	CRM-2H
Number of functions:	2 (function is chosen by connecting S-A1)
Supply terminals:	A1 - A2
Voltage range:	AC/DC 12 - 240 V (AC 50 - 60 Hz)
Burden:	AC 0.7 - 3 VA / DC 0.5 - 1.7 W
Operating range:	-15 %; +10 %
Supply indication:	green LED
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 % / °F, at = 68 °F (0.01 % / °C, at = 20 °C)
Output	
Number of contacts:	1x changeover / SPDT (AgNi / Silver Alloy)
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC Inductive load: 1 HP / 240 V, 1/2 HP / 120V
Inrush current:	30 A / < 3 s
Min. breaking capacity DC:	500 mW
Output indication:	multifunction red LED
Mechanical life:	$3x10^7$
Electrical life (resistive load):	$0.7x10^5$
Reset time:	max. 150 ms
Other information	
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)
Electrical strength:	4 kV (supply-output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 20 terminals
Overvoltage category:	III.
Pollution degree:	2
Terminal wire capacity:	solid wire max.1x 2.5 or 2x1.5, with sleeve max. 1x2.5 (AWG 12) (0.4 Nm)
Dimensions:	3.5″ x 0.7″ x 2.5″ (90 x 17.6 x 64 mm)
Weight:	2.3 oz. (65 g)
Standards:	UL E308660; EN 61812-1, EN 61010-1

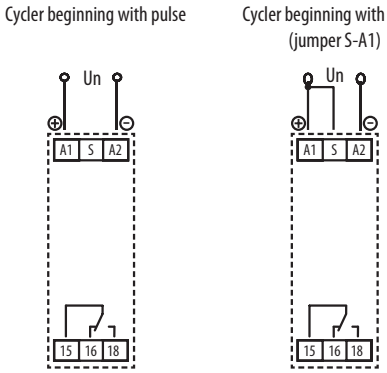
Time ranges



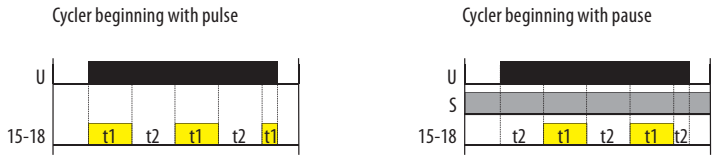
Symbol



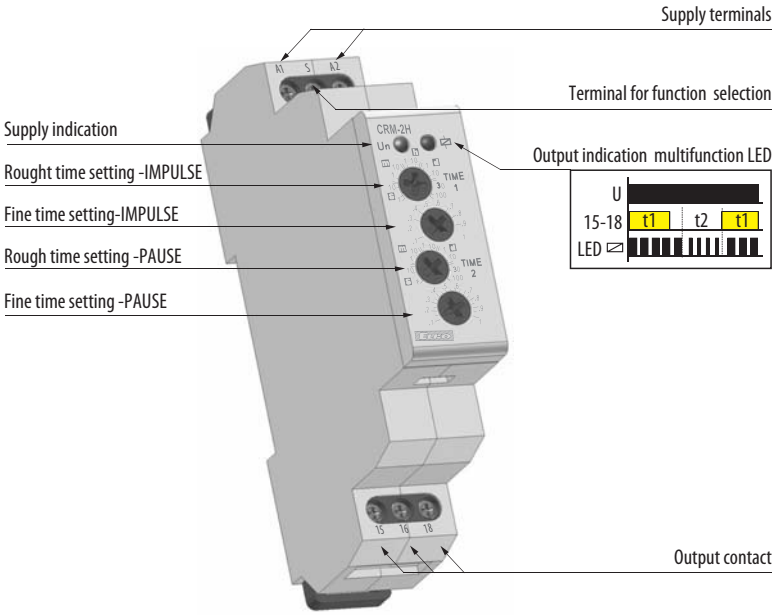
Connection



Function

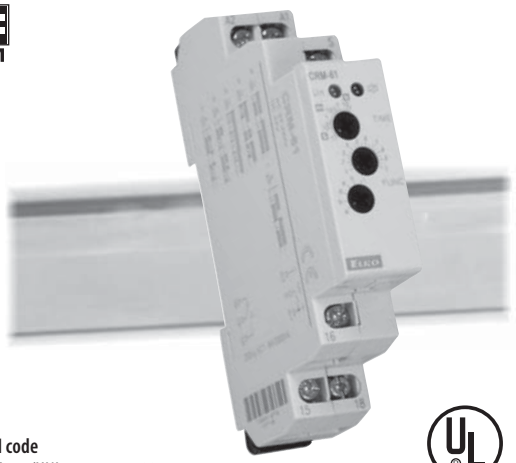


Description



Multifunction time relay **CRM-61**

1M

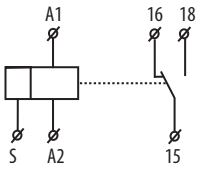


- Multifunction time relay (6 functions and 6 time ranges), economic version of CRM-91H
- To be used for electrical appliances, control of lights, heating, motors, pumps, fans, etc.
- 6 functions: - 3 time functions controlled by supply voltage
  - 3 time functions controlled by control input
- Easy to use function and time-range setting by rotary switches
- Time scale 0.1 s - 10 hrs divided into 6 range:
  (0.1 s - 1 s / 1 s - 10 s / 0.1 min - 1 min / 1 min - 10 min / 0.1 hrs - 1 h rs / 1 hrs - 10 hrs)
- Universal voltage range: AC 24-240 V, DC 24 V
- Multifunction red LED output indicator flashes or shines depending on the status of output
- 1-MODULE, DIN rail mounting

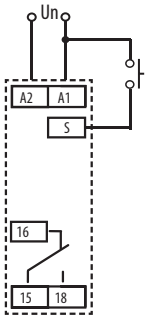
EAN code
CRM-61 /UNI: 8595188120210

Technical parameters	CRM-61
Number of functions:	6
Supply terminals:	A1 - A2
Supply voltage:	AC 24 - 240 V (AC 50 - 60 Hz) and DC 24 V
Burden:	AC 0.7 - 3 VA / DC 0.5 - 1.7 W
Supply voltage tolerance:	15 %; +10 %
Supply indication:	green LED
Time ranges:	0.1 s - 10 h
Time setting:	rotary switch and potentiometer
Time deviation:	5 % - mechanical setting
Repeat accuracy:	0.2 % - set value stability
Temperature coefficient:	0.01 % / °F, at = 68 °F (0.01 % / °C, at = 20°C)
Output	
Number of contacts:	1x changeover / SPDT (AgNi / Silver Alloy)
Current rating:	Resistive load: 8 A / 240 V AC / 24 V DC
	Inductive load: 1/2 HP / 240 V, 1/4 HP / 120V
Output indication:	multifunction red LED
Mechanical life:	$1x10^7$
Electrical life resistive load:	$1x10^5$
Controlling	
Control. voltage:	UNI
Control power input:	AC 0.025 - 0.2 VA / DC 0.1 - 0.7 W
Load between S-A2:	Yes
Control. terminals:	A1-S
Max. capacity of cable control:	0.1µF
Impulse length:	min. 25 ms / max. unlimited
Reset time:	max. 120 ms
Other information	
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)
Electrical strength:	4 kV (supply-output)
Operating position	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 10 terminals
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm^2):	max. 2x 2.5, max. 1x4, with sleeve max. 1x2.5, 2x1.5 (AWG 12) (0.4 Nm)
Dimensions:	3.5˝ x 0.7˝ x 2.5˝ (90 x 17.6 x 64 mm)
Weight:	2.4 oz. (69 g)
Standards:	UL E308660; EN 61812-1, EN 61010-1

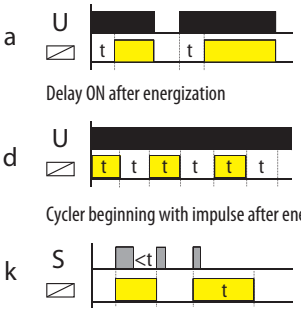
Symbol



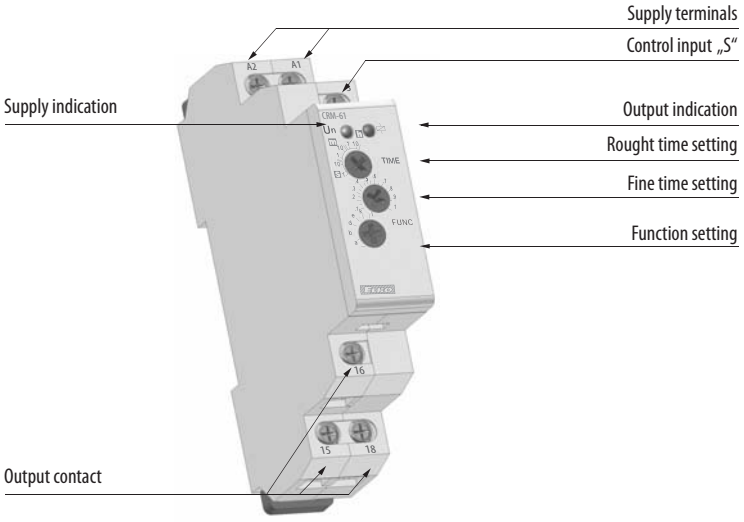
Connection



Function



Description



Time relay with external potentiometer **CRM-91HE, CRM-2HE**

1M

Ø22

EAN code
CRM-91HE /UNI + potentiometr: 8595188142052
CRM-2HE /UNI + potetiometr: 8595188142069
Potentiometr for CRM-91HE, CRM-2HE : 8595188125215

Control by external control unit - potentiometer (can be placed / mounted for example on switch board doors or in panel)

CRM-91HE: multifunction time relays

- 10 functions - 5 time functions controlled by supply voltage
  - 4 time functions controlled by control input
  - 1 function of latching relay
- 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 hrs / 1 hrs - 10 hrs / 0.1 day - 1 day / 1 day - 10 days / only ON / only OFF)

CRM-2HE: asymmetric cycler

- 2 time functions - cycler beginning with pulse
  - cycler beginning with gap
- function selected via external wired link on control input S-A1

CRM-91HE, CRM-2HE:

- Universal supply voltage AC/DC 12 - 240 V
- 1-MODULE, DIN rail mounting
- Possible to connect external potentiometer - max. distance 32.8 ft. (10 m) from relay

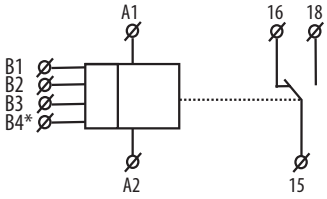
Technical parameters	CRM-91HE	CRM-2HE
Number of functions:	10	2
Supply terminals:	A1 - A2	
Voltage range:	AC/DC 12 - 240 V (AC 50 - 60 Hz)	
Burden:	AC 0.7 - 3 VA / DC 0.5 - 1.7 W	
Supply voltage tolerance:	-15 %; +10 %	
Supply indication:	green LED	
Time ranges:	0.1 s - 10 days	0.1 s - 100 days
Time setting:	rotary switch, external potentiometer	
Repeat accuracy:	0.2 % - set value stability	
Temperature coefficient:	0.01 % / °F, at = 68 °F (0.01 % / °C, at = 20 °C)	
Output		
Number of contacts:	1x changeover / SPDT (AgNi / Silver Alloy)	
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC	
	Inductive load: 1 HP / 240 V, 1/2 HP / 120V	
Inrush current:	30 A / < 3 s	
Min. breaking capacity DC:	500 mW	
Output indication:	multifunction red LED	
Mechanical life:	$3x10^7$	
Electrical life resistive load:	$0.7x10^5$	
Controlling		
Control. voltage:	UNI	
Consumption of input:	AC 0.025-0.2VA / DC 0.1-0.7W	
Load between S-A2:	Yes	
Control. terminals:	A1-S	
Impulse length:	min. 25 ms / max. unlimited	
Reset time:	max. 150 ms	
Other information		
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)	
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)	
Electrical strength:	4 kV (supply - output)	
Operating position:	any	
Mounting:	DIN rail EN 60715	
Protection degree:	IP 40 from front panel / IP 20 terminals	
Overvoltage category:	III.	
Pollution degree:	2	
Max. cable size (mm^2):	solid wire max. 1x 2.5 or 2x1.5, with sleeve max. 1x2.5 (AWG 12) (0.4 Nm)	
Dimensions:	3.5″ x 0.7″ x 2.5″ (90 x 17.6 x 64 mm)	
Weight:	2.7 oz. (77 g)	2.8 oz. (78 g)
Standards:	EN 61812-1, EN 61010-1	

Function

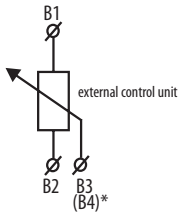
Functions of CRM-91HE are identical with CRM-91H.
Functions of CRM-2HE are identical with CRM-2H.

Symbol

CRM-91HE, CRM-2HE



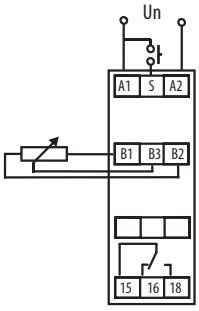
Potentiometer to CRM-91HE, CRM-2HE



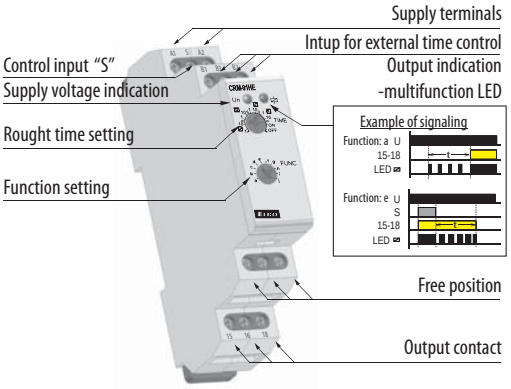
*B4 only for CRM-2HE

Connection

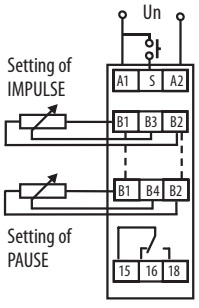
CRM-91HE

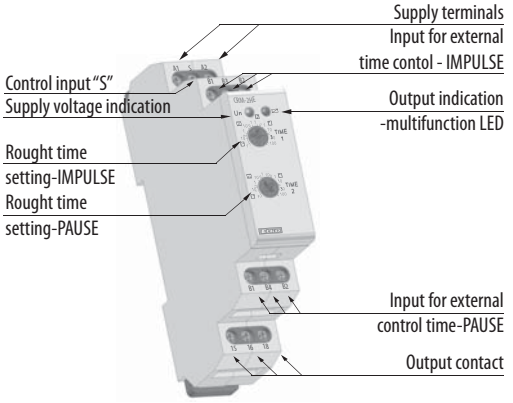


Description



CRM-2HE





Potentiometer

Potentiometer:	47 kΩ, linear
Protection degree:	IP 65 from front side / IP 20 from back side
Max. cable size (mm^2):	1.5 mm^2 with sleeve / without sleeve max.2.5 (AWG 12)
Weight:	0.5 oz. (15 g)
Dimensions:	see page Accessories

Staircase switch **CRM-4**

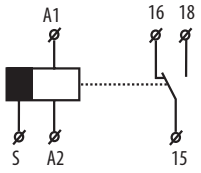
1M

- Used for delayed switching of lights in the corridors, entrances, stairways, halls or for delayed finish of fans (WC, bathroom, etc.)
- It is controlled by a button or by several buttons from more places (connected in parallel)
- Operating system switch:
  AUTO - normal function according to set time
  OFF - permanently OFF (e.g. when changing bulbs)
  ON - permanently ON (e.g. while cleaning, servicing)
- Time range: 0.5 - 10 min
- Time setting by potentiometer
- Supply voltage: AC 120 V
- Protection against button blocking (e.g. a match inserted in a button)
- 1- MODULE, DIN rail mounting

EAN code
CRM-4 /120V: 8595188155595

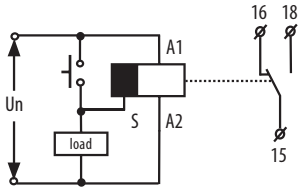
Technical parameters	CRM-4
Function:	delay off reacting to control contact switching
Supply terminals:	A1 - A2
Voltage range:	AC 120 V / 60 Hz
Burden:	AC max. 12 VA / 1.8 W
Supply voltage tolerance:	-15 %; +10 %
Supply indication:	green LED
Time ranges:	0.5 - 10 min
Time setting:	potentiometer
Time deviation:	10 % - mechanical setting
Repeat accuracy:	5 % - set value stability
Temperature coefficient:	0.05 % / °F, at = 68 °F (0.05 % / °C, at = 20 °C)
Output	
Number of contacts:	1x changeover / SPDT ($AgSnO_2$)
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC
	Inductive load: 1 HP / 240 V, 1/2 HP / 120V
Inrush current:	30 A / < 3 s
Min. breaking capacity DC:	500 mW
Output indication:	red LED
Mechanical life:	$3x10^7$
Electrical life resistive load:	$0.7x10^5$
Control	
Control voltage:	AC 120 V
Power on input:	AC 0.53 VA
Load between S-A2:	Yes
Control terminals:	A1-S
Impulse length:	min. 25 ms / max. unlimited
Reset time:	max. 150 ms
Other information	
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)
Electrical strength:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 20 terminals
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm^2):	solid wire max.1x 2.5 or 2x1.5, with sleeve max. 1x2.5 (AWG 12) (0.4 Nm)
Dimensions:	3.5″ x 0.7″ x 2.5″ (90 x 17.6 x 64 mm)
Weight:	2.2 oz. (62 g)
Standards:	EN 60669-2-3, EN 61010-1

Symbol

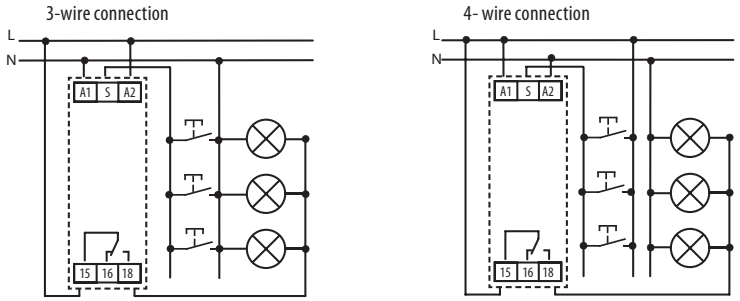


Connection

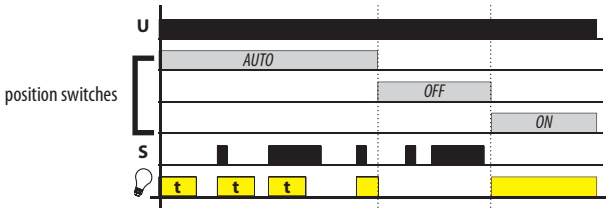
It is possible to connect load between S-A2 (e.g. contactor, control of light or any other device), without disturbing a correct function of relay (load is energized while the switch is ON).



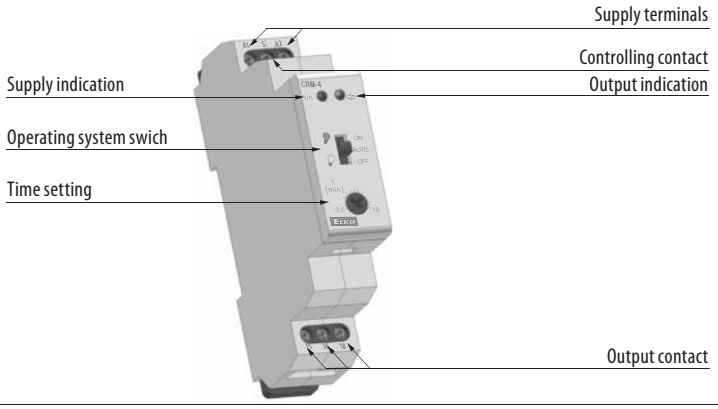
Circuit connection



Function



Description



Multifunction time relay **CRM-91H, CRM-93H, CRM-9S**

1M

EAN code

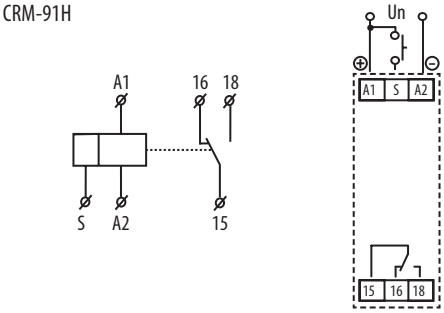
CRM-91 /UNI:	8595188112420
CRM-93H /UNI:	8595188112468
CRM-9S /UNI:	8595188116008

- Multifunction time relay can be used for electrical appliances, control of lights, heating, motors, pumps and fans (10 functions, 10 time ranges, multi-voltage, 15 A or 3x 8 A contacts)
- Fulfills all requirements for time relays
- 10 functions: - 5 time functions controlled by supply voltage
  - 4 time functions controlled by control input
  - 1 function of latching relay
- 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 hrs / 1 hrs - 10 hrs / 0.1 day - 1 day / 1 day - 10 days / only ON / only OFF)
- CRM-91H, CRM-93H: universal supply voltage AC/DC 12 - 240 V
- CRM-9S: universal supply voltage AC 12 - 240 V, absolutely noise-less switching
  1x static contactless output (triac) 0.7 A (60A / < 10 ms)
- Multifunction red LED output indicator flashes or shines depending on the status of output
- 1-MODULE, DIN rail mounting

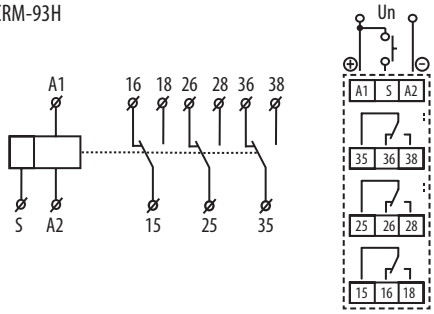
Technical parameters	CRM-91H	CRM-93H	CRM-9S
Number of functions:	10		
Supply terminals:	A1 - A2		
Voltage range:	AC/DC 12 - 240 V (AC 50-60 Hz)		AC 12-240V (50-60Hz)
Burden:	AC 0.7 - 3 VA / DC 0.5 - 1.7 W		AC max. 0.35VA
Supply voltage tolerance:	-15 %; +10 %		
Supply indication:	green LED		
Time ranges:	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 % / °F, at = 68 °F (0.01 % / °C, at = 20 °C)		
Output			
Number of contacts:	1x chang./SPDT (AgNi / Silver Alloy)	3x chang./SPDT (AgNi / Silver Alloy)	1x static contactless output (triac)
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC	8 A / 240 V AC / 24 V DC	0.7A
	Inductive load: 1HP / 240 V, 1/2HP / 120V	1 HP / 240 V, 1/2 HP / 120 V	x
Inrush current:	30A / < 3s	10A / < 3s	60A / < 10ms
Min. breaking capacity DC:	500mA		x
Voltage drop on switch:	x		max. 0.9 V at I max.
Load on B1 terminal:	x		Yes / I max. 0.7 A
Output indication:	multifunction red LED		
Mechanical life:	$3x10^7$		$> 10^8$
Electrical life resistive load:	$0.7x10^5$		$>10^8$
Controlling			
Power on control input:	AC 0.025 - 0.2 VA / DC 0.1 - 0.7 W		AC 0.025 - 0.2 VA
Load between S-A2:	Yes		
Control. terminals:	A1-S		
Impulse length:	min. 25 ms / max. unlimited		
Reset time:	max. 150 ms		max. 250 ms
Other information			
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)		
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)		
Electrical strength:	4kV (supply-output)		x
Operating position:	any		
Mounting:	DIN rail EN 60715		
Protection degree:	IP 40 from front panel / IP 20 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) (0.4 Nm)		
Dimensions:	3.5″ x 0.7″ x 2.5″ (90 x 17.6 x 64 mm)		
Weight:	2.26 oz. (64 g)	3.1 oz. (89 g)	1.8 oz. (51 g)
Standards:	UL E308660 (for CRM-91H and CRM-93H); EN 61812-1, EN 61010-1		

Symbol **Connection**

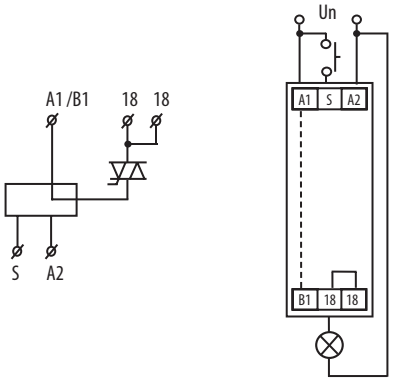
CRM-91H



CRM-93H

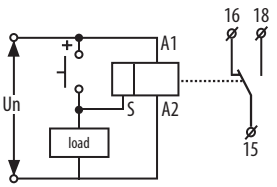


CRM-9S



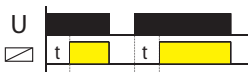
Possibility to connect load onto controlling input

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

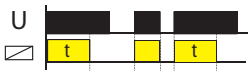


Function

On Delay (Power On)
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.

a 

Off Delay
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.

b 

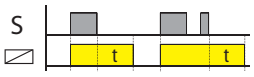
Repeat Cycle (Starting Off)
When input voltage U is applied, time delay t begins. When time delay t is complete, relay contacts R change state for time delay t. This cycle will repeat until input voltage U is removed. Trigger switch is not used in this function.

c 

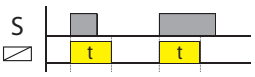
Repeat Cycle (Starting On)
When input voltage U is applied, relay contacts R change state immediately and time delay t begins. When time delay t is complete, contacts return to their shelf state for time delay t. This cycle will repeat until input voltage U is removed. Trigger switch is not used in this function.

d 

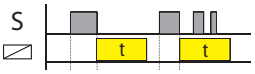
Off Delay (S Break)
Input voltage U must be applied continuously. When trigger switch S is closed, relay contacts R change state. When trigger switch S is opened, delay t begins. When delay t is complete, contacts R return to their shelf state. If trigger switch S is closed before time delay t is complete, 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.

e 

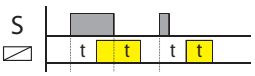
Single Shot
Upon application of input voltage U, the relay is ready to accept trigger signal S. Upon application of the trigger signal S, the relay contacts R transfer and the preset time t begins. During time-out, the trigger signal S is ignored. The relay resets by applying the trigger switch S when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

f 

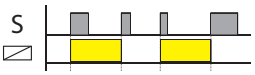
Single Shot Trailing Edge (Non-Retriggerable)
Upon application of input voltage U, the relay is ready to accept trigger signal S. Upon application of the trigger signal S, the relay contacts R transfer and the preset time t begins. At the end of the preset time t, the relay contacts R return to their 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.

g 

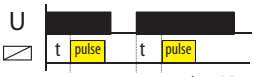
On/Off Delay
Input voltage U must be applied continuously. When trigger switch S is closed, time delay t begins. When time delay t is complete, relay contacts R change state and remain transferred until trigger switch S is opened. If input voltage U is removed, relay contacts R return to their shelf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

h 

Latching relay
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.

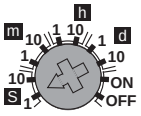
i 

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.

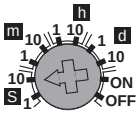
j 

pulse = 0.5 s

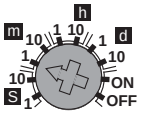
Time ranges



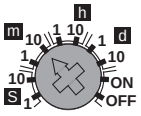
0.1 - 1s



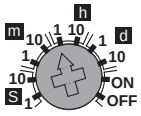
1 - 10 s



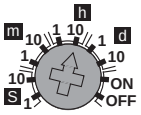
0.1 - 1 min



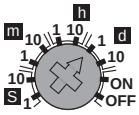
1 - 10 min



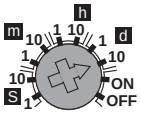
0.1 - 1 h



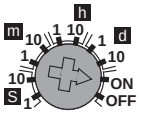
1 - 10 hrs



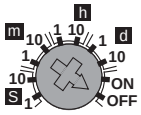
0.1 - 1 day



1 - 10 days

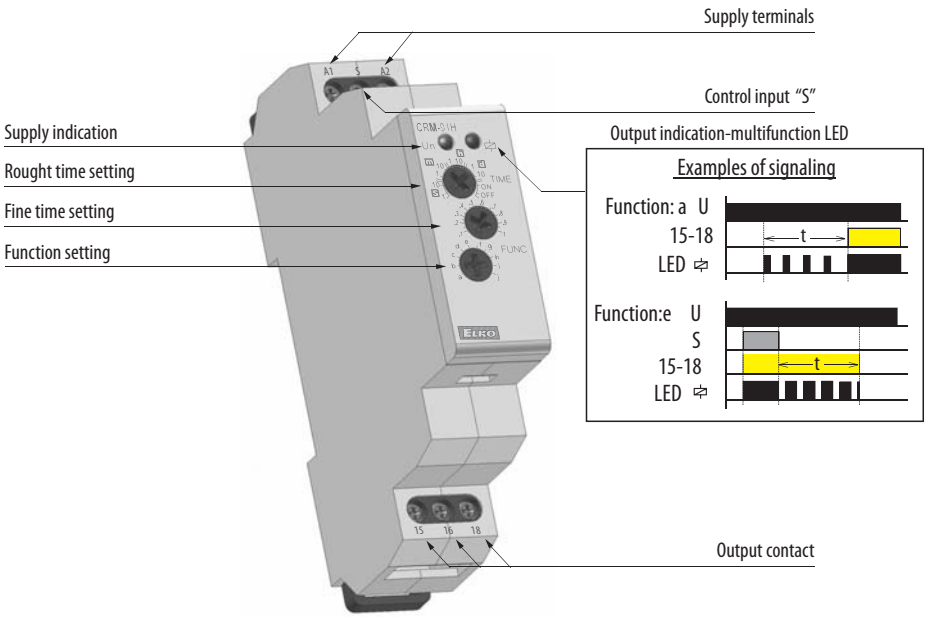


only ON



only OFF

Description



Notes

Output contacts of CRM-93H do not allow switching of different phases or 3-phase voltages (voltage > 250 V).

When mounting into steal-plated switchboards, it is necessary to keep a safety distance of min. 3 mm from terminal's screws 35-36-38 and 25-26-28 towards the shutter of a switchboard.

Programmable digital relay **PDR-2/A, PDR-2/B**

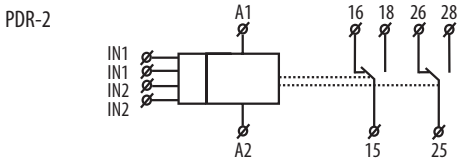
3M

- Multifunction programmable digital relay with 4 digit red LED display
- Control and setting are done by 3 buttons, user-friendly menu, absolute accuracy in timer setting, time countdown on a display, galvanically separated START and STOP control inputs with UNI supply
- Thanks to its complexity, it is possible to program also more demanding time functions by using 2 independent times
- 2 independent times, with combination of 2 inputs and 2 outputs
- PDR-2/A: 16 functions, choice of functions of the other relay, 30 memory places for most frequently used times
- PDR-2/B: 10 functions, 1 output of 10 functions can be assigned to each relay = 2 relays in one device
- 2 independent times in range: 0.01 s - 100 hrs
- Supply voltage AC/DC 12 - 240 V
- 3-MODULE, DIN rail mounting

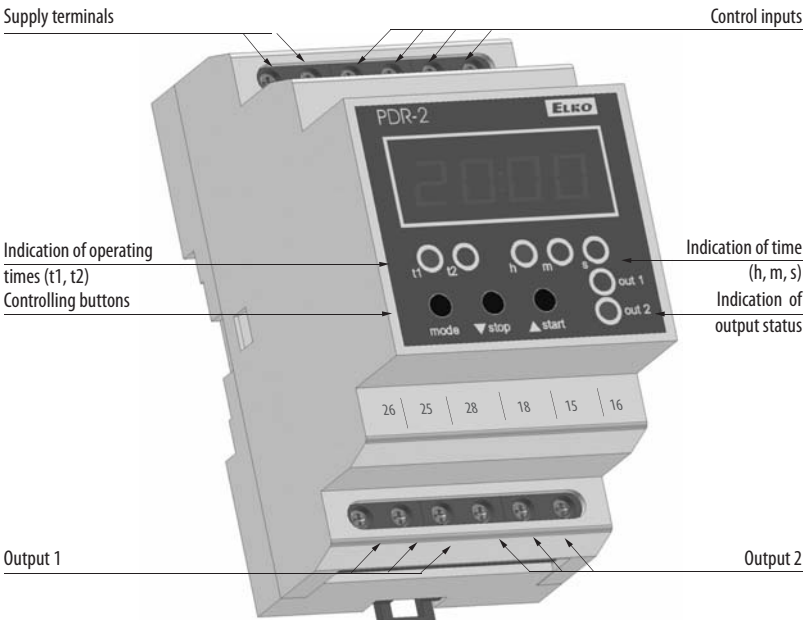
EAN code
PDR-2A /UNI: 8594030333044
PDR-2B /UNI: 8594030333068

Technical parameters	PDR-2/A	PDR-2/B
Function:	16	10
Supply terminals:	A1 - A2	
Voltage range:	AC/DC 12 - 240 V (AC 50 - 60 Hz)	
Burden:	AC 0.5 - 2.5 VA / DC 0.4 - 2.5 W	
Supply voltage tolerance:	-15 %; +10 %	
Time ranges:	0.01 s - 100 h	
Repeat accuracy:	0.2 % - set value stability	
Temperature coefficient:	0.01 % / °F, at = 68 °F (0.01 % / °C, at = 20 °C)	
Output		
Number of contacts:	2x changeover / SPDT (AgNi / Silver Alloy)	
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC Inductive load: 1 HP / 240 V, 1/2 HP / 120V	
Inrush current:	30 A / < 3 s	
Min. breaking capacity DC:	500 mW	
Output indication:	red LED	
Mechanical life:	$3x10^7$	
Electrical life resistive load:	$0.7x10^5$	
Control		
Control input Burden:	AC 0.01 - 0.25 VA	
Control. impulse length:	min. 1 ms / max. unlimited	
Reset time:	max. 200 ms	
Display - colour:	red	
Number and height of digits:	4 positions with separating colon, height 0.39″ (10 mm)	
Luminace:	2200 - 3800 ucd	
Light wavelength:	635 nm	
Brightness setting:	range 20 - 100 % in 10 steps adjustable	
Memory - memory locations:	30 (PDR-2/A) / 20 (PDR-2/B) for times ranges + service function	
Data stored for:	min. 10 years	
Other information		
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)	
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)	
Electrical strength:	4 kV (supply - output)	
Operating position:	any	
Mounting:	DIN rail EN 60715	
Protection degree:	IP 40 from front panel / IP 20 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 1.5 (AWG 12) (0.4 Nm)	
Dimensions:	3.5″ x 2″ x 2.6″ (90 x 52 x 65 mm)	
Weight:	5 oz. (143 g)	
Standards:	EN 61812-1, EN 61010-1	

Symbol



Description

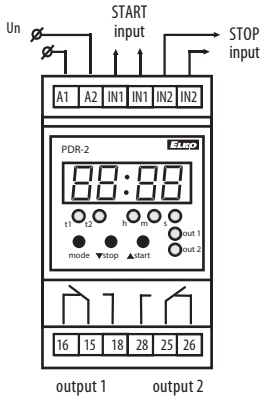


Time data

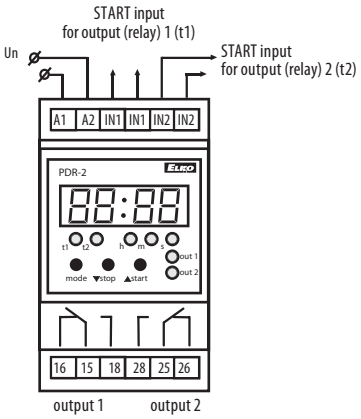
Time range:	0.01 s - 99 h 59 min 59 sec 99 ss
Minimal time step:	0.01 s
Time deviation:	0.01 % of set value
Setting error:	0 %
Setting, reset accuracy:	100 %
Digital places:	selected via program

Connection

PDR-2/A



PDR-2/B



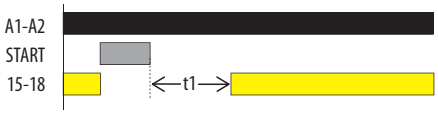
Function

Functions for PDR-2/A and PDR-2/B

1. Delay ON

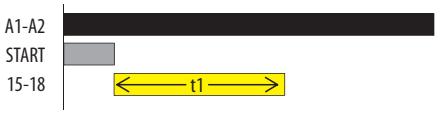
2. Delay OFF

3. Delay ON after switching off control contact



4. Delay ON by closing control contact

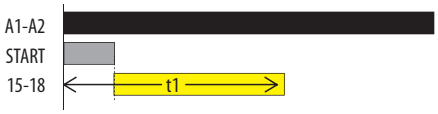
5. Delay OFF after switching off control contact



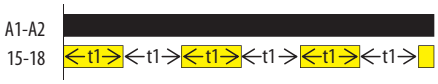
6. Delay OFF by closing control output

7. Delay OFF by opening control contact with instant output

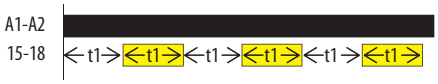
8. Delay OFF by closing control contact with delayed output



9. Cycler beginning with impulse

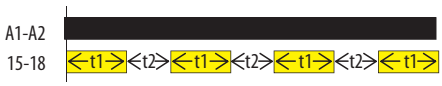


10. Cycler beginning with pause

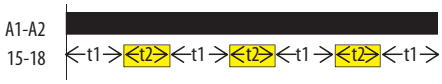


Functions for PDR-2/A

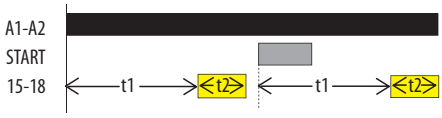
11. Cycler beginning with impulse with variable interval



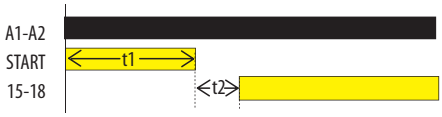
12. Cycler beginning with pause with variable interval



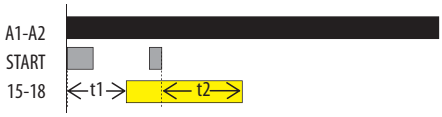
13. Generator of impulse



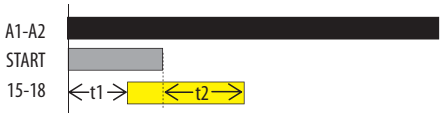
14. Changeover star/delta



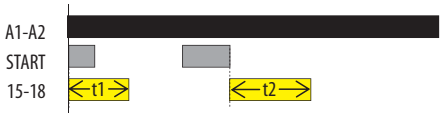
15A. Shift of pulse by 2 times



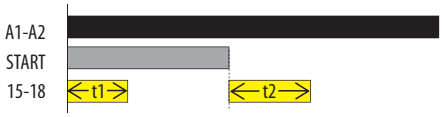
15B. Shift of impulse by 2 times



16A. Extended impulse by 2 times



16B. Extended impulse by 2 times



Recommendation: PDR-2/B is replacing by 2 simple time relays = 2 in one.

Super-multifunction relay **SMR-T, SMR-B**

SMR-B

60mm
21mm

SMR-T

60mm
13mm

EAN code
SMR-T/120V: 8595188155588
SMR-B/120V: 8595188155571

- Multifunction relay designed for installation into a wiring box or under wall-switch in an existing electrical installation
- Advantageous and fast solution for exchanging standard wall-switch for a switch controlled by time or for an impulse relay controlled by a button

SMR-T
- 3-wire connection, works without the connection of a neutral conductor
- Power output: 10 - 80 VA
- Between input S and neutral wire is possible connect any load R, L, or C - that is not necessary

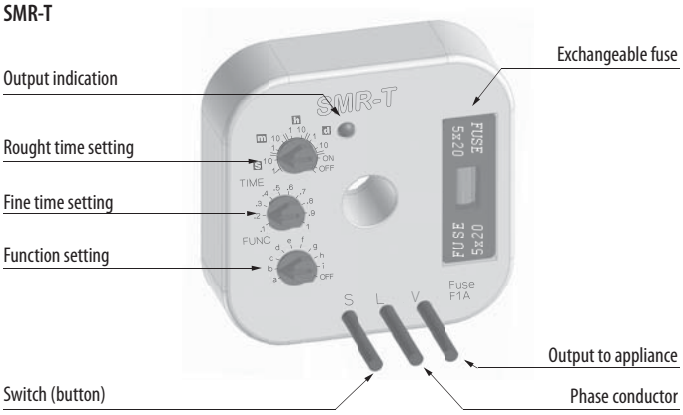
SMR-B
- 4-wire connection
- 10 functions
- Enables switching of fluorescent lights and also energy saving lights
- Suitable for switching loads greater than SMR-T, for example pulse relay, stair automatic switch, switching of ladder radiators in bathrooms
- Independent galvanically separated input AC/DC 5-250V, for example for control from a security system

Technical parameters	SMR-T	SMR-B
Number of functions:	9	10
Connection:	3-wire, without neutral	4-wire, with neutral
Voltage range:	AC 120V / 60Hz	
Power input (no operation / make):	0.8 / 3VA	max. 1 / 1VA
Supply voltage tolerance:	-15%; +10%	
Time ranges:	0.1 s - 10 days	
Time setting:	via rotaty switch	
Time deviation:	10 % - mechanical setting	
Repeat accuracy:	2 % - set value stability	
Temperature coefficient:	0.1 % / °F, at = 68 °F (0.1 % / °C, at = 20 °C)	
Output		
Number of contacts:	1 x triac	1x NO-SPST ($AgSnO_2$)
Resistive load:	10 - 80 VA	15 A / 240 V AC / 24 V DC
Inductive load:	10 - 50 VA	1 HP / 240 V, 1/2 HP / 120V
Control		
Control voltage:	AC 120 V	AC 120 V, UNI-5-250 V AC/DC
Control current:	3 mA	
Impulse length:	min. 50ms / max. unlimited	
Other information		
Operating temperature:	32.. 122 °F (0..50°C)	
Operating position:	any	
Mounting:	free at connecting wires	
Protection degree*:	IP30 in standard conditions	
Overvoltage category:	III.	
Pollution degree:	2	
Fuse:	F 1A / 250V	x
Connection (cross-section/ lenght):	4 x sol. wir., 0.75 mm^2 (AWG 18) / 3.5˝ (90 mm)	2xCY, 0.75mm^2 (AWG 18), 2xCY, 2.5mm^2 (AWG 10) / 3.5˝ (90mm)
Dimensions:	1.9˝x 1.9˝x 0.5˝ (49 x 49 x 13 mm)	1.9˝x 1.9˝x 0.8˝ (49 x 49 x 21 mm)
Weight:	0.92 oz. (26 g)	1.9 oz. (53 g)
Standards:	EN 61812-1, EN 61010-1	

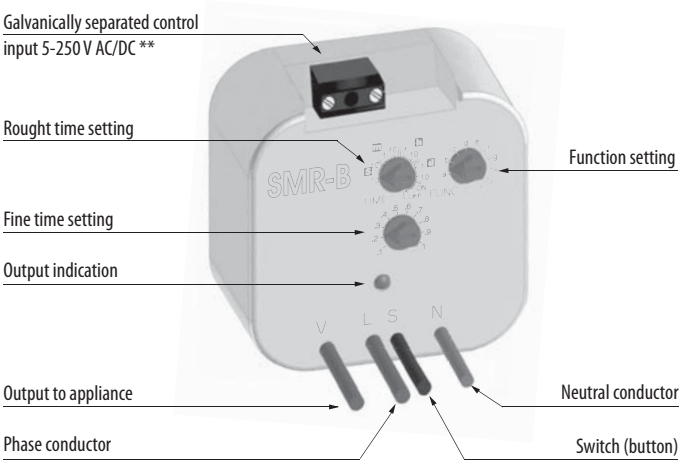
* for more information see page 30

Description

SMR-T

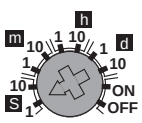


SMR-B

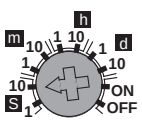


** Max Tightening Torque for terminals is 0.25 Nm.

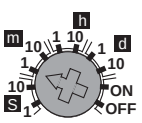
Time ranges



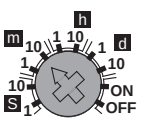
0.1 - 1 s



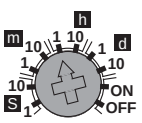
1 - 10 s



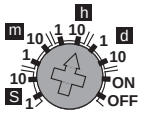
0.1 - 1 min



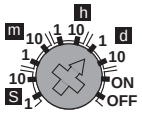
1 - 10 min



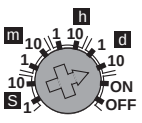
0.1 - 1 hrs



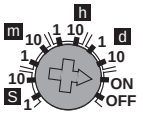
1 - 10 hrs



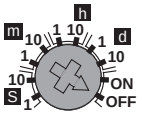
0.1 - 1 day



1 - 10 days



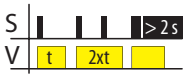
only ON



only OFF

Function

Function a - delay OFF on entrering edge
output times when it is switched. Each following pressing (max. 5x) increases time. Long pressing swithes output off.



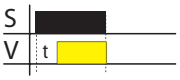
Function b - delay OFF on downward edge
output times after button is swithed off, switches immediately

Function c - delay OFF on downward edge
after switching off output switches on and times

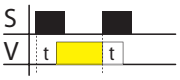
Function d - cycler - flasher impulsem
output cycles in regular interval, cycler starts with an impulse

Function e - puls shift
delay on after the switch is switched on and delay on after it is switched off

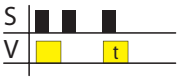
Function f - delay ON
delay on after switch is switched on until it is switched off



Function g - impulse relay
switches on by a press, another pressing switches the output off. The length of pressing doesn't matter, it is possible to set reaction delay by a potentiometer and thus eliminate rebound of a button



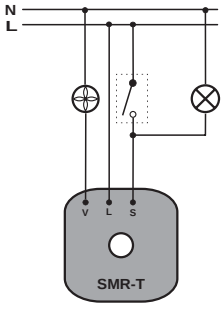
Function h - impulse relay with delay
one press switches on, another one switches the output off in case it is done before the end of timing



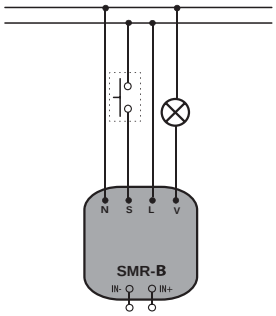
Function i - cycler starting with pause
output cycles in regular intervals, cycler starts with a pause

Function j* - cycler starting with gap
delay ON until switched off until it is de-energized or a switch is pressed again
Note: * Function j is valid only for SMR-B

Connection SMR-T, SMR-B



Fan controlling depending on the lighting



Input for external control voltage AC/DC 5-250 V

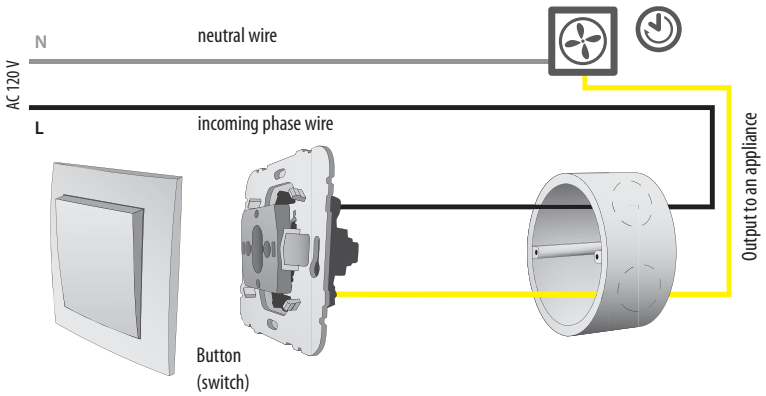
Note

SMR-T is not intended for switching capacity load (energy saving bulbs and LED lights with capacity power etc.), these products are only intended for switching resistive and inductive loads (incandescent bulbs, fans, etc.).

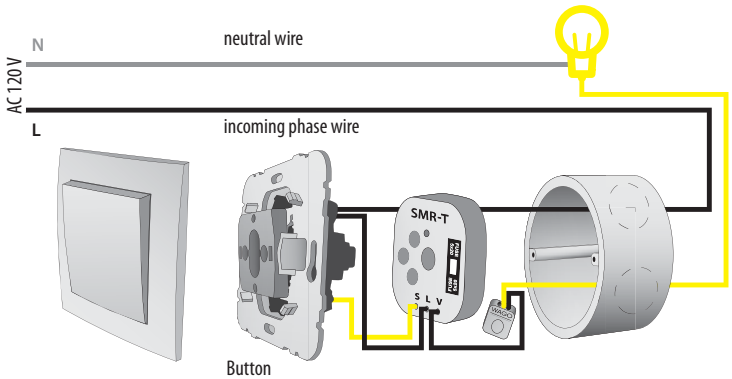
SMR-B with relay output is intended to other types of load. Using this output it is possible to switch the load of R, L or C-values listed in the load table. Between inputs S and neutral wire is possible to connect any load of R, L or C, however this is not condition.

Example of connection SMR-T

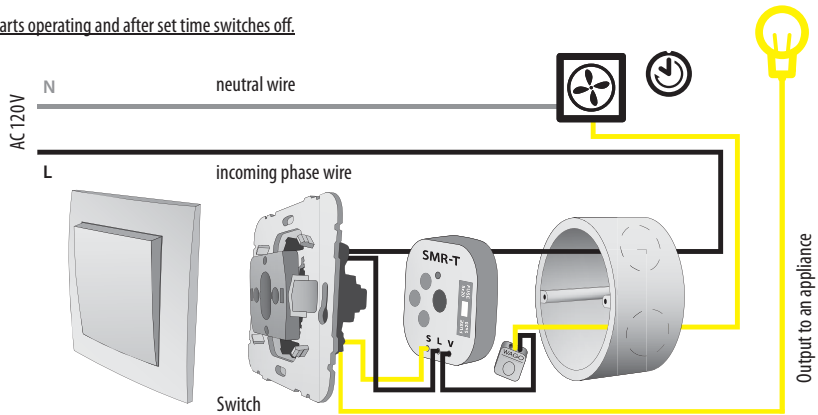
Original connection



Control of an appliance by button



After the light bulb switch is switched off, fan starts operating and after set time switches off.



Digital time switch clock **SHT**

2M

	Output		Time programm			
	1 channel	2 channel	day	week	month	year
SHT-1	●		●	●		
SHT-1/2		●	●	●		
SHT-3	●		●	●	●	●
SHT-3/2		●	●	●	●	●

- This time switch clock SHT is used to control various appliances in real time; daily, weekly, monthly and yearly mode
- Switching: according the program (AUTO) / constantly manually, manually to next program change / random (CUBE)
- „Holiday program" option to choose an interval when the device doesn´t switch according to the standard program, but will be block during that time
- Automatic conversion summer / winter time
- Sealable cover of front panel, easy controlling via 4 buttons
- 100 memory places, clear LCD display, min. interval 1 s
- Voltage range: AC/DC 12-240 V
- Cyclic output
- Pulse output

SHT-1, SHT-3: one channel version, 2-MODULE, DIN rail mounting, clamp terminals

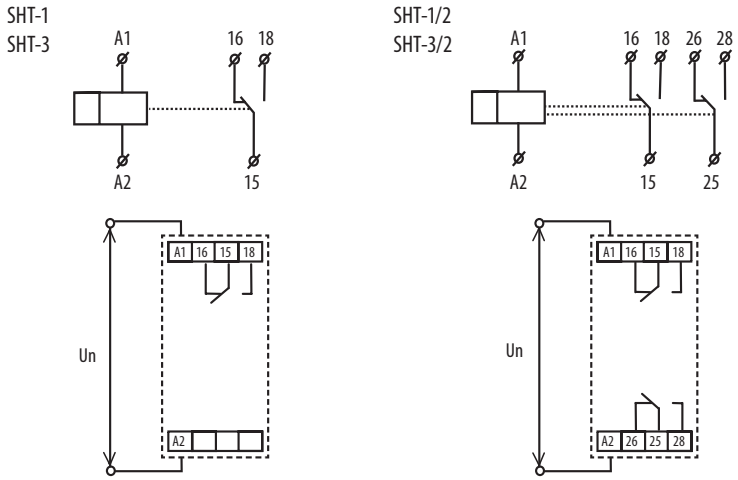
SHT-1/2, SHT-3/2: two channel version, 2-MODULE, an individual program can be run on each channel

EAN code

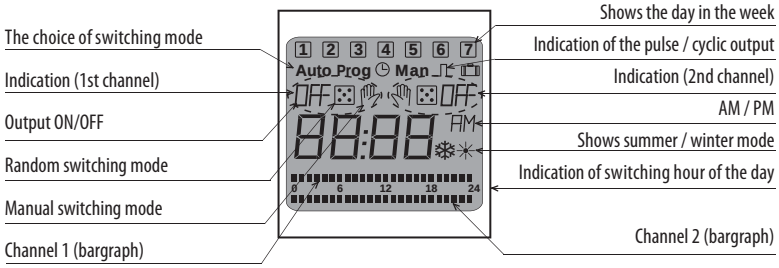
SHT-1 /UNI:	8595188130431
SHT-1/2 /UNI:	8595188130417
SHT-3 /UNI:	8595188136754
SHT-3/2 /UNI:	8595188129046

Technical parameters	SHT-1, SHT-3	SHT-1/2, SHT-3/2
Supply terminals:	A1 - A2	
Voltage range:	AC/DC 12 - 240 V (AC 50 - 60 Hz)	
Burden:	AC 0.5 - 2 VA / DC 0.4 - 2 W	
Supply voltage tolerance:	-15 %; +10 %	
Back-up supply:	yes	
Summer/winter time:	automatic	
Output		
Number of contacts:	1x changeover/SPDT ($AgSnO_2$)	2x changeover/SPDT ($AgSnO_2$)
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC	
	Inductive load: 1 HP / 240 V, 1/2 HP / 120V	
Inrush current:	30 A / < 3 s	
Min. breaking capacity DC:	500 mW	
Mechanical life:	> $3x10^7$	
Electrical life resistive load:	> $0.7x10^5$	
Time circuit		
Power back-up:	up to 3 years	
Accuracy:	max. ±1s / day at 73.4 °F (23 °C)	
Minimum interval:	1 min	
Data stored for:	min. 10 years	
Cyclic output:	1-99s	
Pulse output:	1-99s	
Program circuit		
Number of memory places:	100	
Program (SHT-1; SHT-1/2):	daily, weekly	
Program (SHT-3; SHT-3/2):	daily, weekly, monthly, yearly (up to year 2095)	
Data readout:	LCD display, with back light	
Other information		
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)	
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)	
Electrical strength:	4 kV (supply - output)	
Operating position:	any	
Mounting:	DIN rail EN 60715	
Protection degree:	IP 10 clips, IP 40 from front panel	
Overvoltage category:	III.	
Polution degree:	2	
Max. cable size (mm^2):	solid wire max. 2x2.5 or 1x4, with sleeve max. 1x2.5 or 2x1.5 (AWG 12) (0.4 Nm)	
Dimensions:	3.5˝ x1.4˝ x 2.5˝ (90 x 35.6 x 64 mm)	
Weight:	4.6 oz. (130 g)	5 oz. (143 g)
Standards:	EN 61812-1, EN 61010-1	

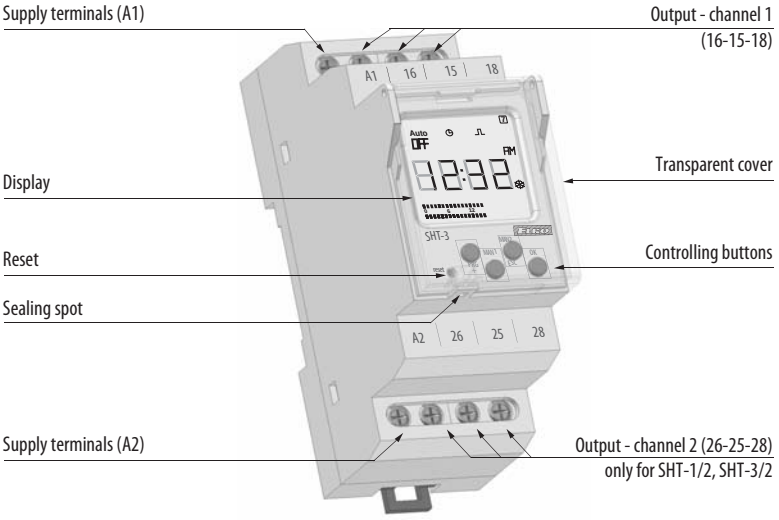
Symbol / Connection



Description of displayed elements on the screen

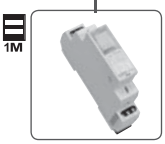


Description

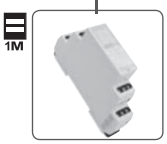


Auxiliary and Power relays

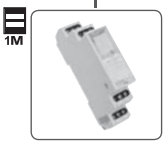
VS



VS116U
Supply voltage:
AC/DC 12-240 V
Output contact:
1x changeover / SPDT 15 A.



VS308U
Supply voltage:
AC/DC 12-240 V
Output contacts:
3x changeover / TPDT 8 A.



VS316/24
Supply voltage:
AC/DC 24 V
Output contacts:
3x changeover / TPDT 15 A,
possibility to be connected
into 3-phase circuit.

VS316/120
Supply voltage:
AC 120 V
Output contacts:
3x changeover / TPDT 15 A,
possibility to be connected
into 3-phase circuit.

Overview table

Type	Design	Coil voltage	Output contact	Other features			Designation	Page of catalogue
				LED signal light	RC unit	Paralel diode		
VS116U	1M-DIN	AC/DC 12..240 V	1x15 A changeover/ SPDT	●	●	●	as a separation relay (4kV), direct switching of appliances up to 4000VA (e.g. heaters), well visible signalization, noiseless	28
VS308U	1M-DIN	AC/DC 12..240 V	3x8 A changeover/ TPDT	●	●	●	a "multiplication" of contacts, 3x changeover contact/ 3TPDT only in 1-MODULE, well visible signalization, noiseless	
VS316/24	1M-DIN	AC/DC 24 V	3x15 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	
VS316/120	1M-DIN	AC 230 V	3x15 A changeover/ TPDT	●	●	●	as VS316/24, but AC 120V	

Power relays modular type **VS**

1M

60mm
121mm

- Power relay used for switching larger load output, strengthen or „multiplying" contacts of the existing device

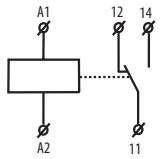
Type	Current rating	Number of contacts	Design	Supply terminals
VS116U	15 A	1	DIN (1M)	A1 - A2 12- 240V AC/DC
VS308U	8 A	3	DIN (1M)	A1 - A2 12-240V AC/DC
VS316/24	15 A	3	DIN (1M)	A1 - A2 24V AC/DC
VS316/120	15 A	3	DIN (1M)	A1 - A2 120V AC

- Relays VS316/24, VS316/120 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, yellow, blue or white LED*)

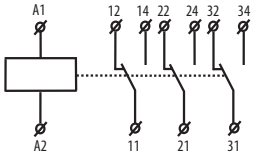
Technical parameters	VS116U	VS308U	VS316/24	VS316/120
Supply terminals:	A1 - A2			
Voltage range:	AC/DC 12-240 V/ 50-60 Hz	AC/DC 12-240 V/ 50-60 Hz	AC/DC 24 V/ 50-60 Hz	AC 120 V/ 60 Hz
Burden:	AC 0.7 - 3 VA/ DC 0.5 - 1.7 W	AC 0.7 - 3 VA/ DC 0.5 - 1.7 W	1.6 VA/ 1.2 W	2.5 VA
Supply voltage tolerance:	-15%; +10%			
Output				
Number of contacts:	1x changeover / SPDT ($AgSnO_2$)	3x changeover/TPDT (AgNi /Silver Alloy)	3x changeover / TPDT ($AgSnO_2$)	
Current rating:	Resistive load: 15 A/240 V AC/24 V DC	8 A / 240 V AC / 24 V DC	15 A / 240 V AC / 24 V DC	
	Inductive load: 1HP/240 V, 1/2HP/120V	1 HP / 240 V, 1/2 HP / 120V	1 HP / 240V, 1/2 HP / 120 V	
Inrush current:	30 A / < 3s	10 A / < 3s	30 A / < 3s	
Min. breaking capacity DC:	500 mW			
Output indication:	high intensity of LED			
Mechanical life:	$3x10^7$		$1x10^7$	
Electrical life resistive load:	$0.7x10^5$		$1x10^5$	
Time between switching:	min. 2s		20 ms	50 ms
Other information				
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)			
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)			
Electrical strength:	4 kV (supply-output)			
Operating position:	any			
Mounting:	DIN rail EN 60715			
Protection degree:	IP 40 from front panel			
Overvoltage category:	III.			
Pollution degree:	2			
Max. cable size (mm^2):	max.1x 2.5 or 2x1.5, max. 1x2.5 (AWG 12) (0.4 Nm)			
Dimensions:	3.5˝ x 0.7˝ x 2.5˝ (90 x 17.6 x 64 mm)			
Weight:	2.05 oz. (58 g)	2.9 oz. (83g)	3.17 oz. (90 g)	3.3 oz. (92g)
Standards:	UL E308660 (for VS116U and VS308U); EN 61810-1, EN 61010-1			

Symbol

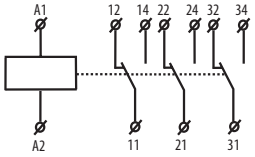
VS116U



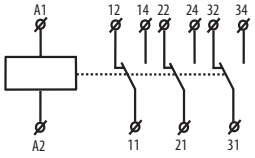
VS308U



VS316/24



VS316/120



EAN codes

VS116U /red	8595188124607	VS308U /red	8595188130103	VS316 /24 red	8595188135771	VS316 /120 red	8595188155656
VS116U /green	8595188136433	VS308U /green	8595188136440	VS316 /24 green	8595188136105	VS316 /120 green	8595188155670
VS116U /yellow	8595188138499	VS308U /yellow	8595188138529	VS316 /24 yellow	8595188136129	VS316 /120 yellow	8595188155687
VS116U /white	8595188138482	VS308U /white	8595188138512	VS316 /24 white	8595188136099	VS316 /120 white	8595188155649
VS116U /blue	8595188138475	VS308U / blue	8595188138505	VS316 /24 blue	8595188136112	VS316 /120 blue	8595188155663

Notes

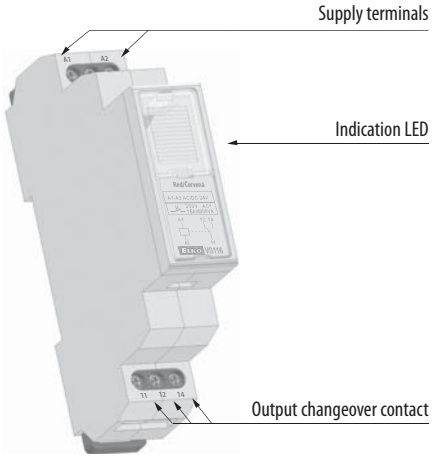
Max. time of changeover of contact is 10ms.

VS316/24 or VS316/120 enables switching of different phases or 3 phase voltage.

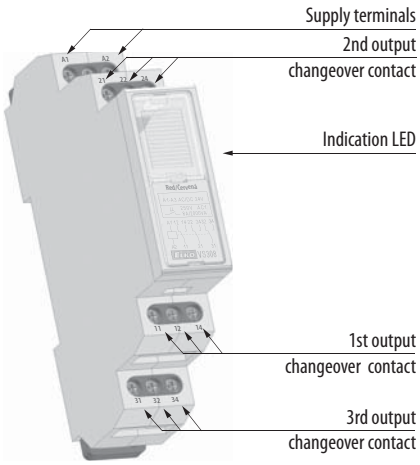
* Possibility to choose blue, white and yellow color of LED for power relays line VS in case of minimal order quantity 100 pcs.

Description

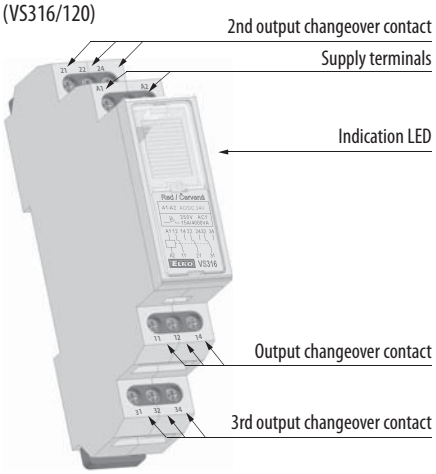
VS116U



VS308U



VS316/24
(VS316/120)



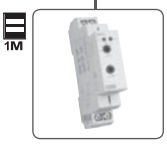
Dimmers

R, L, C

MODULAR

LIC-2

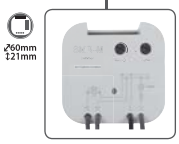
Serves to dim monochrome LED strips and RGB LED strips with power supply 24 V DC which are current-controlled.



DIM-15

Designated for dimming of: dimmable energy saving fluorescent lamps, LED lamps. R,L,C, - resistive, inductive and capacitive loads.

MINI



SMR-M

For mounting under a wall-switch into an installation box KU-68 (or similar). Dimmable energy saving fluorescent lamps, LED lamps. R,L,C, - resistive, inductive and capacitive loads.

Overview table

Type	Design	Supply voltage	Type of dimmed load					Output				Method of phase regulation		Control principal		Designation	Page of catalogue
			resistive (el. bulbs, halogen lights) R	inductive (wound transformers) L	capacitive (electronic transformers) C	energy saving fluorescent lamps ESL	LED lamps LED	Output unit	Rated load R	Rated load L	Rated load C	ON-DIMMER	OFF-DIMMER	DALI, CIB, DMX	0-10V / 1-10V		
LIC-2	1M-DIN	AC 100-250V	●	●	●	●	●	2x MOSFET	x	x	x	●	●	●	●	control unit for dimmers or electronic ballasts with analog control 0-10 V / 1-10 V	31
DIM-15	1M-DIN	AC 120V	●	●	●	●	●	2x MOSFET	150 W	150 W	150 W	x	x	x	x	designated for dimming of: R, L, C, ESL, LED	32
SMR-M	BOX	AC 120V	●	●	●	●	●	2x MOSFET	80 W	80 W	80 W	●	●	x	x	designated for dimming of: R, L, C, ESL, LED	

Key to 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	LED lamps
					
	R	L	C	ESL	LED

Demonstrated symbols are informative.

Expandatory:

R, L, C

Dimmer with designated load:
R - resistive
L - inductive
C - capacitive

ESL - energy saving lamps
LED - LED bulbs

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:

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

Lighting intensity controller **LIC-2**

1M

Mounting of SKS photosensor on the wall

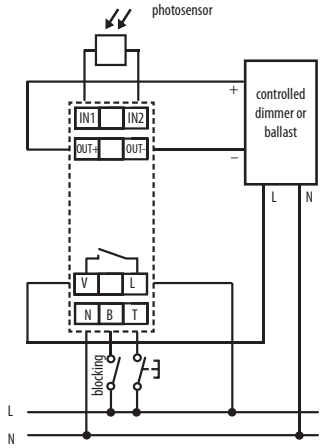
Mounting of SKS photosensor into the panel

EAN code
LIC-2 + SKS photosensor: 8595188145312
SKS photosensor: 8594030337288

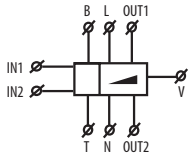
- Serves as control unit for dimmers or electronic ballasts with analog control 0-10 V / 1-10 V
- Keeps a preset lighting intensity (automatic regulation)
- Control operating modes using existing button
  - switch OFF
  - automatic regulation
  - cleaning (maximum illumination level)
- Setting the basic parameters of lighting is performed by potentiometers
  - min. brightness of illumination
  - maximum illumination level
  - speed of dimming / illumination
- Blocking the automatic control using external signal
- Power supply AC 100-250 V
- 1-MODULE, DIN rail mounting

Technical parameters		LIC-2
Supply terminals:		L - N
Supply voltage:		AC 100-250 V / 50-60 Hz
Consumption apparent / loss:		max. 2.7 VA / 1.4 W
Power supply indication:		green LED
Control		
Button - control terminals:		L - T
Control voltage:		AC 100-250 V
Impulse length:		min. 80 ms / max. unlimited
Button - control terminals:		L - B
Duration of control pulse:		min. 80 ms / max. unlimited
Output 1		
Analog:		0 - 10V / 10mA max. or 1 - 10 / 10mA max.
Terminals:		OUT-1, OUT-2
Galvanically separated:		Yes
Output 2		
Number of contacts:		1x switching ($AgSnO_2$)
Current rating:	Resistive load:	15 A / 240 V AC / 24 V DC
	Inductive load:	1 HP / 240 V, 1/2 HP / 120V
Peak current:		30 A / < 3 s
Min. switching capacity DC:		500 mW
Output indication:		red LED
Mechanical life:		$3x10^7$
Electrical life resistive load:		$0.7x10^5$
Other information		
Operating temperature:		-4 °F to 131 °F (-20 °C to 55 °C)
Storage temperature:		-4 °F to 140 °F (-20 to 60 °C)
Operating position:		any
Mounting:		DIN rail EN 60715
Ingress protection:		IP 40 from front panel / IP 20 terminals
Overvoltage category:		III.
Contamination degree:		2
Connecting cond.cross-section (mm^2):		max. 1x2.5, max. 2x1.5, with sleeve max. 1x2.5 (AWG 12) (0.4Nm)
Dimensions:		3.5″ x 0.7″ x 2.5″ (90 x 17.6 x 64 mm)
Weight:		2.8 oz. (78g)
Standards:		EN 60669-2-1, EN 61010-1, EN 60929

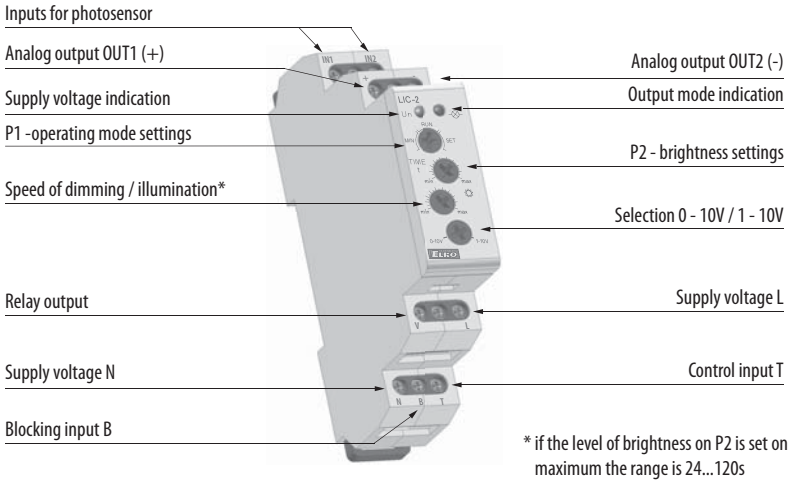
Connection



Symbol

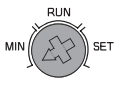


Device description



* if the level of brightness on P2 is set on maximum the range is 24...120s

Operating mode settings



MIN - setting of min. brightness level (e.g. so energy-saving lamps do not go out during regulation).
RUN - automatic regulation of lighting (brightness is maintained at the set value and regulated using an photosensor).
SET - setting of the required level of illumination for automatic regulation.

In position SET and MIN, the brightness level is set by potentiometer P2 (green LED also flashes). If the required brightness level is attained, the trimmer P1 is set to the RUN position. The brightness level is thereby set (green LED lights up permanently).

Function

Control button functions
- short press (< 0.5s) - always switches off output (relay and output voltage)
- longer press (0.5...3s) - runs automatic regulation of brightness level (according to sensor)
- long press (> 3s) - sets the max. brightness level (CLEANING mode).

Blocking input function
- switches off lighting - only in automatic regulation mode (has no influence in CLEANING mode), e.g. for central switching off of lighting

Output relay
- switches on always upon switching on the lighting using the button if the DC output voltage is greater than 0.1V (for the mode 0-10V) or 1V (for the mode 1-10V)
- upon switching off the light, the relay opens if the output voltage drops below the stated limits

Red LED
- illuminates upon active ouput (at any brightness level)
- flashes upon activation of blocking

Universal dimmer **DIM-15, SMR-M**

1M

60mm
21mm

DIM-15

SMR-M

EAN code
DIM-15/120V: 8595188155601
SMR-M/120V: 8595188155618

- Designed for dimming of: a) R - bulbs, halogen lamps
  b) L - low-voltage el.bulbs 12/24V wound transformers
  c) C - low-voltage el.bulbs 12/24V electronic transformers
  d) ESL - dimmable compact fluorescent lamps
  e) LED - LED lamps
- Enables gradual setting of luminance by push-button (non-detent) or parallel buttons
- Returns to last state upon re-energization
- Type of light source is set by switch-over on the front panel of device
- Min. luminance, set by potentiometer on the front panel, eliminates flashing of light sources
- Supply voltage 120V AC

DIM-15

- Output status is indicated by red LED:
  - shines when output is active
  - flashes while heating overload, at the same time output is disconnected
- 1-MODULE version, DIN rail mounting, saddle terminals

SMR-M

- Button-controlled dimmer intended to be installed in an installation box into the existing electrical wiring
- Protection against excessive temperature inside the device - switches off the output

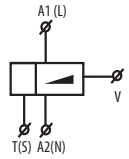
Technical parameters	DIM-15	SMR-M
Supply terminals:	A1 - A2	x
Voltage range:	x	4-wire, with neutral
Operating range:	AC 120 V / 60 Hz	
Apparent power:	-15 %; +10 %	
Loss power:	max. 1.5VA	
Dissipated power:	max. 0.7W	
Supply indication:	green LED	
Control		
Control terminals:	A1 - T	x
Control wire:	x	L - S
Control voltage:	AC 120 V	
Control input power:	AC 0.3-0.6 VA	
Control impulse lenght:	min. 80 ms / unlimited	
Output		
Contactless:	2 x MOSFET	
Load:	150 W (at cos φ =1)*	80 W (at cos φ =1)*
Output status indication:	red LED	x
Other information		
Operating temperature:	-4 °F to 95 °F (-20 °C to 35 °C)	
Storing temperature:	-4 °F to 140 °F (-20 °C to 60 °C)	
Operating position:	any	
Mounting:	DIN rail EN 60715	free at connecting wires
Protection degree:	IP40 from front panel / IP10 clips	IP30 in standard conditions**
Overvoltage category:	III.	
Pollution level:	2	
Terminal wire capacity (mm^2):	max. 2x2.5, with sleeve max. 1x2.5, max. 2x1.5 (AWG 12) (0.4 Nm)	x
Connection: (cross-section/ lenght):	x	solid w. CY, 0.75 mm^2 (AWG 18) / 3.5˝ (90 mm)
Dimensions:	3.5˝ x 0.7˝ x 2.5˝ (90 x 17.6 x 64 mm)	1.9˝x 1.9˝x 0.8˝ (49 x 49 x 21 mm)
Weight:	1.98 oz. (57 g)	1.3 oz. (38 g)
Standards:	EN 60669-2-1, EN 61010-1	

* Due to a large number of light source types, the maximum load depends on the internal construction of dimmable light sources and their power factor cos φ.
The power factor of dimmable LEDs and ESL bulbs ranges from cos φ = 0.95 to 0.4.
An approximate value of maximum load may be obtained by multiplying the load capacity of the dimmer by the power factor of the connected light source.

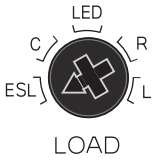
** For more information see page 30.

Symbol

DIM-15
(SMR-M)

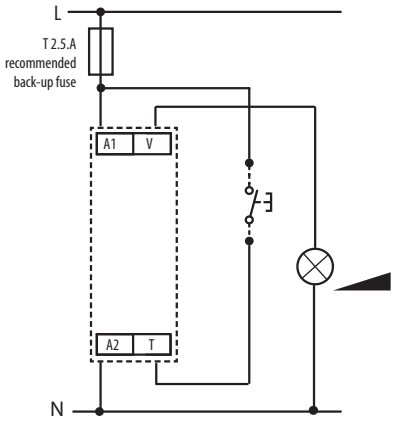


Light source type setting

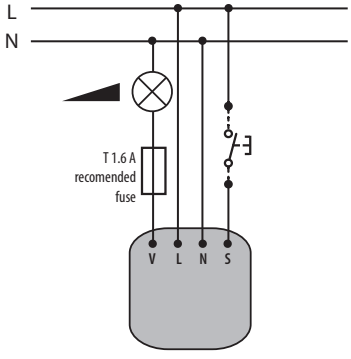


Connection

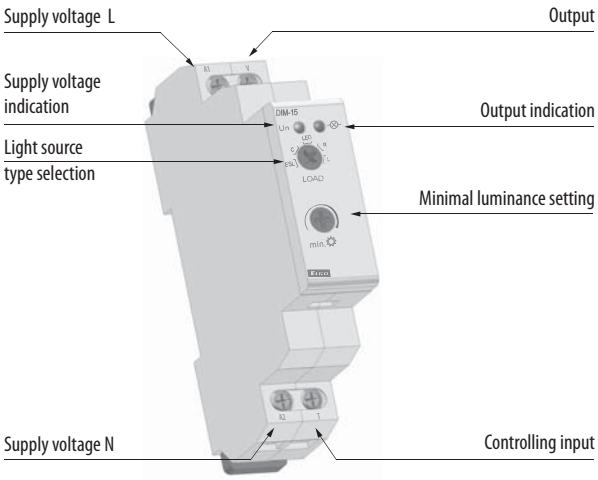
DIM-15

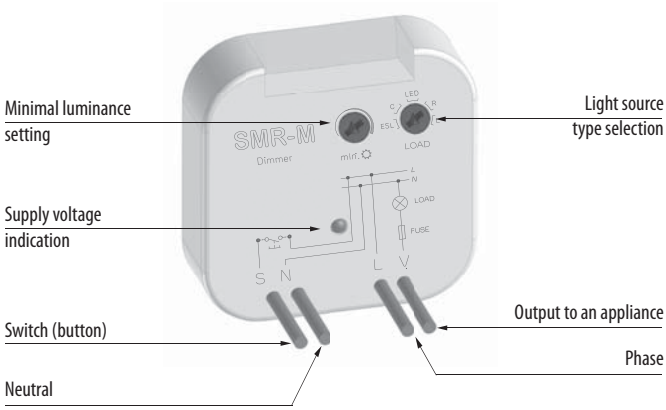


SMR-M

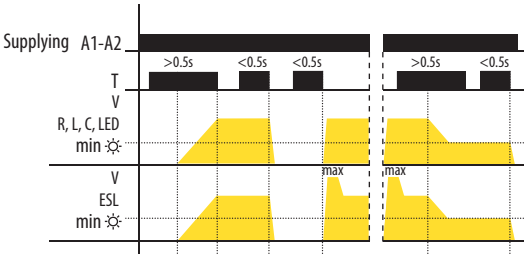


Description





Functions and controlling



- short button press (<0.5s) turns the light off or on
- long press (>0.5s) enables slight regulation of light intensity
- setting of minimal luminance is possible only during decreasing of luminance by long button press
- setting of minimal luminance by saving fluorescent lamps serves for harmonizing of lowest light intensity prior its unprompted switching off

Luminance setting:

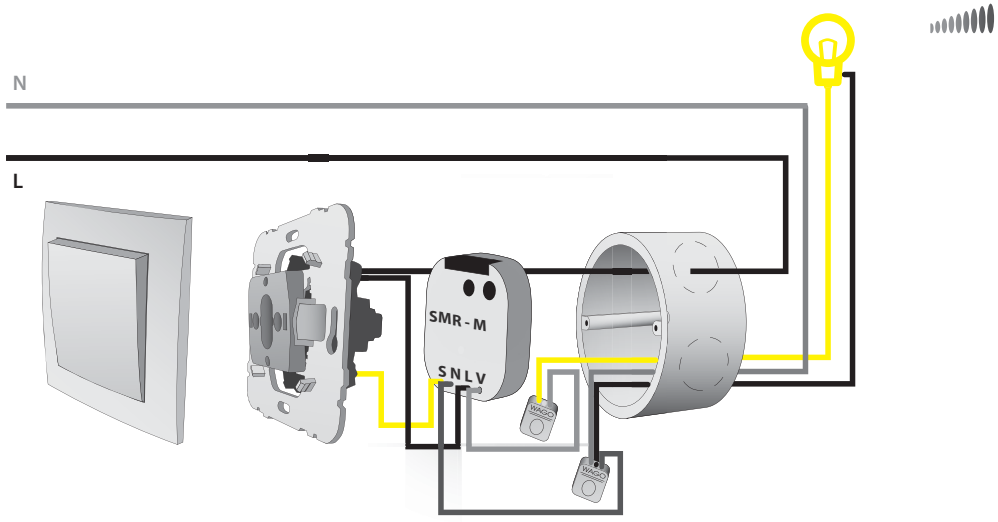
LED, R, L, C:

- if the light is turned off, short press (<0.5s) switches the light onto last set luminance level

ESL:

- when light is off, short impulse turns lamp on and then luminance is decreased to set level

Connection example



Additional information

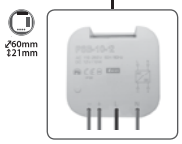
- it is not possible to dim energy-saving lamps without marking: dimmable
- an incorrect setting of light source has effect only on dimming range, it means neither dimmer or load get damaged
- max. number of dimmable light sources depends on their internal structure
- it is not recommended to connect light sources with different types and brands, to one dimmer

Notes

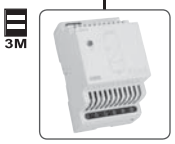
Power supplies

Voltage — Stabilized DC- switching

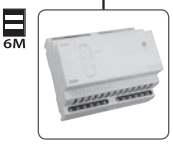
12V



PSB-10-12
IN: AC 110-250 V
OUT: DC 12V stabil
LOAD: 0.84 A / 10 W
- galvanically separated
- electronic fuse
- thermo protection
MINI, into an installation box.

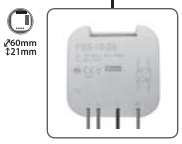


PS-30-12
IN: AC 100-250 V
OUT: DC 12 V stabil
LOAD: 2.5 A / 30 W
- galvanically separated
- electronic fuse
- thermo protection
3 MODULE.

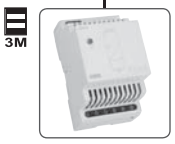


PS-100-12
IN: AC 100-250 V
OUT: DC 12 V stabil
LOAD: 8.4 A / 100 W
- galvanically separated
- fusion safety
- electronic fuse
- thermo protection
6 MODULE.

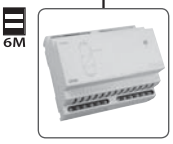
24V



PSB-10-24
IN: AC 110-250 V
OUT: DC 24 V stabil
LOAD: 0.42 A / 10 W
- galvanically separated
- electronic fuse
- thermo protection
MINI, into an installation box.

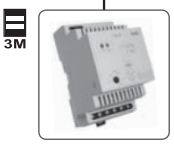


PS-30-24
IN: AC 100-250 V
OUT: DC 24 V stabil
LOAD: 1.25 A / 30 W
- galvanically separated
- electronic fuse
- thermo protection
3 MODULE.



PS-100-24
IN: AC 100-250 V
OUT: DC 24 V stabil
LOAD: 4.2 A / 100 W
- fusion safety
- electronic fuse
- thermo protection
6 MODULE.

Regulated



PS-30-R
IN: AC 100-250 V
OUT: DC 12-24 V
regul., stab.
LOAD: 2.5-1.25 A / 30 W
- galvanically separated
- electronic fuse
- thermo protection
3 MODULE.

Overview table

Type	Design	Input voltage	Output						Protection against overload			Designation	Page of catalogue
			AC	DC	Stabilized	Output voltage	Output current	Switching (S) / Linear (L)	Safety fuse	Electronic fuse	Short-circuit-proof		
PSB-10-12	MINI-BOX	AC 110-250V	x	●	●	DC 12 V	0.84 A	S	x	●	●	stabilized switching power supply with fixed output voltage 12 V / 10 W, box	36
PSB-10-24	MINI-BOX	AC 110-250V	x	●	●	DC 24V	0.42 A	S	x	●	●	stabilized switching power supply with fixed output voltage 24 V / 10 W, box	
PS-30-12	3M-DIN	AC 100-250V	x	●	●	DC 12 V	2.5 A	S	●	●	●	stabilized switching power supply with fixed output voltage 12 V / 30 W, 3 module	
PS-30-24	3M-DIN	AC 100-250V	x	●	●	DC 24V	1.25 A	S	●	●	●	stabilized switching power supply with fixed output voltage 24 V / 30 W, 3 module	
PS-30-R	3M-DIN	AC 100-250V	x	●	●	DC 12-24 V	2.5 A-1.25A	S	●	●	●	stabilized switching power supply with fixed output voltage 12-24 V / 30 W, 3 module	
PS-100-12	6M-DIN	AC 100-250V	x	●	●	DC 12 V	8.4 A	S	●	●	●	stabilized switching power supply with fixed output voltage 12 V / 100 W, 6 module	
PS-100-24	6M-DIN	AC 100-250V	x	●	●	DC 24V	4.2 A	S	●	●	●	stabilized switching power supply with fixed output voltage 24V / 100W, 6 module	

Power supplies **PS** range

PSB-10-24

60mm
21mm

3M

6M

- PSB-10: switching stabilized power supplies with fixed output voltage, for mounting into an installation box
  - PSB-10-12 - stabilized power supply 12V/10W
  - PSB-10-24 - stabilized power supply 24V/10W
- PS-30: switching stabilized power supplies, version 3-module
  - PS-30-12 - stabilized power supply with fixed output voltage 12 V/30 W
  - PS-30-24 - stabilized power supply with fixed output voltage 24 V/30 W
  - PS-30-R – stabilized regulated power supply 12-24 V/30 W
- PS-100: stabilized power supply with fixed output voltage, version 6-module
  - PS-100-12 - stabilized power supply 12 V/100 W
  - PS-100-24 - stabilized power supply 24 V/100 W
- Output current is limited by electronic fuse, in case maximal current is exceeded, the device switches off and after a shot time interval it again switches on.
- Indication of output voltage by green LED on front panel (except PSB-10)
- Temperature protection – if temperature is exceeded, the device switches off and after cooled down, it switches on again

EAN code

PSB-10-12: 8595188145022
PSB-10-24: 8595188143783

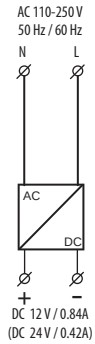
PS-30-12V: 8595188137966
PS-30-24V: 8595188139045
PS-30-R: 8595188136655

PS-100-12V: 8595188137195
PS-100-24V: 8595188139021

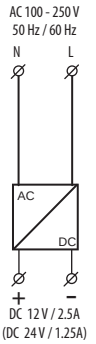
Technical parameters	PSB-10-12	PSB-10-24	PS-30-12	PS-30-24	PS-30-R	PS-100-12	PS-100-24
Input							
Voltage range:	AC 110 - 250 V / 50-60 Hz		AC 100-250 V / 50-60 Hz			AC 100-250 V / 50-60 Hz	
Burden without load (max.):	3 VA / 0.5 W		9 VA / 1 W	10 VA /1.5 W	10 VA / 1.7 W	12 VA / 2 W	
Burden with full load (max.):	26 VA / 13 W		70 VA / 37W			195 VA / 121 W	
Protection:	x		fuse T2A			fuse T 3.15 A	
Output							
Output voltage DC / max. current:	12 V / 0.84 A	24 V / 0.42 A	12.2 V / 2.5 A	24.2 V / 1.25 A	12.2 V / 2.5 A 24.2 V / 1.25 A	12.2 V / 8.4 A	24.2 V / 4.2 A
Tolerance of output voltage:	± 2%		± 2%		± 3%	± 2%	
Output indication:	x		green LED				
Wave of off-load output voltage:	40 mV		30 mV		40 mV	1V	
Wave of output voltage with max load:	380 mV		80 mV		500 mV	40 mV	
Time delay after connection:	max. 1s		max. 5s		max. 1s	max. 3s	
Time delay after over-load:	max. 1s		max. 1s			max. 0.5s	
Efficiency:	> 75%		> 82%		> 81%	> 82%	
Electronic fuse:	electronic protections short-circuit, over load, over voltage (from 120% of rated output)						
Other information							
Working humidity:	20 .. 90% RH						
Operating temperature:	-4 °F to 104°F (-20 °C to 40 °C)						
Storage temperature:	-40 °F to 185 °F (-40 °C to 85 °C)		-13 °F to 158 °F (-25 °C to 70 °C)			-40 °F to 185 °F (-40 °C to 85 °C)	
Electrical strength input- output:	4 kV						
Protection degree:	IP30		IP40 device / IP20 in-built in distribution board				
Overvoltage category:	II.						
Polutioon degree:	2						
Max. cable size (mm²):	x		solid wire max.1x2.5 or 2x1.5 / with sleeve max.1x1.5 (AWG 12) (0.4 Nm)				
Connection: (cross-section/ lenght):	solid wire CY, 4x0.75mm² / 3.5˝ (90 mm) (AWG 18)		x				
Dimensions:	1.9˝x 1.9˝x 0.8˝ (48 x 48 x 21 mm)		3.5˝x 2.1˝x 2.6˝ (90 x 52 x 65 mm)			3.5˝x 4.1˝x 2.6˝ (90 x 105 x 65 mm)	
Weight:	2.5 oz. (70 g)		5.6 oz. (158 g)			12.9 oz. (367 g)	
Standards:	EN 61204-1, EN 61204-3, EN 61204-7						

Connection

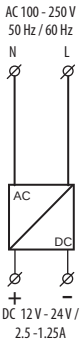
PSB-10-12
(PSB-10-24)



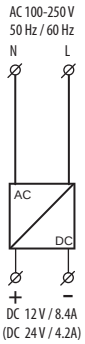
PS-30-12
(PS-30-24)



PS-30-R



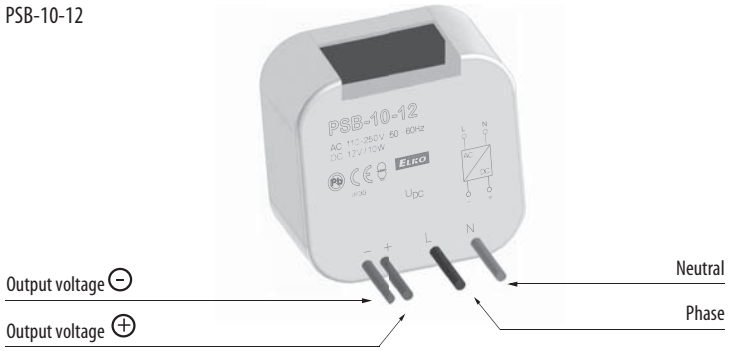
PS-100-12
(PS-100-24)



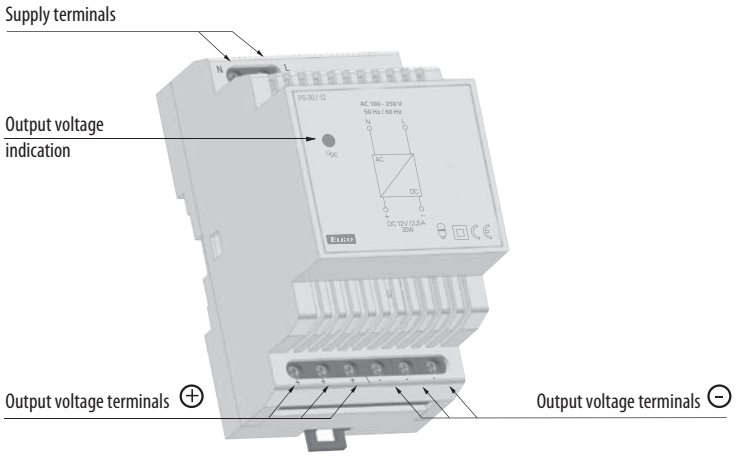
Connection

PSB-10-12 / PSB-10-24
designated for installation into an installation box. Suitable for controlling of lighting sources, thermo valves, shutter engines, etc.

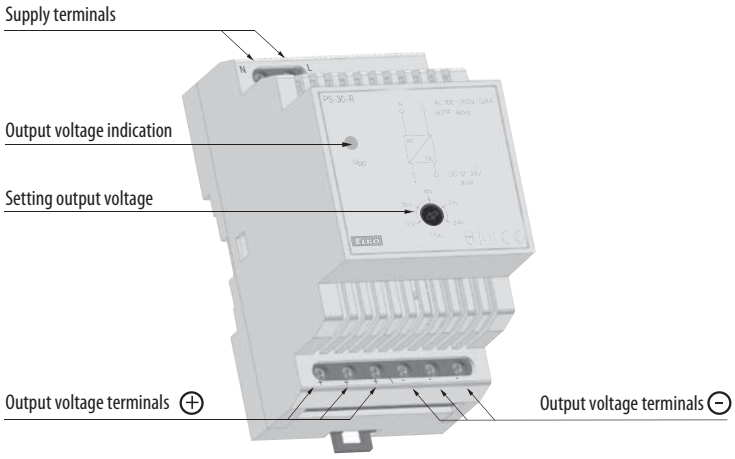
PSB-10-12



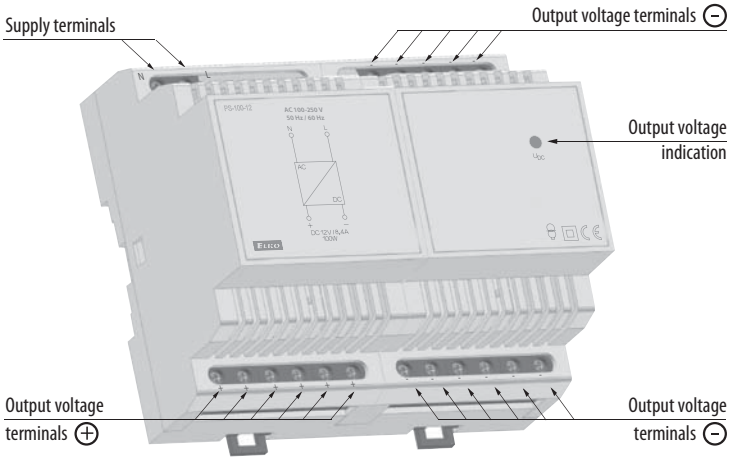
PS-30-12



PS-30-R



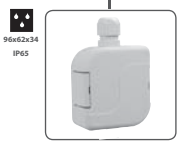
PS-100-12



Twilight switches

SOU

SOU-1
Twilight switch.
Voltage range:
AC/DC 12-240 V
Output contact:
1x changeover /
SPDT 15 A.



SOU-3
Twilight and light
switch
Voltage range:
AC 120 V / 60 Hz
Output conatct:
1x NO / SPST 15 A.

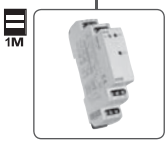
Accessories of twilight switches:

Photosensor SKS
Protection degree: IP56.
It is suitable for mounting on the wall or
in panel.

Memory relays

MR

MR-41
Voltage range:
AC/DC 12 -240 V
Output contact:
1x changeover / SPDT 15 A.



MR-42
Voltage range:
AC/DC 12 -240 V
Output contact:
2x changeover / DPDT 15 A.

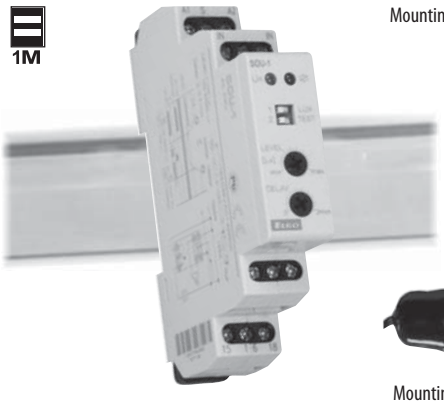
Overview table

Type	Design	Power supply	Output contact	Other				Designation	Page of catalogue
				LED indication	Display	Internal sensor	External sensor		
SOU-1	1M-DIN	AC/DC 12-240V (AC 50-60 Hz)	1x15 A changeover	●	x	x	●	Is used to control lights on the basis of ambient light intensity	39
SOU-3	IP65	AC 120 V (AC 60 Hz)	1x15 A NO-SPST	x	x	●	x	Is used to control lights on the basis of ambient light intensity	40

Type	Design	Power supply	Output contact	Other			Designation	Page of catalogue
				LED indication	Control output	Function		
MR-41	1M-DIN	AC/DC 12-240V (AC 50-60 Hz)	1x15 A changeover	●	●	1	Latching relays, controlled by buttons from several locations can replace three way switches or cross bar switches thanks to control by buttons (unlimited number, connected in parallel by 2 wires), installation gets more transparent and faster for mounting.	41
MR-42	1M-DIN	AC/DC 12-240V (AC 50-60 Hz)	2x15 A changeover	●	●	2		

Twilight switch **SOU-1**

1M



Mounting of photosensor SKS on the wall

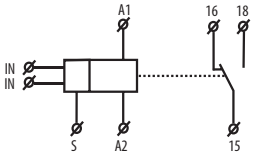
Mounting of photosensor SKS into the panel

- Is used to control lights on the basis of ambient light intensity
- Used for switching street illumination and garden lights, illumination of advertisements, shop windows, etc.
- Level of ambient intensity is monitored by an external sensor and output is switched according to set level on the device
- Control input for additional control, e.g. time switch, preswitch etc.
- Level of illumination adjustable in two ranges: 1 - 100 lx and 100 - 50000 lx
- Adjustable time delay to eliminate short term fluctuation in illumination
- External sensor IP56 suitable for mounting on the wall (cover and holder of a sensor are a part of the package)
- Supply voltage AC/DC 12 - 240 V
- Red LED output indication
- 1-MODULE, DIN rail mounting

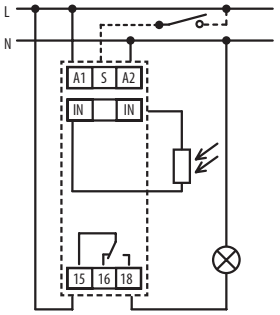
EAN codes:
SOU-1/UNI + photosensor SKS: 8595188121019
Photosensor SKS: 8594030337288

Technical parameters	SOU-1
Supply terminals:	A1 - A2
Voltage range:	AC/DC 12 - 240 V (AC 50-60 Hz)
Burden:	AC 0.7 - 3 VA / DC 0.5 - 1.7 W
Supply voltage tolerance:	-15 %; +10 %
Supply indication:	green LED
Time delay:	0 - 2 min
Time delay setting:	potentiometer
Illumination rang 1):	1 - 100 lx
Illumination rang 2):	100 - 50000 lx
Output	
Number of contacts:	1x changeover / SPDT ($AgSnO_2$)
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC
	Inductive load: 1 HP / 240 V, 1/2 HP / 120V
Inrush current:	30 A / < 3 s
Min. breaking capacity DC:	500 mW
Output indication:	red LED
Mechanical life:	$3x10^7$
Electrical life resistive load:	$0.7x10^5$
Control	
Power the control input:	0.8 - 530 mVA
Load between S-A2:	Yes
Control. terminals:	A1-S
Impulse length:	min. 25 ms / max. unlimited
Reset time:	150 ms
Other information	
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)
Electrical strength:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 20 terminals
Sensor cable length:	max. 50 m (standard wire)
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm^2):	solid wire max.1x 2.5 or 2x1.5, with sleeve max. 1x2.5 (AWG 12) (0.4Nm)
Dimensions of the sensor SKS:	see page 85
Weight of sensor SKS:	0.7 oz. (20 g)
Dimensions:	3.5˝ x 0.7˝ x 2.5˝ (90 x 17.6 x 64 mm)
Weight:	2.6 oz. (75 g)
Standards:	EN 60255-6, EN 61010-1

Symbol



Connection

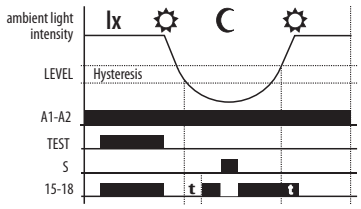


Description of DIP switch

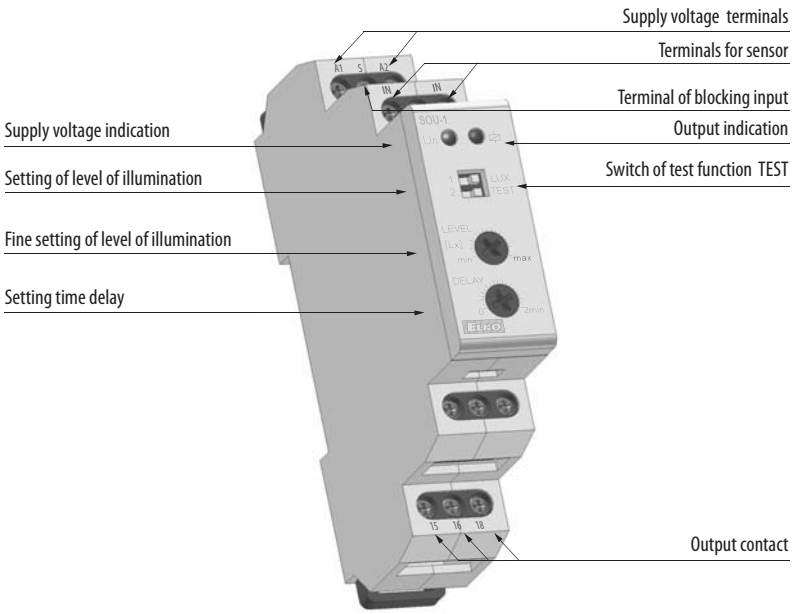
DIP 1 - LUX
ON
100 - 50000 lx
1 - 100 lx

DIP 2 - TEST
ON
TEST ON
NORMAL

Function



Description



Twilight light switch **SOU-3**

96x62x34
IP65

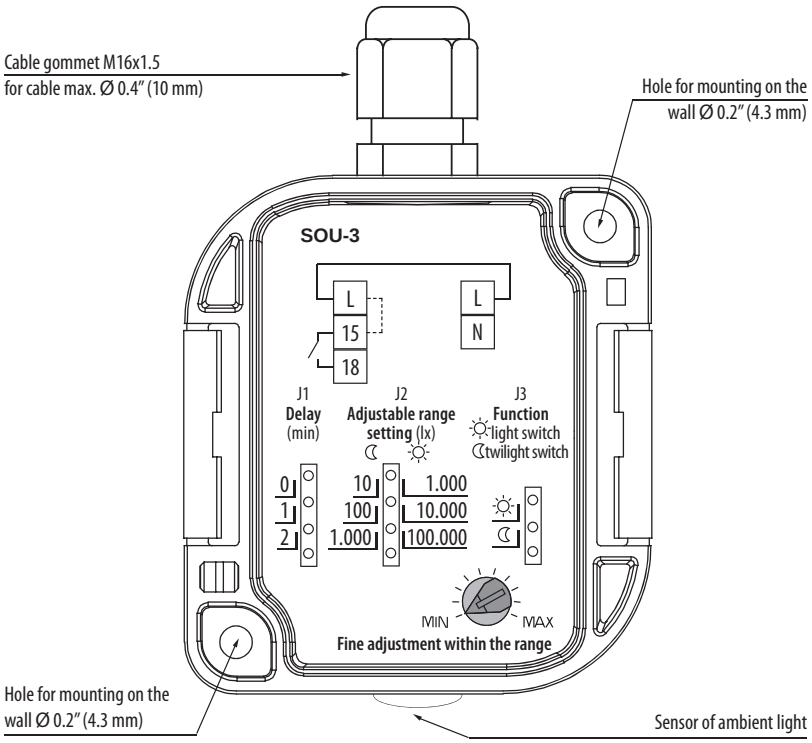
- Is used as control of the device on the basis of ambient light intensity
- External version in IP65, box for mounting on the wall, front cover removable without screws
- Built in high resolution light sensor
- Two devices in one, function is set by jumper:
  - twilight switch - contact closes by decreasing of ambient light intensity, and opens by its increasing
  - light switch - contact closes by increasing ambient light intensity, and opens by decreasing light intensity. Used for switching of devices by reaching of pre-set ambient light level, usually sun shine (pulling down the shutters or blinds, activation of solar panels)
- 3 adjustable (by jumper) ranges of light level
- 3 adjustable levels of time delay (for elimination of short-term fluctuations of light intensity – for short increases in light intensity)
- Supply voltage 120 V AC

EAN code
SOU-3/120V: 8595188155625

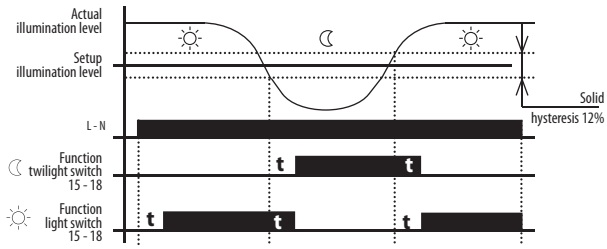
Technical parameters	SOU-3	
Supply		
Supply terminals:	L - N	
Voltage range:	AC 120V / 60Hz	
Tolerance of voltage range:	- 15% .. +10%	
Input (apparent / loss):	max 6VA / 0.7W	
Setting the scale level of lighting	by jumper J2	
Function ☾ (twilight switch)		
- range 1:	1 ... 10 lx	
- range 2:	10 ... 100 lx	
- range 3:	100 ... 1.000 lx	
Function ☼ (light switch)		
- range 1:	100 ... 1 000 lx	
- range 2:	1 000 ... 10 000 lx	
- range 3:	10 000 ... 100 000 lx	
Setting function	by jumper J3	
Level of light-slight:	0.1 ... 1 x range	
Slight setting of light level:	potenciometer	
Time delay t:	0 / 1 min. / 2 min.	
Delay setting t:	by jumper J1	
Output		
Output contact:	1 x NO- SPST ($AgSnO_2$)	
Current rating:	Resistive load:	12 A / 240 V AC / 24 V DC
	Inductive load:	1 HP / 240 V, 1/2 HP / 120V
Peak current:	30 A / < 3 s	
Min.switching output:	500 mW	
Mechanical life:	3×10^7	
Electrical life:	0.7×10^5	
Other information		
Operation temperature:	-22 °F to 140 °F (-30 °C to 60 °C)	
Storing temperature:	-22 °F to 158 °F (-30 °C to 70 °C)	
Electrical strengh:	4kV (supply-output)	
Operation position:	sensor-side down or on the sides	
Protection degree:	IP65	
Overvoltage category:	III.	
Pollution level:	2	
Max. cable size (mm^2):	max.1x2.5, max. 2x1.5, with sleeve max.1x2.5 (AWG 12) (0.4 Nm)	
Suggested power-supply cable:	CYKY 3x2.5 (CYKY 4x1.5)	
Dimensions:	3.8˝ x 2.4˝ x 1.3˝ (96 x 62 x 34 mm)	
Weight:	4.3 oz. (122 g)	
Standards:	EN 60255-6, 61010-1	

Device is standardly supplied with jumper L-15 (3-wire connection).
For the correct function of device is neccesary sensor-side down device mounting.

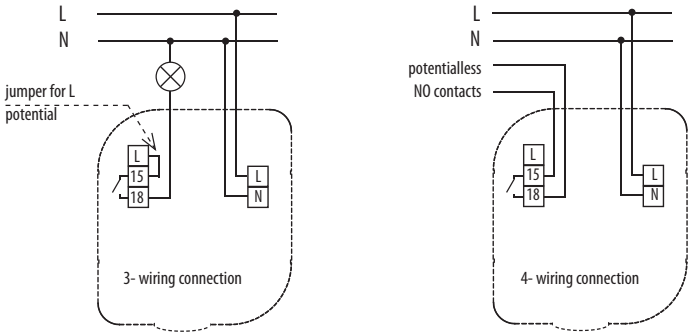
Description (proportion is accordant to real size)



Function



Connection



Memory & latching relays **MR-41, MR-42**

1M

EAN code
MR-41 /UNI: 8595188115896
MR-42 /UNI: 8595188115919

- Latching relays, controlled by buttons from several locations can replace three way switches or cross bar switches thanks to control by buttons (unlimited number, connected in parallel by 2 wires), installation gets more transparent and faster for mounting
- Relays MR-41/UNI, MR-42/UNI memorize its last state even after supply failure. During the failure relay will turn off and after re-energizing will automatically turns on

MR-42

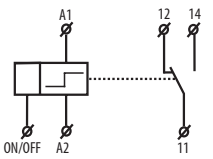
- options - 2x parallel contacts or the other relay is latching
- function selected via external jumper between B1 - B2

- Supply voltage AC/DC 12-240 V
- 1-MODULE version, DIN rail mounting, controlling by buttons

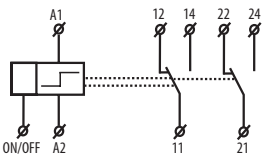
Technical parameters	MR-41	MR-42
Number of functions:	1	2
Supply terminals:	A1 - A2	
Voltage range:	AC/DC 12 - 240 V (AC 50-60 Hz)	
Burden:	AC 0.17 - 3 VA / DC 0.1 - 1.2 W	AC 0.17 - 12 VA / DC 0.11 - 1.9 W
Supply voltage tolerance:	-15 %; +10 %	
Supply indication:	green LED	
Output		
Number of contacts:	1x changeover / SPDT ($AgSnO_2$)	2x changeover / DPDT ($AgSnO_2$)
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC	
	Inductive load: 1 HP / 240 V, 1/2 HP / 120V	
Inrush current:	30 A / < 3 s	
Min. breaking capacity DC:	500 mW	
Output indication:	red LED	
Mechanical life:	$3x10^7$	
Electrical life resistive load:	$0.7x10^5$	
Controlling		
Consumption of input:	AC 0.025 - 0.2 VA / DC 0.1 - 0.7 W	
Load between A2-ON/OFF:	Yes	
Control. terminals:	A1 - ON/OFF	
Impulse length:	min. 25 ms / max. unlimited	
Other data		
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)	
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)	
Electrical strength:	4 kV (supply - output)	
Operating position:	any	
Mounting:	DIN rail EN 60715	
Protection degree:	IP 40 from front panel / IP 20 terminals	
Overvoltage category:	III.	
Pollution degree:	2	
Max. cable size (mm^2):	solid wire max.1x 2.5 or 2x1.5 / with sleeve max. 1x2.5 (AWG 12) (0.4 Nm)	
Dimensions:	3.5˝ x 0.7˝ x 2.5˝ (90 x 17.6 x 64 mm)	
Weight:	2.2 oz. (62 g)	3.1 oz. (89 g)
Standards:	EN 61810-1, EN 61010-1	

Symbol

MR-41

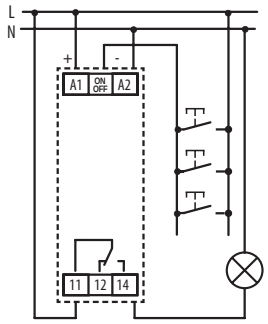


MR-42

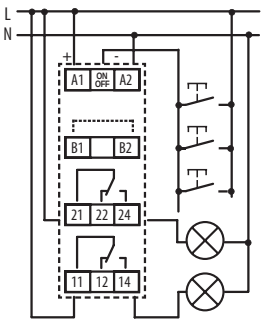


Connection

MR-41

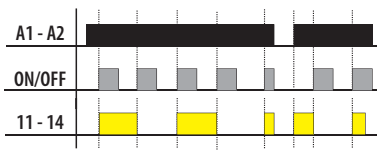


MR-42

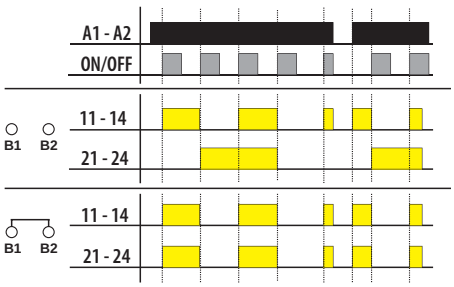


Function

MR-41



MR-42



Monitoring relays

Voltage

1 phase

AC/DC

HRN-41

(Hysteresis) monitoring DC and AC voltage 10-500 V, divided into 3 inputs and 3 ranges, 2 independent outputs 15 A, 2x time delay.

HRN-42

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

HRN-34

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

HRN-64

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

AC

HRN-33

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

HRN-35

As HRN-33 but individual output for each level (Umax/ Umin). Adjustable time delay to eliminate voltage peaks.

HRN-37

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

HRN-63

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

HRN-67

As HRN-63, but in voltage range AC 24-150 V.

3 phase

HRN-56/120

Adjustable level Umin.

HRN-56/208

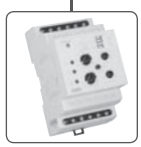
Adjustable level Umin.

HRN-56/240

Adjustable level Umin.

HRN-43

Galvanically separated supply, memory, adjustable hysteresis and delay, 2 x independent output.



HRN-43N

Galvanically separated supply, memory, adjustable hysteresis and delay, 2 x independent output.

Power factor

COS-1

Monitors and scores power factor (phase shift between current and voltage cos φ) in 3phase / 1phase circuits (motors, pumps etc.).

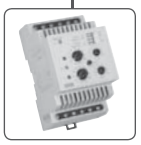
Monitoring relays

Current

AC/DC

PRI-41

(Hysteresis) 3 inputs (0.4-16A) divided into 3 ranges (selectable by a switch).



PRI-42

(Window) as PRI-41 but function "WINDOW".

AC

PRI-32

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

PRI-51

Monitoring of current by in-built transformer, 5 ranges (in versions 1/2/5/8/16A), range 5A is suitable for current transformer (X/5), supply and output as PRI-32, difference from PRI-32: direct monitoring and finer ranges (higher sensitivity) = higher accuracy in measuring.

PRI-53

For monitoring the current in three-phase devices. Power supply: 24-240 V AC/DC, galvanically separated from the circuit of the monitored current 2 types depending on the strength of rated current In (1A, 5A).

Level

HRH-1

4 functions, advanced setting for various combinations, 2 output contacts / 2PDT 16A.

HRH-5

Simple version, 2 functions, galvanically separated supply voltage UNI 24.. 240 V AC/DC

HRH-7

Suitable to operate in harsh conditions due to the high degree of protection IP65. Switch monitors the level changes in wells, reservoirs, tanks, tankers etc.

Accessories

SHR

Level sensors
SHR-1(M, N) - for monitoring flooding
SHR-2- for level detection
SHR-3 - for demanding and industrial environment

Overview table

Relays monitor voltage

Type	Design	Voltage	Secure variables							Setting			Description	Page of catalogue
			Phases	Range	> U	< U	Failure	Phase sequence	Asymmetry	Delay	Hysteresis	Memory Errors		
HRN-33	1-M	from monitored	1	AC 48 - 276 V	●	●	x	x	x	●	x	x	For all types, the delay is adjustable from 0 - 10 seconds (to eliminate short-term outages or peaks). The lower voltage level (Umin) is set in % of the upper level (Umax).	46
HRN-34	1-M	from monitored	1	DC 6 - 30 V	●	●	x	x	x	●	x	x		
HRN-35	1-M	from monitored	1	AC 48 - 276 V	●	●	x	x	x	●	x	x		
HRN-37	1-M	from monitored	1	AC 24 - 150 V	●	●	x	x	x	●	x	x		
HRN-63	1-M	from monitored	1	AC 48 - 276 V	●	●	x	x	x	●	x	x		
HRN-64	1-M	from monitored	1	DC 6 - 30 V	●	●	x	x	x	●	x	x		
HRN-67	1-M	from monitored	1	AC 24 - 150 V	●	●	x	x	x	●	x	x		
HRN-43/120V	3-M	AC 120V	3	AC 3 x 84 - 480 V	●	●	●	●	●	●	●	●	2 output relays, functions of the second relay may be selected (independent / parallel). Galvanically separated power supply.	48
HRN-43N/120V	3-M	AC-120V	3	AC 3 x 48 - 276 V	●	●	●	●	●	●	●	●		
HRN-41/120V **HRN-41/24V**	3-M	AC 120V AC/DC 24V	1	AC/DC 50 V AC/DC 160 V AC/DC 500 V	●	●	x	x	x	●	●	●	Second relay function (independent / parallel). Galvanically separated power supply from measuring inputs.	50
HRN-42/120V **HRN-42/24V**	3-M	AC 120V AC/DC 24V	1	AC/DC 50 V AC/DC 160 V AC/DC 500 V	●	●	x	x	x	●	●	●		
HRN-56/120 **HRN-56/208** **HRN-56/240**	1-M	from monitored	3	AC 3 x 72 - 160 V AC 3 x 125 - 276 V AC 3 x 144 - 276 V	x	●	●	●	x	●	x	x	Thanks to the power supply from all three phases, the relay is operational even if one phase fails.	51

Relay for factor cos-φ monitoring

Type	Design	Supply voltage	Secure variables				Setting			Description	Page of catalogue
			Phases	cos φ range	> cos φ	< cos φ	Delay	Hysteresis	Memory Errors		
COS-1/120V	3-M	AC 110V	3	0.1 - 0.99	●	●	●	●	●	Two output relays, one independent relay for each level. Galvanically separated power supply.	52

Relay for current monitor

Type	Design	Supply voltage	Secure variables				Setting					Description	Page of catalogue
			Phases	Range	>I	<I	Delay	Hysteresis	Memory Errors	>I	<I		
PRI-32	1-M	AC 24-240 V DC 24 V	1	AC 1-20 A	●	x	x	x	x	●	x	Exceeding the current value - the current flowing through the monitored conductor must not exceed 100 A even on a short-term basis.	53
PRI-51/0.5 **PRI-51/1** **PRI-51/2** **PRI-51/5** **PRI-51/8** **PRI-51/16**	1-M	AC 24-240 V DC 24 V	1	AC 0.05 - 0.5 A AC 0.1 - 1 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	May be used for scanning the current from the current transformer - up to 600A. Power supply is galvanically separated from the measured current.	54
PRI-53/1 **PRI-53/5**	6-M	AC/DC 24-240 V	3	AC 3 x 0.4 - 1.2 A AC 3 x 2 - 6 A	●	●	●	x	x	●	●	Monitors the drop in the strength of current below the preset value. Monitors exceeding the preset value.	55
PRI-41/110V **PRI-41/24V**	3-M	AC 120 V AC/DC 24 V	1	AC/DC 1.6 A AC/DC 5 A AC/DC 16 A	●	●	●	●	●	●	●	The adjustable delay for elimination of short-term outages and peaks for every level. Galvanically separated power supply.	56
PRI-42/110V **PRI-42/24V**	3-M	AC 120 V AC/DC 24 V	1	AC/DC 1.6 A AC/DC 5 A AC/DC 16 A	●	●	●	●	●	●	●	The adjustable delay for elimination of short-term outages and peaks for every level. Galvanically separated power supply.	

Level switches

Type	Design	Supply voltage	Secure variables		Setting			Description	Page of catalogue
			Leve max.	Leve min.	Delay	Sensitivity Probe	Function		
HRH-5	1-M	AC/DC 24-240 V	●	●	●	●	●	Measuring the frequency of 10 Hz will protect liquid from polarisation and measuring probes from increased oxidation. Galv. separated power supply.	57
HRH-1/120V **HRH-1/24V**	3-M	AC 110 V AC/DC 24 V	●	●	●	●	●	Sensitivity adjustable by potentiometer. Galvanically separated power supply.	58
HRH-7	box IP65	AC/DC 24-240 V	●	●	●	●	●	Suitable to work in harsh conditions due to the high degree of protection IP65.	60

Monitoring voltage relay range **HRN-3x** and **HRN-6x**

1M

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

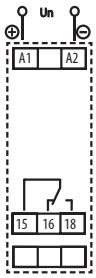
- It serves to control supply voltage for appliances sensitive to supply tolerance, protection of the device against under/over voltage
- HRN-3x is band voltage relay, HRN-6x is over/under voltage relay. For difference - see graph of function
- HRN-33, HRN-63 - monitors voltage in range AC 48 - 276 V
  - Umax and Umin can be monitored independently
- HRN-34, HRN-64 - like HRN-33, but voltage range is DC 6 - 30 V
  - monitoring of battery circuits (12, 24 V)
- HRN-35 - like HRN-33, but independent output relays for each voltage level
  - switching of other loads possible
- HRN-37, HRN-67 - like HRN-33, monitors voltage in range AC 24 -150 V
  - it is possible to monitor level of overvoltage and undervoltage independently
- Adjustable time delay for all types is 0 - 10 s (to eliminate short voltage drops or peaks)
- Voltage Umin adjusted as % of Umax
- 3-state indication - LEDs indicating normal state and 2 fault states
- Supply from monitored voltage (monitors level of its own supply)
- 1-MODULE, DIN rail mounting

Technical parameters	HRN-33 / HRN-63	HRN-34 / HRN-64	HRN-35	HRN-37 / HRN-67
Supply and measuring				
Terminals:	A1 - A2	A1 - A2	A1 - A2	A1 - A2
Voltage range:	AC 48 - 276 V / 50-60Hz	DC 6 - 30 V	AC 48 - 276 V / 50-60Hz	AC 24-150 V / 50-60Hz
Burden:	AC max. 1.2 VA	DC max. 1.2 VA	AC max. 1.2 VA	AC max. 1.2 VA
Upper level (Umax):	AC 160 - 276 V	DC 18 - 30 V	AC 160 - 276 V	AC 80-150 V
Bottom level (Umin):	30 - 95 % Umax	35 - 95 % Umax	30 - 95 % Umax	30 - 95 % Umax
Max. permanent:	AC 276 V	DC 36 V	AC 276 V	AC 276 V
Peak overload < 1ms:	AC 290 V	DC 50 V	AC 290 V	AC 290 V
Time delay:	adjustable 0 - 10 s			
Accuracy				
Setting accuracy (mechanical):	5 %			
Repeat accuracy:	< 1 %			
Dependance on temperature:	< 0.1 % / °F (°C)			
Tolerance of limit values:	5 %			
Hysteresis (from fault to normal):	2 - 6 % of adjusted value (only HRN-33, HRN-34, HRN-35, HRN-37)			
Output - Number of contacts:	1x changeover / SPDT (AgNi / Silver Alloy)	1x changeove r / SPDT (AgNi / Silver Alloy)	2x chang. for each level of voltage,(AgNi)	1x changeover / SPDT (AgNi / Silver Alloy)
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC			
	Inductive load: 1 HP / 240 V, 1/2 HP / 120V			
Inrush current:	30 A / < 3 s			
Min. breaking capacity DC:	500 mW			
Output indication:	red / green LED			
Mechanical life:	$3x10^7$			
Electrical life (AC1):	$0.7x10^5$			
Other information				
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)			
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)			
Electrical strength:	4 kV (supply - output)			
Operating position:	any			
Mounting:	DIN rail EN 60715			
Protection degree:	IP 40 from front panel			
Overvoltage cathegory:	III.			
Pollution degree:	2			
Max. cable size (mm^2):	solid wire max.1x 2.5 or 2x1.5, with sleeve max. 1x2.5 (AWG 12) (0.4 Nm)			
Dimensions:	3.5″ x 0.7″ x 2.5″ (90 x 17.6 x 64 mm)			
Weight:	2.2 oz. (61 g)	2.6 oz. (73 g)	3 oz. (85 g)	2.2 oz. (61 g)
Standards:	UL E308660; EN 60255-6, EN 61010-1			

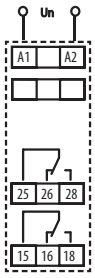
Connection

HRN-33, HRN-37
HRN-63, HRN-67

HRN-34,
HRN-64

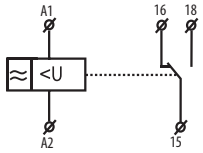


HRN-35

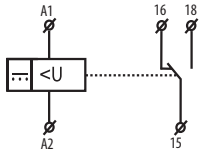


Symbol

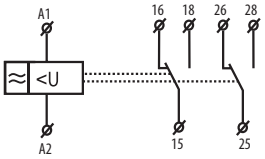
HRN-33, HRN-37
HRN-63, HRN-67



HRN-34,
HRN-64

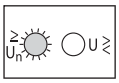


HRN-35

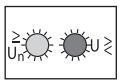


Indication LED

HRN-33, HRN-37

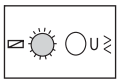


Normal state
Umin<Un<Umax
Green LED = ON
Red LED = OFF

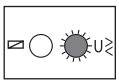


Exceeded Umax (overvoltage)
Drop below Umin (undervoltage)
Un>Umax or Un<Umax
Green LED = ON
Red LED = ON

HRN-34

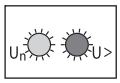


Normal state
Umin<Un<Umax
Green LED = ON
Red LED = OFF

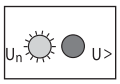


Exceeded Umax (overvoltage)
Drop below Umin (undervoltage)
Un>Umax or Un<Umax
Green LED = OFF
Red LED = ON

HRN-63, HRN-67

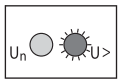


Exceeded Umax (overvoltage)
Un>Umax
Green LED = ON
Red LED = ON

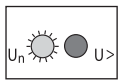


Drop below Umin (undervoltage)
Un<Umin
Green LED = ON
Red LED = OFF

HRN-64

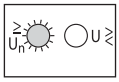


Exceeded Umax (overvoltage)
Un>Umax
Green LED = OFF
Red LED = ON

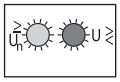


Drop below Umin (undervoltage)
Un<Umin
Green LED = ON
Red LED = OFF

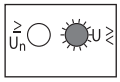
HRN-35



Normal state
Umin<Un<Umax
Green LED = ON
Red LED = OFF



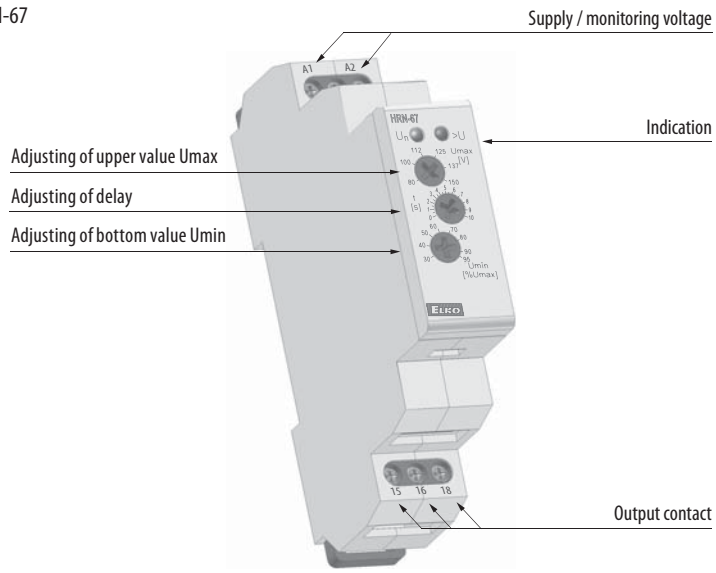
Exceeded Umax (overvoltage)
Un>Umax
Green LED = ON
Red LED = ON



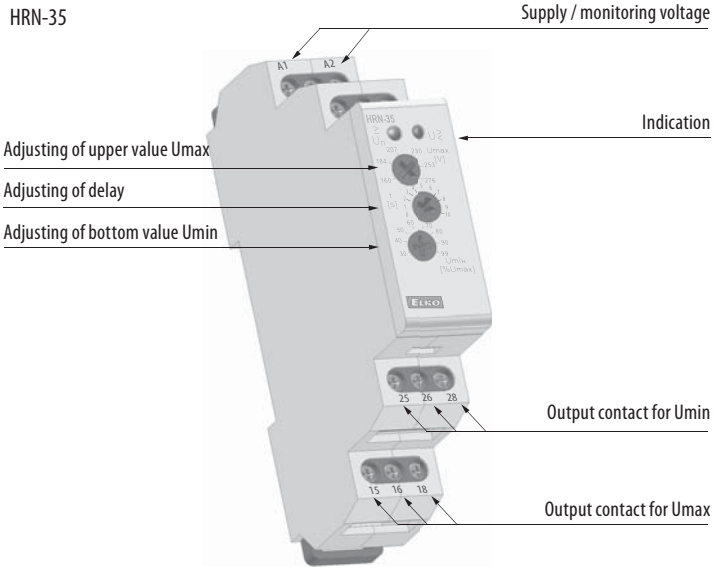
Drop below Umin (undervoltage)
Un<Umin
Green LED = OFF
Red LED = ON

Description

HRN-67

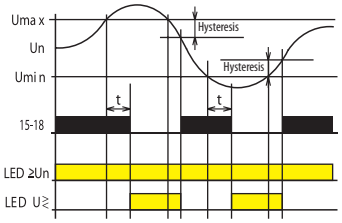


HRN-35

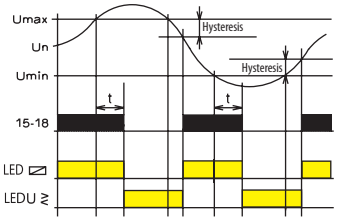


Function HRN-33, 34, 35, 37 (band voltage relay)

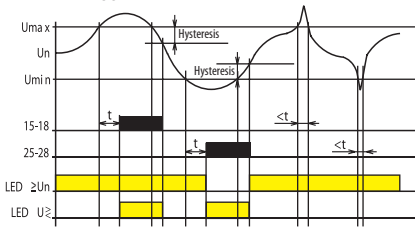
HRN-33,HRN-37



HRN-34



HRN-35

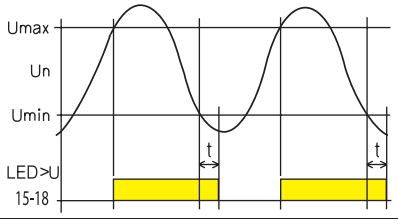


Legend:

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

Monitoring relay series HRN-3x monitors level of voltage in single - phase circuits. Monitored voltage serves also as supply voltage. It is possible to set two indipendent (all occurrences) levels of voltage, when exceeded the output is activated. HRN-33 and HRN-34 - in normal state the output relay is permanently switched. It switches off when there is a limit settings. This combination of linkage of the output relay is advantageous when the full failure of supply (monitored) voltage is considered to be a faulty state in the same way as a decrease of voltage within the set level. Output relay is in both
situations always switched off.
Differently HRN-35 version uses indipendent relay for each level, in normal state it is switched off. If the upper level is exceeded (for example overvoltage) 1 relay switches on, when the bottom level (e.g. undervoltage) is exceeded 2 relay switches. It is thus possible to see the particular faulty state. To eliminate short peaks in the main the time delay, which is possible to be set in range 0 - 10 s, is used. It functions when changing from normal to faulty state and prevents unavailing pulsation of the output relay caused by parasitive peaks. Time delay doesn´t apply when changing from faulty to normal state, but hysteresis (1-6% depends on the voltage setting) apply. Thanks to changeover contacts it is possible to get other configurations and functions according to actual requirements of the application.

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



Legend:

Umax - upper adjustable level of voltage
Un - measured voltage
Umin - bottom adjustable level of voltage
15-18 - switching contact of output relay
LED U> - red indicator light

Monitoring relay line HRN-6x serves to monitor levels of voltage in single-phase or DC circuits. Monitored voltage is in the same time also supply voltage. It is possible to set two indipendent levels of voltage. When Umax is exceeded, output is activated. In case voltage level falls below Umin, output is deactivated. This combination is advantageous when full absence of supply voltage is understood as faulty state, as well as voltage drop within the set level. To eliminate short voltage peaks in the main there is time delay which can be set in a range of 0-10 sec. Such delay applies in case of going from overvoltage to undervoltage. In case of returning from undervoltage to overvoltage this delay doesn't apply. Thanks to changeover output contacts it is possible to reach various configurations and functions according to requirements or an application.

Relay for complete monitoring 3-phase mains **HRN-43, HRN-43N**

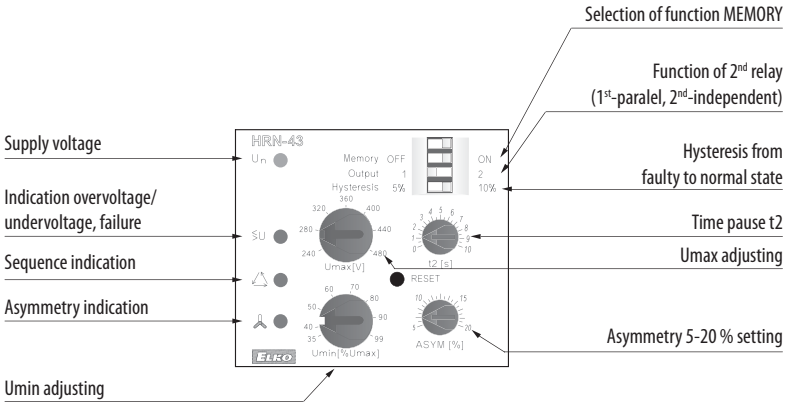
3M

EAN code
HRN-43 /120V: 8595188130387
HRN-43N /120V: 8595188121323

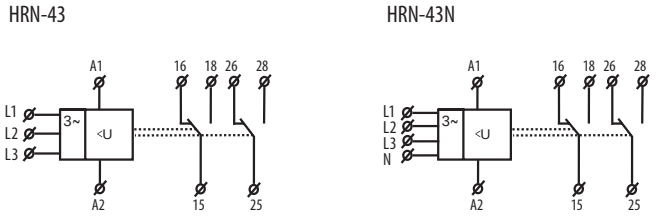
- Monitoring 3-phase mains:
  - voltage in 2 levels (undervoltage and overvoltage) in range 138-276 V or 280-480 V (3x400 V)
  - phase asymmetry
  - phase sequence
  - phase failure
- Function "MEMORY" - for return from the faulty into normal state press button „RESET" located on the front panel
- HRN-43 - for circuits 3x400 V (without neutral)
- HRN-43N - for circuits 3x400 / 120 V (with neutral)
- 2 output relays, selectable function of 2nd relay (independent / parallel)
- Fixed (t1) and adjustable (t2) delay to eliminate short voltage drops and peaks
- Galvanically separated supply voltage AC 120 V
- 3-MODULE, DIN rail mounting

Technical parameters	HRN-43	HRN-43N
Supply		
Supply terminals:	A1 - A2	
Voltage range:	AC 120 V / 60Hz	
Burden:	max. 4.5 VA	
Supply voltage tolerance:	-15 %; +10 %	
Measuring circuit		
Nominal voltage:	3x400 V / 50Hz	3x400 V / 230 V / 50Hz
Terminals:	L1, L2, L3	L1, L2, L3, N
Upper level Umax:	240–480 V	138–276 V
Bottom level Umin:	35 - 99 % Umax	
Max. permanent overload:	3x480 V	
Hysteresis:	adjustable 5 % or 10 % of set value	
Asymmetry:	5 - 20 %	
Peak overload < 1ms:	600 < 1ms	350V < 1ms
Time delay t1:	fixed, max. 200 ms	
Time delay t2:	adjustable 0-10 s	
Accuracy		
Set. accuracy (mechanical):	5 %	
Repeat accuracy:	< 1 %	
Temperature dependance:	< 0.1 % / °F (°C)	
Limit values tolerance:	5 %	
Output		
Number of contacts:	2x changeover / SPDT (AgNi / Silver Alloy)	
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC Inductive load: 1 HP / 240 V, 1/2 HP / 120 V	
Inrush current:	30 A / < 3 s	
Min. breaking capacity DC:	500 mW	
Mechanical life:	$3x10^7$	
Electrical life resistive load:	$0.7x10^5$	
Other information		
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)	
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)	
Electrical strength:	4 kV (supply - output)	
Operating position:	any	
Mounting:	DIN rail EN 60715	
Protection degree:	IP 40 from front panel / IP 20 terminals	
Overvoltage category:	III.	
Pollution degree:	2	
Max. cable size (mm^2):	solid wire max.1x 2.5 or 2x1.5, with sleeve max. 1x1.5 (AWG 12) (0.4 Nm)	
Dimensions:	3.5˝ x 2˝ x 2.6˝ (90 x 52 x 65 mm)	
Weight:	8.4 oz. (239 g)	
Standards:	EN 60255-6, EN 61010-1	

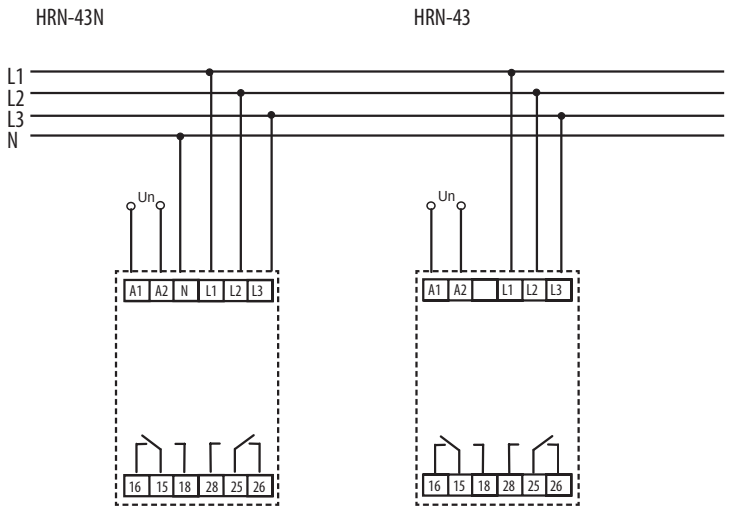
Description



Symbol

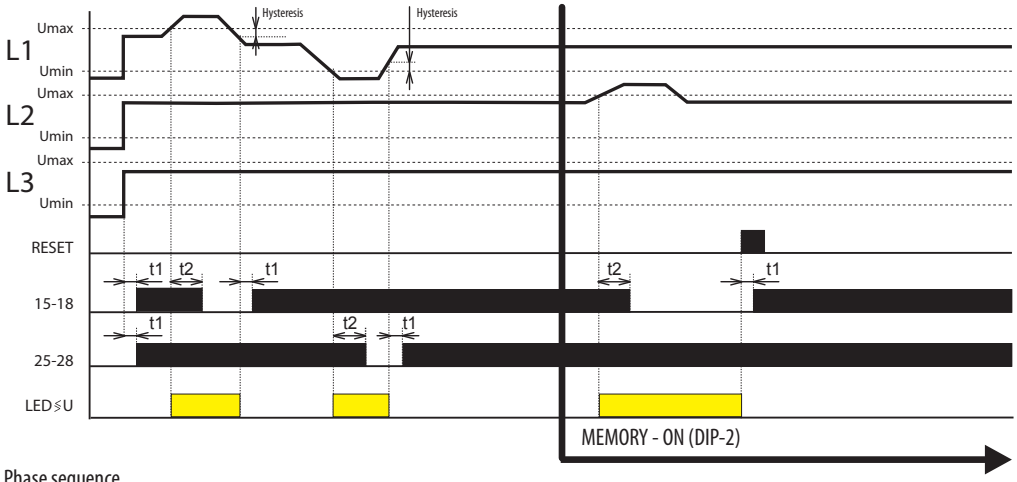


Connection



Function

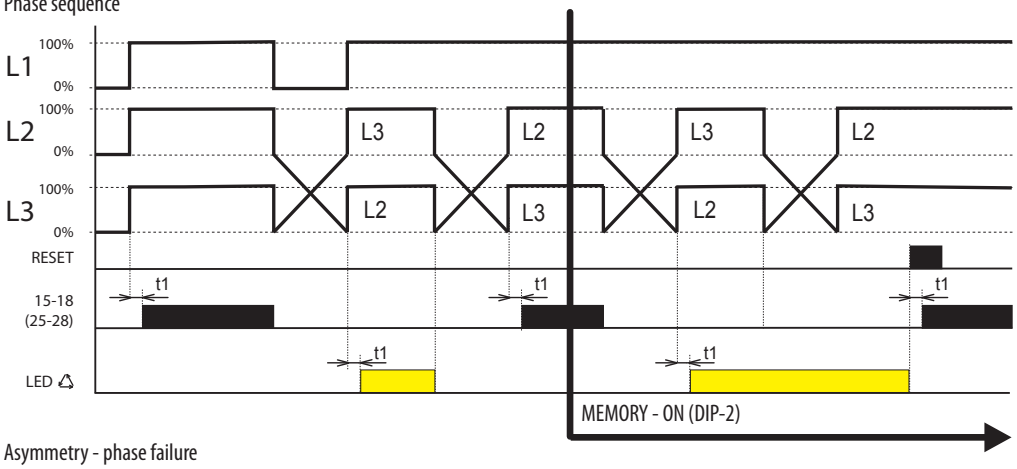
Overvoltage - undervoltage



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

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

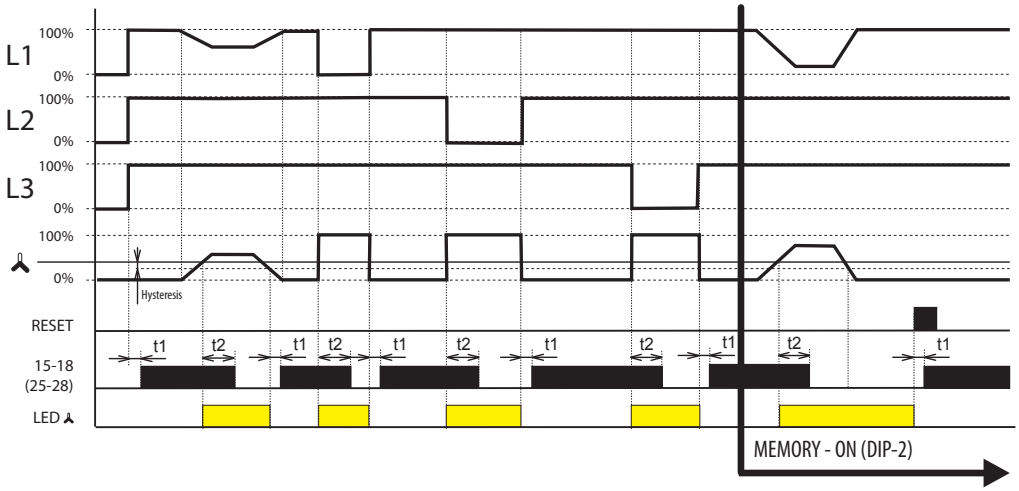
Phase sequence



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

Selection of 2nd relay function:
The function is not implied in the monitoring phase sequence, the relays are switched in parallel way.
DIP switch no. 3 is ignored.

Asymmetry - phase failure



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

Selection of 2nd relay function:
The function is not implied in the monitoring phase sequence, the relays are switched in parallel way.
DIP switch no. 3 is ignored.

Function description

Relay is designated to monitor 3-phase circuits. Type HRN-43N controls voltage towards neutral wire, type HRN-43 controls interphase voltage. Relay can monitor voltage in two levels (overvoltage/ undervoltage), phase assymetry, sequence and failure. Each faulty state is indicated by individual LED. By DIP switch (No.3) it is possible to define function of the other relay – independent function (1x for overvoltage, 1x for undervoltage) or in parallel. Time delays t1(fixed) – when changing from faulty to normal state or when de-energized and t2 (adjustable) when changing from normal to faulty state. These delays prevent incorrect conduct and oscillation of output device during short voltage peaks in the main or during gradual voltage decline into normal.

Voltage control

Set upper level Umax in range 138-276 V (or 240 - 480 V for HRN-43) and lower level Umin in range 35-99% Umax. In case any phase passes this range, after a delay which eliminated short voltage peaks, contact opens. Output contact again switches after returning back into monitored voltage range and exceeding fixed hysteresis (which is adjustable in two values by DIP switch).

Phase sequence

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

Asymmetry

Rate of assymetry between individual phases is set in a range of 5-20%. In case set asymmetry is exceeded, output relay breaks and LED indicating asymmetry shines. Delays t1, t2 and hysteretic are applicable when returning to normal state.

Monitoring voltage relay **HRN-41, HRN-42**

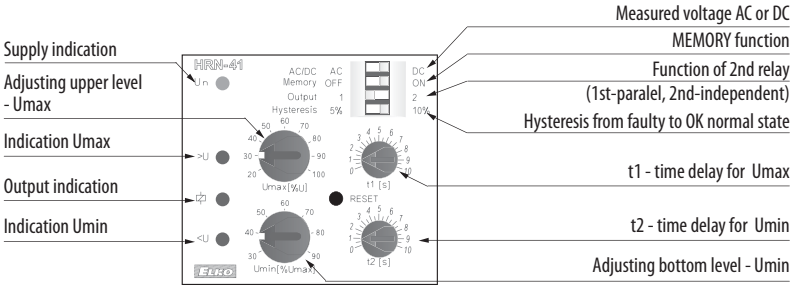
EAN code
HRN-41 /120V: 8595188140430
HRN-41 /24V: 8595188140416

HRN-42 /120V: 8595188140478
HRN-42 /24V: 8595188140454

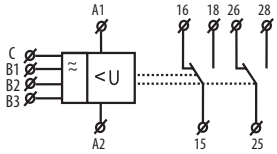
- Monitoring DC / AC 1-phase in 3 ranges
- Monitoring voltage with 2 independent levels (overvoltage / undervoltage)
- Two versions, HRN-41: Function "HYSTERESIS" a HRN-42: Function "WINDOW"
- "MEMORY" function - manual reset key on frontal panel
- Function of second relay (independent / parallel)
- Adjustable delay for short peaks
- Galvanically separated supply voltage from measuring inputs
- 3-MODULE, DIN rail mounting

Technical parameters	HRN-41	HRN-42	
Supply			
Supply terminals:	A1 - A2		
Voltage range:	AC 120 V or AC/DC 24 V (AC 50-60Hz)		
Burden:	max. 4.5 VA		
Supply voltage tolerance:	-15 %; +10 %		
Measuring			
Ranges:	10 - 50 V (AC 60Hz)	32 - 160 V (AC 60Hz)	100 - 500 V (AC 60Hz)
Terminals:	C - B1	C - B2	C - B3
Input resistance:	110 kΩ	360 kΩ	1.1 MΩ
Max. permanent overload:	100 V	300 V	600 V
Peak overload < 1ms:	250 V	700 V	1 kV
Time delay for Umax:	adjustable, 0 -10 s		
Time delay for Umin:	adjustable, 0 -10 s		
Accuracy			
Setting accuracy (mechanical):	5 %		
Repeat accuracy:	< 1 %		
Dependance on temperature:	< 0.1 % / °F (°C)		
Tolerance of limit values:	5 %		
Hysteresis (from fault to normal):	selectable 5 % / 10 %		
Output			
Number of contacts:	2x changeover / SPDT (AgNi / Silver Alloy)		
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC		
	Inductive load: 1 HP / 240 V, 1/2 HP / 120V		
Inrush current:	30 A / < 3 s		
Min. breaking capacity DC:	500 mW		
Output indication:	yellow LED		
Mechanical life:	$3x10^7$		
Electrical life resistive load:	$0.7x10^5$		
Other information			
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)		
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)		
Electrical strength:	4 kV (supply - output)		
Operating position:	any		
Mounting:	DIN rail EN 60715		
Protection degree:	IP 40 from front panel / IP 20 terminals		
Overvoltage category:	III.		
Pollution degree:	2		
Max. cable size (mm^2):	solid wire max.1x 2.5 or 2x1.5, with sleeve max. 1x1.5 (AWG 12) (0.4 Nm)		
Dimensions:	3.5˝ x 2˝ x 2.6˝ (90 x 52 x 65 mm)		
Weight:	8.4 oz. (239 g)		
Standards:	EN 60255-6, EN 61010-1		

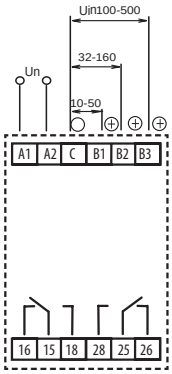
Description



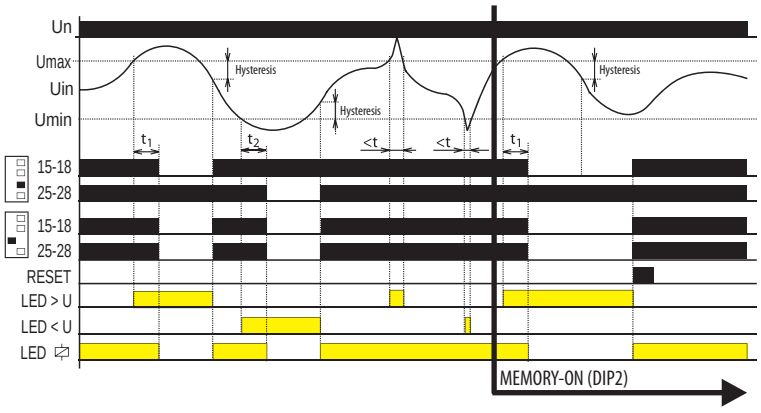
Symbol



Connection



Function



Relay is delivered in two versions – according to the way of setting and monitoring voltage levels.
HRN-41 has function Hysteresiss, which means that only upper level is set (Umax) and lower level (Umin) is set in % from upper level. Therefore lower level automatically changes when changing upper level.

HRN-42 has function "WINDOW", which means that upper level (Umax) and lower level (Umin) are set independently in % from rated monitores range.
Both types have choice of function MEMORY, in case the relay gets into a faulty state it keeps output in this state until it is reset by button RESET. DIP switch No.3 can be used to choose if relays should switch individually for each level or in parallel in case any level of voltage is overrun. DIP switch No.4 serves to set hysteresis which applies when going from normal state to a faulty one.
Relay has protection against polarity reversing for DC voltage or incorrectly chosen AC-DC voltage (this fault is indicated by flashing of both LEDs (LED < U a LED > U).

Relay for monitoring phase sequence and failure **HRN-56**

1M

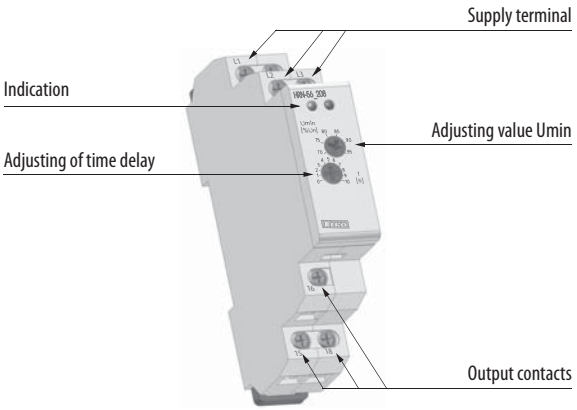
- Relay monitors phase sequence and failure (e.g. control of correct motor winding etc.)
- Relay is designated for monitoring of 3-phase networks
- Supply from all phases which means that relay is functional also in case of one phase failure
- Supply and monitored supply Un:
  - HRN-56/120 - 3 x 120V
  - HRN-56/208 - 3 x 208 V
  - HRN-56/240 - 3 x 240 V
- Fixed time delay T1 (500 ms) and adjustable time delay T2 (0 -10s)
- Faulty state is indicated by LED and by opening of output relay contact
- 1-MODULE, DIN rail mounting

EAN code
HRN-56 /120V: 8595188130745
HRN-56 /208V: 8595188130134
HRN-56 /240V: 8595188137119

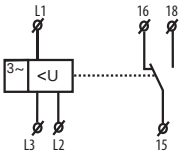
Technical parameters	HRN-56		
	120	208	240
Monitoring terminals:	L1, L2, L3		
Supply terminals:	L1, L2, L3		
Supply / measured voltage:	3 x 120V / 60 Hz	3 x 208V / 50-60 Hz	3 x 240V / 50-60 Hz
Level Umin:	adjustable 70 - 95 % Un		
Level Uoff:	60 % Un		
Burden:	max. 2 VA		
Hysteresis:	2%		
Max. permanent overload:	AC 3 x 160V	AC 3 x 276V	
Peak overload < 1s:	AC 3 x 180V	AC 3 x 300V	
Time delay T1:	max. 500 ms		
Time delay T2:	adjustable 0 -10 s		
Output			
Number of contacts:	1x changeover / SPDT (AgNi / Silver Alloy)		
Current rating:	Resistive load:	8 A / 240 V AC / 24 V DC	
	Inductive load:	1/2 HP / 240 V, 1/4 HP / 120V	1 HP / 240 V, 1/2 HP / 120V
Inrush current:	10 A		
Indication of state:	red LED		
Mechanical life:	$1x10^7$		
Electrical life resistive load:	$1x10^5$		
Other information			
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)		
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)		
Electrical strength:	4 kV (supply - output)		
Operating position:	any		
Mounting:	DIN rail EN 60715		
Protection degree:	IP 40 from front panel / IP 10 terminals		
Overvoltage category:	III.		
Pollution degree:	2		
Max. cable size (mm^2):	solid wire max. 2x2.5 or 1x4,with sleeve max. 1x2.5 or 2x1.5 (AWG 12) (0.4 Nm)		
Dimensions:	3.5″ x 0.7″ x 2.5″ (90 x 17.6 x 64 mm)		
Weight:	2.3 oz. (66 g)		
Standards:	UL E308660; EN 60255-6, EN 61010-1		

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 (Uoff 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.

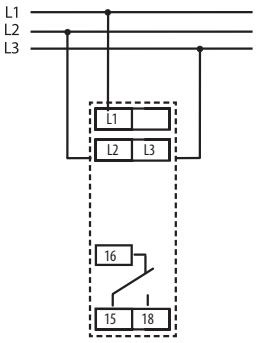
Description



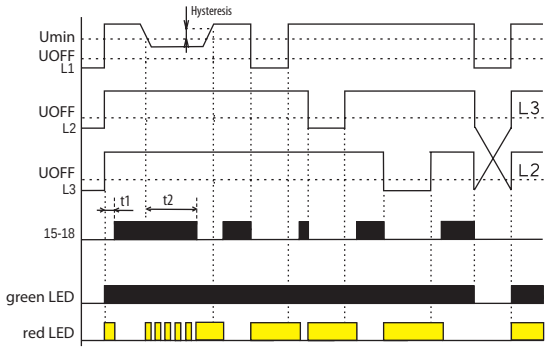
Symbol



Connection



Function



Power factor monitoring relay **COS-1**

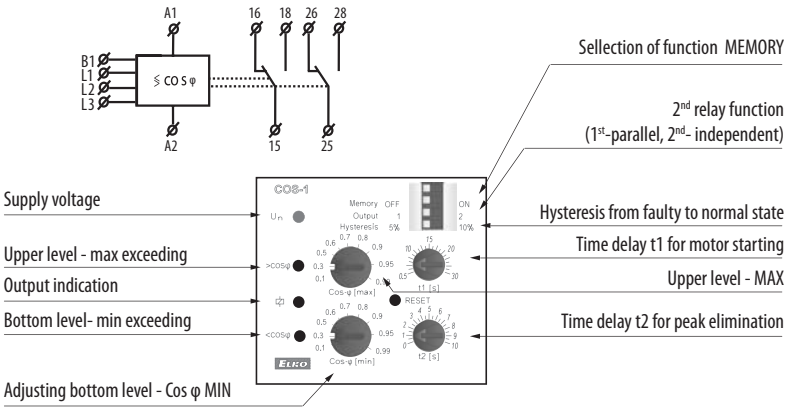
3M

EAN code
COS-1/120V: 8595188147163

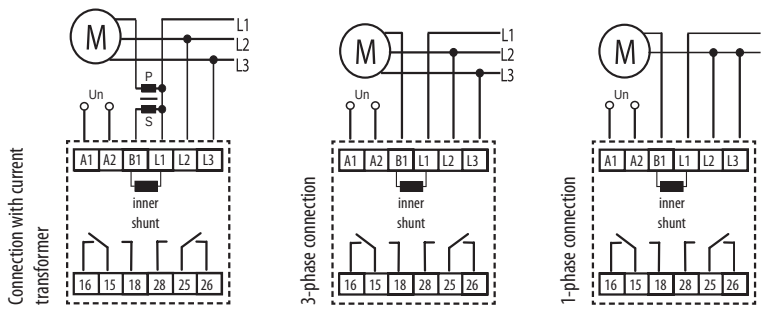
- Relay monitors phase shift between current and voltage - cos-φ in 3-phase and also 1-phase main for monitoring overload / unloading of motors
- Supply set 3 x 400 V
- Function "MEMORY" - manual reset - button on front panel
- It is possible to connect current transformer in front of the device. This enables increase of current range
- 2 output relays, independent for each level
- Adjustable delay to eliminate short peak overloading
- Adjustable range and bottom level cos-φ, of power factor between 0.1- 0.99
- Adjustable delay to eliminate starting of motor
- Selectable hysteresis 5 or 10%
- Galvanically separated supply voltage AC 120 V
- 3-MODULE, DIN rail mounting

Technical parameters	COS-1
Supply	
Supply terminals:	A1 - A2
Voltage range:	AC 120V / 60Hz
Burden:	max. 4.5 VA
Operating range:	-15 %; +10 %
Measuring	
Voltage set:	3x400 V / 50 Hz
Terminals:	L1, L2, L3, B1
Upper level cos-φ:	adjustable 0.1 - 0.99
Bottom level cos-φ:	adjustable 0.1 - 0.99
Max. permanent voltage:	(input L1, L2, L3) AC 3x460 V
Current range:	0.1 - 16 A
Current overloading:	20 A (< 3 sec.)
Hysteresis:	adjustable 5% or 10%
Time delay t1:	adjustable 0.5 - 30 s
Time delay t2:	adjustable 0 - 10 s
Accuracy	
Accuracy setting (mechanical):	5 %
Accuracy of repetition:	< 1 %
Temperature dependance:	< 0.1 % / °F (°C)
Limit values tolerance:	5 %
Output	
Number of contacts:	2x changeover / SPDT (AgNi / Silver Alloy)
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC Inductive load: 1 HP / 240 V, 1/2 HP / 120V
Inrush current:	20 A / < 3 s
Min. breaking capacity DC:	500 mW
Output indication:	yellow LED
Mechanical life:	$3x10^7$
Electrical life resistive load:	$0.7x10^5$
Other information	
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)
Electrical strength:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 20 terminals
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm^2):	max.1x 2.5, max.2x1.5, with sleeve max. 1x1.5 (AWG 12) (0.4 Nm)
Dimensions:	3.5˝ x 2˝ x 2.6˝ (90 x 52 x 65 mm)
Weight:	8 oz. (240 g)
Standards:	EN 60255-6, EN 61010-1

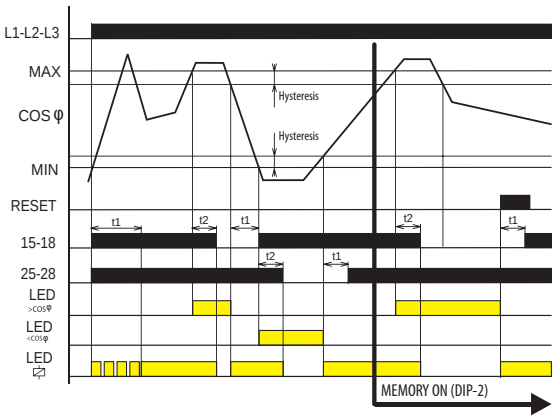
Symbol Description



Connection



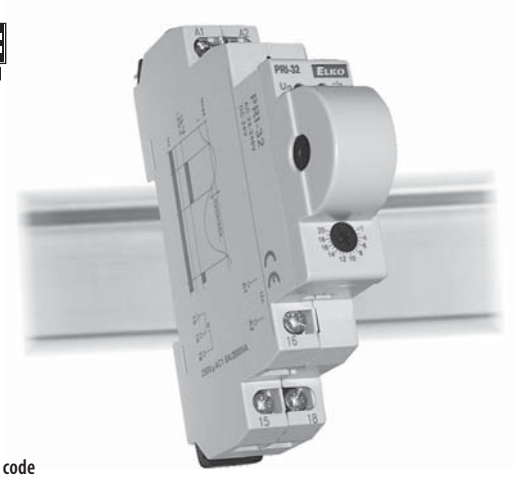
Function



After the device is switched on, the yellow LED flashes for time t1 and both relays are switched (state OK). This delay serves to eliminate a faulty state e.g. motor start-up. If the upper limit is exceeded (cosφ - max) red LED shines > cosφ . After a time delay t2 the output relay opens (15-18). Equally, if it falls under bottom limit (cosφ - min) red LED shines < cosφ and after a time delay t2 the output relay opens (25-28). In case the load is disconnected (no current), red LED shines > cosφ (cosφ = 1).

Current monitoring relay **PRI-32**

1M

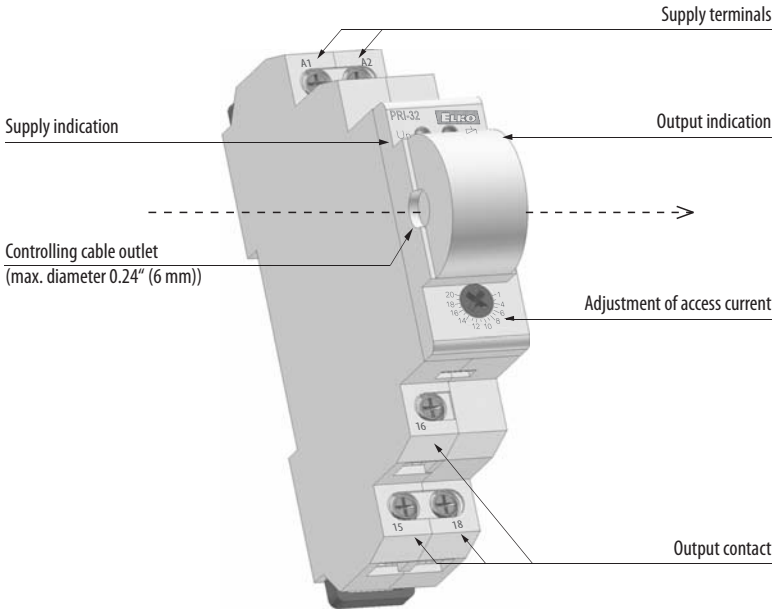


- Current transformer is a part of the product. Inside this transformer there is a wire which senses the volume of flowing current
- This construction reduces thermal stress of product when compared with conventional solutions with inbuilt shunt, and increases current range up to 20 Amps, and galvanically separates monitored circuit
- For heating bars in sliding rails, heating cables, indication of current flow, controlling of 1-phase motor consumption...
- Universal supply AC 24 - 240 V and DC 24 V
- Supply is galvanically separated from measuring current
- Current exceeding – current flowing through monitored wire must not exceed 100 A
- Clamp terminals
- 1-phase, 1-MODULE, DIN rail mounting

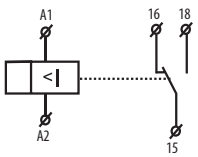
EAN code
PRI-32: 8595188121965

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
Operating range:	-15 %; +10 %
Measuring circuit	
Current range:	1 - 20 A (AC 50 Hz)
Current adjustment:	potentiometer
Accuracy	
Setting accuracy (mechanical):	5 %
Repeat accuracy:	< 1 %
Temperature dependancy:	< 0.1 % / °F (°C)
Limit values tolerance:	5%
Overload capacity:	max.100 A / 10 s
Output	
Number of contacts:	1x changeover / SPDT (AgNi / Silver Alloy)
Current rating:	Resistive load: 8 A / 240 V AC / 24 V DC Inductive load: 1/2 HP / 240 V, 1/4 HP / 120V
Output indication:	red LED
Other information	
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)
Electrical strength:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 10 terminals
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm²):	solid wire max. 2x2.5 or 1x4, with sleeve max. 1x2.5 or 2x1.5 (AWG 12) (0.4 Nm)
Dimensions:	3.5″ x 0.7″ x 2.5″ (90 x 17.6 x 64 mm)
Weight:	2.4 oz. (68 g)
Standards:	EN 60255-6, EN 61010-1

Description

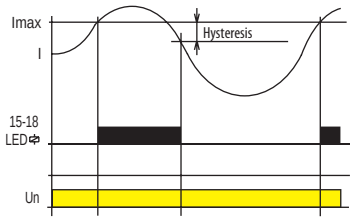


Symbol



Connection

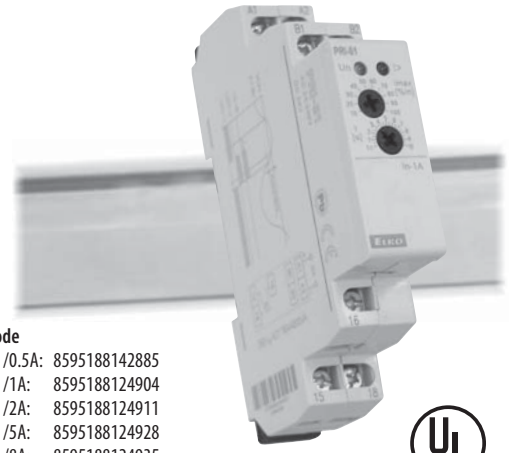
Function



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.

Current monitoring relay **PRI-51**

1M



EAN code

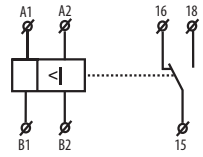
PRI-51 /0.5A: 8595188142885
PRI-51 /1A: 8595188124904
PRI-51 /2A: 8595188124911
PRI-51 /5A: 8595188124928
PRI-51 /8A: 8595188124935
PRI-51 /16A: 8595188124942

- It serves for monitoring of heating in rail-switches, heating cables, consumption of one-phase motors, indicates current flow
- Flexible adjustment by potentiometer, choice of 6 ranges:

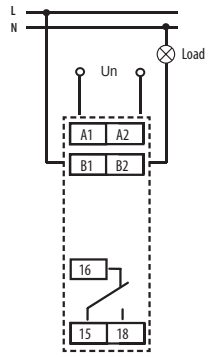
  AC 0.05-0.5A; AC 0.1-1A; AC 0.2-2A; AC 0.5-5A; AC 0.8-8A; AC 1.6-16A
- Adjustable delay 0.5 - 10 s to eliminate short current peaks
- It is possible to use for current scanning from current transformer - up to 600 A!
- Universal supply AC 24 - 240 V and DC 24 V
- Supply is galvanically separated from measured current, it must be in the same phase
- 1-phase, 1-MODULE, DIN rail mounting

Technical parameters	PRI-51					
Supply circuit						
Supply terminals:	A1 - A2					
Voltage range:	AC 24 - 240 V a DC 24 V (AC 50-60 Hz)					
Burden:	max. 1.5 VA					
Supply voltage tolerance:	-15 %; +10 %					
Measuring circuit						
Load:	between B1 - B2					
Current range:	PRI-51/0.5 AC0.05-0.5A (AC50Hz)	PRI-51/1 AC0.1-1A (AC 50Hz)	PRI-51/2 AC0.2-2A (AC 50Hz)	PRI-51/5 AC0.5-5A (AC 50Hz)	PRI-51/8 AC0.8-8A (AC 50Hz)	PRI-51/16 AC1.6-16A (AC 50Hz)
	applicable also for current transformer					
Max. permanent current:	0.5A	1 A	2 A	5 A	8 A	16 A
Inrush overload <1ms:	100 A					
Current adjustment:	potentiometer					
Time delay:	adjustable 0.5-10 s					
Accuracy						
Setting accuracy (mechanical):	5 %					
Repeat accuracy:	< 1 %					
Temperature dependancy:	< 0.1 % / °F (°C)					
Limit values tolerance:	5 % (10% for 0.05-0.5A range)					
Hysteresis (fault to OK):	5 %					
Output						
Number of contacts:	1x changeover / SPDT (AgNi / Silver Alloy)					
Current rating:	Resistive load: 8 A / 240 V AC / 24 V DC					
	Inductive load: 1/2 HP / 240 V, 1/4 HP / 120V					
Output indication:	green / red LED					
Other information						
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)					
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)					
Electrical strength:	4 kV (supply - output)					
Operating position:	any					
Mounting:	DIN rail EN 60715					
Protection degree:	IP 40 from front panel / IP 10 terminals					
Overvoltage cathegory:	III.					
Pollution degree:	2					
Max. cable size (mm²):	solid wire max.2x2.5 or 1x4, with sleeve max.1x2.5 or 2x1.5 (AWG 12) (0.4 Nm)					
Dimensions:	3.5˝ x 0.7˝ x 2.5˝ (90 x 17.6 x 64 mm)					
Weight:	2.54 oz. (72 g)					
Standards:	UL E308660; EN 60255-6, EN 61010-1					

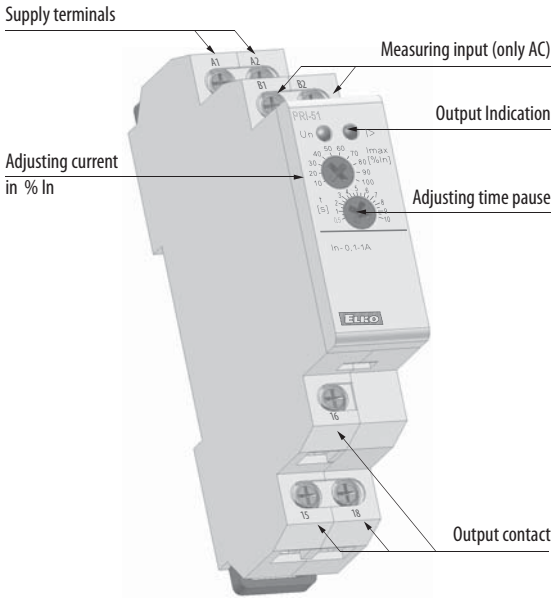
Symbol



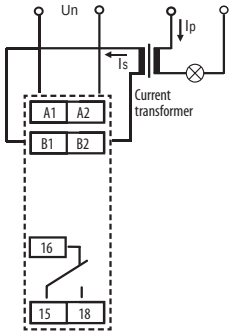
Connection



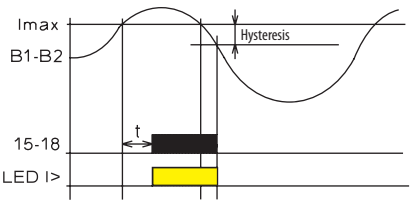
Description



Example Connection:
PRI-51 with current transformer for current range increase



Function



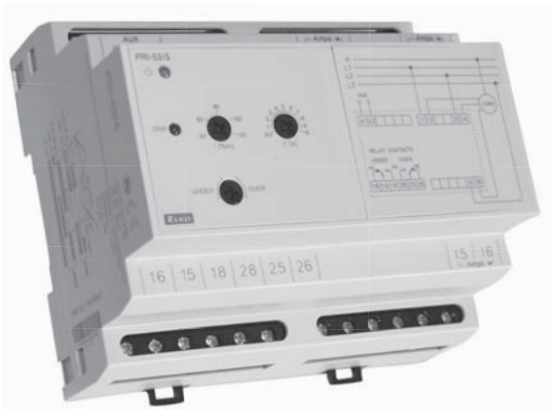
Monitoring relay PRI-51 serves to monitor current level in one-phase AC circuits. Gradual setting of actuating current of monitoring relay enables many different applications. Output relay is in normal state opened. After the set current level is reached, relay closes after the set delay (0.5-10s). When returning from faulty to normal state there is a hystersis (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.

Example of an order

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

Three-phase current monitoring relay **PRI-53**

6M

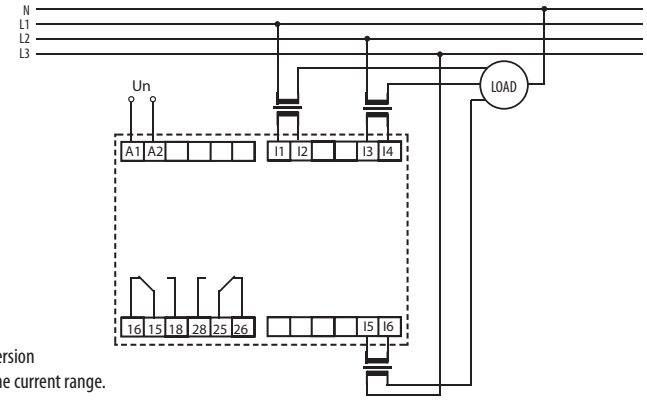


- It is intended for monitoring the current in three-phase devices (e.g. cranes, motors, etc.)
- 24-240 V AC/DC power supply galvanically separated from the circuit of the monitored current
- Adjustable current level in % of In
- Fixed difference level
- Adjustable delay level (when exceeding the preset limit)
- Adjustable function:
  - UNDER - monitors the drop in the strength of current below the preset value I
  - OVER - exceeding the preset value I
- 2 types depending on the strength of rated current In (1A, 5A)
- 6-MODULE, DIN rail mounting
- Output relay with 2 changeover contacts
- Option of connecting via the current transformers to increase the value of the monitored current by up to 600 A

EAN code
PRI-53/1: 8595188142137
PRI-53/5: 8595188142144

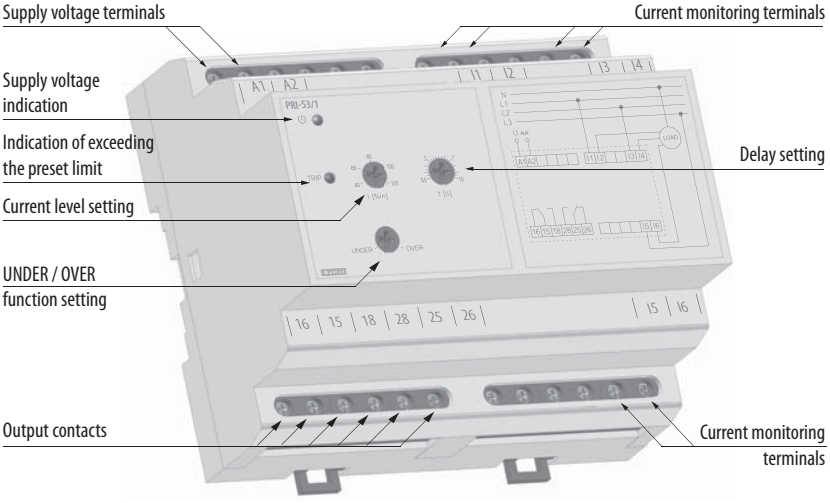
Technical parameters	PRI-53/1	PRI-53/5
Supply terminals:	A1, A2	
Current monitoring terminals		
1st phase:	I1, I2	
2nd phase:	I3, I4	
3rd phase:	I5, I6	
Supply voltage:	24 - 240V AC/DC (AC 50-60 Hz)	
Tolerance of voltage range:	± 10%	
Operating AC frequency:	45 - 65 Hz	
Burden: (max):	3VA / 1.2W	
Rated current In:	AC 1A	AC 5A
Current level - I:	adjustable 40 - 120% In	
Overload capacity		
- continuous:	2A	10A
- max.3s:	20A	50A
Difference:	fix 1 % In	
Delay (until failure):	adjustable 0.5 - 10s	
Output relay - contact:	2x schangeover / SPDT (AgNi) gilded	
Current rating:	Resistive load: 8 A / 240 V AC / 24 V DC	
	Inductive load: 1/2 HP / 240 V, 1/4 HP / 120V	
Mechanical life:	3x10^6 at rated load	
Other information		
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)	
Storing temperature:	-22 °F to 158 °F (-30 °C to 70 °C)	
Electrical strengh (power supply – relay contact):	4 kV / 1 min.	
Overvoltage category:	III.	
Pollution level:	2	
Protection degree:	IP 40 from font panel / IP 20 terminal	
Max. cable size (mm^2):	max 2 x 1.5 / 1 x 2.5 (AWG 12) (0.4 Nm)	
Dimensions:	3.5˝ x 4.1˝ x 2.5˝ (90 x 105 x 64 mm)	
Weight:	7.3 oz. (208 g)	
Standards:	EN 60255-6, EN 60255-27, EN 61000-6-2, EN 61000-6-4	

Connection



Example of connection:
PRI - 53 with a current conversion transformer for increasing the current range.

Device describtion

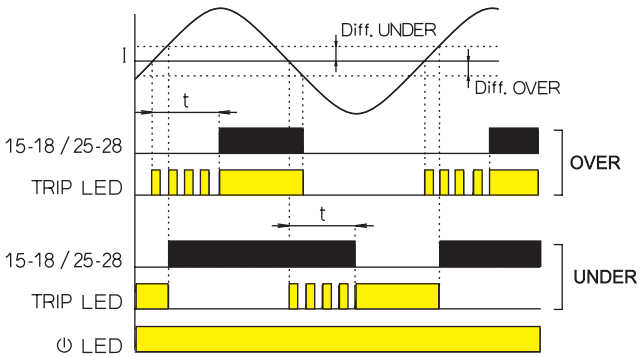


Functions

After the supply voltage is connected the green LED is on.

UNDER function:
If the strength of the monitored current in all phases exceeds the preset level I, the relay is triggered and the red LED is off. If the strength of the monitored current drops in any phase below the level I, the relay is disconnected after the preset delay timing elapses and the red LED goes on. The red LED flashes during the delay.
If the strength of the monitored current returns above the level I + difference, the relay is triggered without delay and the red LED goes off.

OVER function:
If the strength of the monitored current is lower in all phases than the preset level I, the relay is disconnected and the red LED is off.
If the strength of the monitored current exceeds in any phase the level I, the relay is triggered after the preset delay timing elapses and the red LED goes on. The red LED flashes during the delay.
If the strength of the monitored current again drops below the level I - difference, the relay is disconnected without delay and the red LED goes off.



Current monitoring relay **PRI-41, PRI-42**

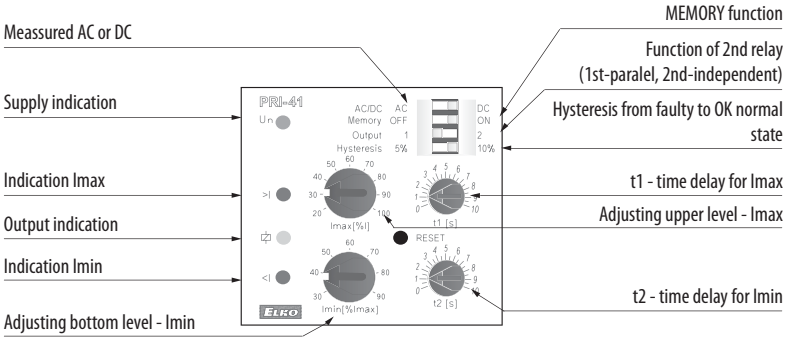
3M

EAN code
PRI-41/120V: 8595188140508
PRI-41/24V: 8595188140492
PRI-42/120V: 8595188140539
PRI-42/24V: 8595188140522

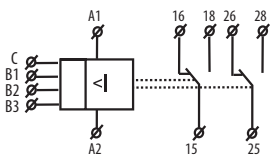
- To monitor overloading / discharge (machine, motor...), load sensing, diagnostics of remote device (interruption, short circuit, current cunsumption increase...)
- Monitors AC/DC 1-phase current in 3 ranges
- Monitoring adjusted current in 2 independent levels
- PRI-41: "HYSTERESIS" function and PRI-42: "WINDOW" function
- Function of 2nd relay (independent / parallel):
  "MEMORY" function - manual reset
  "RESET" button on the frontal panel
- Adjustable time delay for each level
- Galvanically separated supply
- 3-MODULE, DIN rail mounting

Technical parameters	PRI-41	PRI-42	
Supply circuit			
Supply terminals:	A1 - A2		
Voltage range:	AC 120 V or AC / DC 24 V (AC 50-60 Hz)		
Burden:	max. 4.5 VA		
Operating range:	-15 %; +10 %		
Measuring circuit			
Ranges:	4 - 16 A (AC 60Hz)	1.25 - 5 A (AC 60Hz)	0.4 - 1.6 A (AC 60Hz)
Terminals:	C - B1	C - B2	C - B3
Input resistance:	5 mΩ	11 mΩ	50 mΩ
Max. permanent current:	16 A	5 A	1.6 A
Inrush overload <1ms:	20 A	6.3 A	2 A
Time delay for Imax:	adjustable 0-10 sec		
Time delay for Imin:	adjustable 0-10 sec		
Accuracy			
Measuring accuracy:	5 %		
Repeat accuracy:	< 1 %		
Temperature dependancy:	< 0.1 % / °F (°C)		
Limit values tolerance:	5 %		
Hysteresis (fault to OK):	selectable 5 % / 10 %		
Output			
Number of contacts:	2x changeover / SPDT (AgNi / Silver Alloy)		
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC		
	Inductive load: 1 HP / 240 V, 1/2 HP / 120V		
Inrush current:	30 A / < 3 s		
Min. breaking capacity DC:	500 mW		
Output indication:	yellow LED		
Mechanical life:	$3x10^7$		
Electrical life resistive load:	$0.7x10^5$		
Other information			
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)		
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)		
Electrical strength:	4 kV (supply - output)		
Operating position:	any		
Mounting:	DIN rail EN 60715		
Protection degree:	IP 40 from front panel / IP20 terminals		
Overvoltage category:	III.		
Pollution degree:	2		
Max. cable size (mm^2):	solid wire max.1x 2.5 or 2x1.5, with sleeve max. 1x1.5 (AWG 12) (0.4 Nm)		
Dimensions:	3.5˝ x 2˝ x 2.6˝ (90 x 52 x 65 mm)		
Weight:	8.4 oz. (239 g)		
Standards:	EN 60255-6, EN 61010-1		

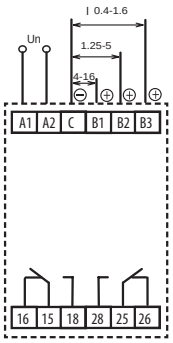
Description



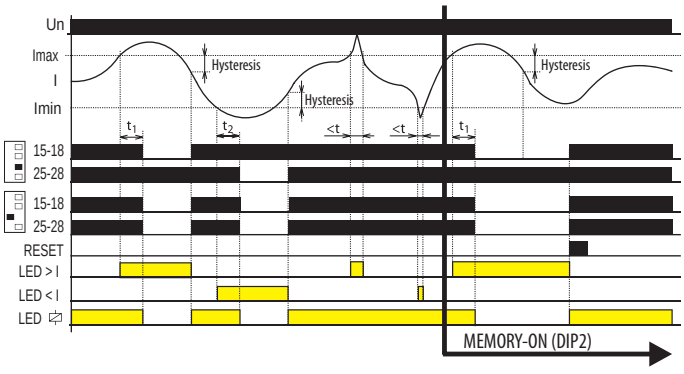
Symbol



Connection



Function



Relay is delivered in two versions - according to setting and level monitoring.
PRI-41 has function hysteresis, which means that you set only upper level (Imax) and lower level is set in % from upper level. Therefore when upper level is changed, lower level changes automatically.
PRI-42 has function "WINDOW", which means that you set upper level (Imax) and lower level (Imin) individually in % of rated monitored range.

Both types have selectable function MEMORY. In case the relay gets to faulty state, this function leaves relay in this state until it is reseted by RESET button. DIP switch No. 3 can be used to choose if output relay should switch for each level separatelly, or in parallel in case any current level is exceeded. DIP switch No. 4 serves to set hysteresis which applies when changing from faulty to normal state. Relay is protected against re-poling of DC current, or wrong AC/DC current (this fault is indicated by LED < I a LED > I common flashing).

Level switch **HRH-5**

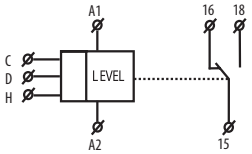
1M

EAN code
HRH-5: 8595188136396

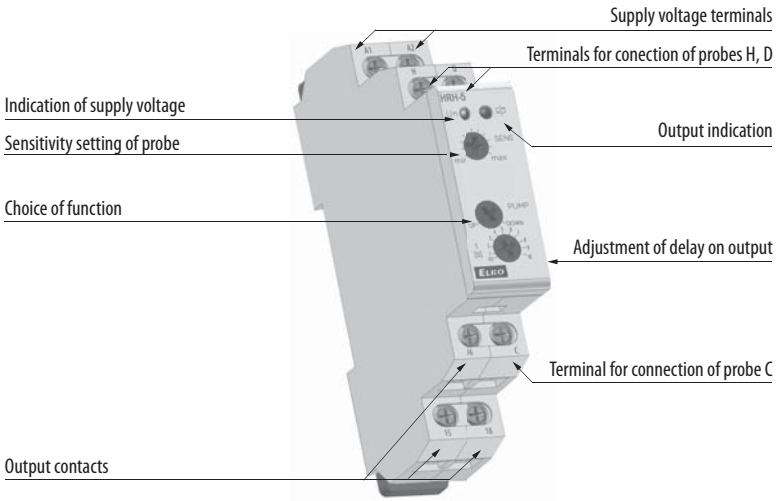
- Relay is designed for monitoring levels in wells, basins, reservoirs, tanks...
- In one device you can choose the following configurations:
  - one-level switch of conductive liquids (by connecting H and D)
  - two-level switch of conductive liquids
- One-state device monitors one level, two-state device monitors two levels (switches on one level and switches off on another level)
- Choice of function PUMP UP, PUMP DOWN
- Adjustable time delay on the output (0.5 - 10s)
- Sensitivity adjustable by a potentiometer (5-100kΩ)
- Measuring frequency 10Hz prevents polarization of liquid and raising oxidation of measuring probes
- Galvanically separated supply voltage UNI 24.. 240 VAC/DC
- 1-MODULE, mounting onto DIN rail

Technical parameters	HRH-5
Functions:	2
Supply terminals:	A1 - A2
Voltage range:	24... 240 V AC/ DC (AC 50-60 Hz)
Input:	max. 2 VA
Toleration of voltage range:	-15 %; +10 %
Measuring circuit	
Sensitivity (input resistance):	adjustable in range 5 kΩ -100 kΩ
Voltagen electrodes:	max. AC 3.5 V
Current in probes:	AC < 0.1 mA
Time response:	max. 400 ms
Max. capacity of probe cable:	800 nF (sensitivity 5kΩ), 100 nF (sensitivity 100 kΩ)
Time delay (t):	adjustable, 0.5 -10 sec
Time delay after switching on (t1):	1.5 sec
Accuracy	
Accuracy in setting (mechanical):	± 5 %
Output	
Number of contacts:	1x changeover / SPDT (AgNi / Silver Alloy)
Current rating:	Resistive load: 8 A / 240 V AC / 24 V DC Inductive load: 1/2 HP / 240 V, 1/4 HP / 120V
Min. switched output DC:	500 mW
Mechanical life resistive load:	$1x10^7$
Electrical life:	$1x10^5$
Other information	
Operational temperature:	-4 °F to 131 °F (-20 °C to 55 °C)
Storing temperature:	-22 °F to 158 °F (-30 °C to 70 °C)
Electrical strenght:	3.75 kV (supply - sensors)
Operational position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from font panel / IP 10 terminals
Overvltage category:	II.
Pollution degree:	2
Profile of connecting wires (mm^2):	max. 2x2.5, max.1x4, with sleeve max. 1x2.5, max.2x1.5 (AWG 12) (0.4 Nm)
Dimensions:	3.5˝ x 0.7˝ x 2.5˝ (90 x 17.6 x 64 mm)
Weight:	2.5 oz. (72 g)
Standards:	EN 60255-6, EN 61010-1
Recommended measuring probes:	see pg. 62

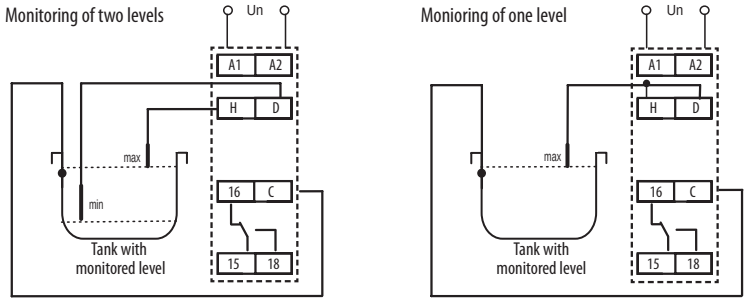
Symbol



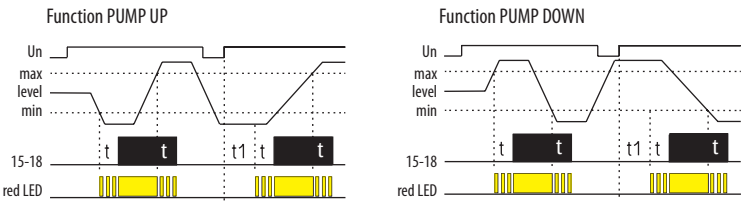
Device description



Connection



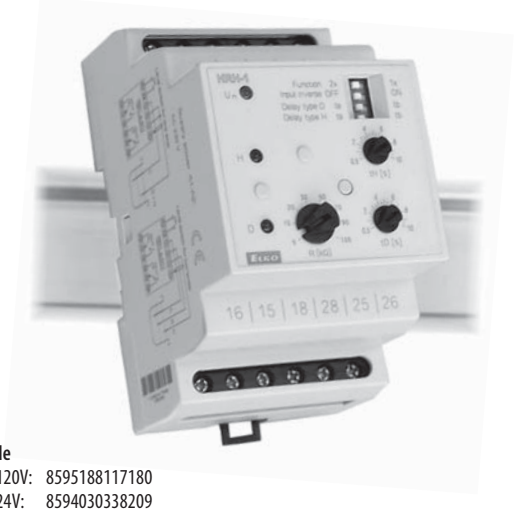
Function



Relay is designated for monitoring of levels of conductive liquids with possibility of functions: PUMP UP or PUMP DOWN. To prevent polarization and liquid electrolysis of liquid, and undesirable oxidation of measuring probes, alternating current is used. For measuring use three measuring probes: H- upper level, D- lower level, C - common probe. In case you use a tank made of a conductive material, you can use it as probe C. In case you require monitoring of one level only, it is neccessary to connect inputs H and D and connect them to one probe - in this case sensitivity is lowered by half (2.5... 50kΩ). Probe C can be connected with a protective wire of supply system (PE). To prevent undesirable switching out output contacts by various influences (sediment on probes, humidity...) it is possible to set sensitivity of the device according to conductivity of monitored liquid (corresponding to "resistance" of liquid) range 5 up to 100kΩ. To reduce infuences of undesirable switching of output contacts by liquid gorgle in tanks, it is possible to set delay of output reaction 0.5 - 10s.

Level switch **HRH-1**

3M

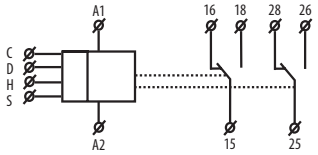


EAN code
HRH-1/120V: 8595188117180
HRH-1/24V: 8594030338209

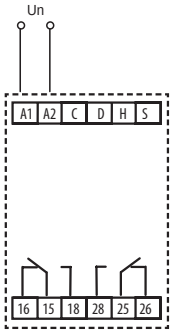
- Used to control the level in wells, reservoirs, tanks, pools, tankers, containers, etc.
- Within the framework of a single device, the following configurations can be selected (see functions graph):
  - two separate level switches
  - two probes in one tank
  - filling tank from well
- Single-state monitors one level (full or empty tank), double-state monitors two levels (switches on upon one level and switches off upon the second)
- DIP switch on front panel is used to choose function (see functions graph):
  - pumping in
  - pumping out
  - over-pumping
- Option of setting time delay for reacting to the output upon a change in level, any type of delay by DIP switch
- Sensitivity adjustable by potentiometer (probe resistance based on fluid)
- The measuring frequency 500 Hz prevents fluid polarization and oxidation increase of measured probes
- Galvanically separated supply AC 120 V or AC/DC 24 V
- 3-MODULE design, mounting onto DIN rail

Technical parameters	HRH-1
Function:	3
Supply terminals:	A1 - A2
Voltage range:	AC 120 V or AC/DC 24V galvanicaly separated (AC 50-60Hz)
Burden:	max. 4.5 VA
Supply voltage tolerance:	-15 %; +10 %
Measuring circuit	
Hysteresis (input - opening):	in an adjustable range 5 kΩ- 100 kΩ
Voltage on electrode:	max. AC 5 V
Current in probes:	AC < 1 mA
Time reaction:	max. 400 ms
Max. cable capacity:	4 nF
Time delay tD:	adjustable 0.5 -10 sec
Time delay tH:	adjustable 0.5 -10 sec
Accuracy	
Setting accuracy (mech.):	± 5 %
Output	
Number of contacts:	2x changeover / SPDT (AgNi / Silver Alloy)
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC Inductive load: 1 HP / 240 V, 1/2 HP / 120V
Inrush current:	30 A / < 3 s
Min. breaking capacity DC:	500 mW
Mechanical life:	$3x10^7$
Electrical life resistive load:	$0.7x10^5$
Other information	
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)
Electrical strength:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 20 terminals
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm^2):	solid wire max.1x 2.5 or 2x1.5, with cavern max. 1x1.5 (AWG 12) (0.4 Nm)
Dimensions:	3.5″ x 2″ x 2.6″ (90 x 52 x 65 mm)
Weight:	8 oz. (240 g)
Standards:	EN 60255-6, EN 61010-1
Measuring sensors:	see pg. 62

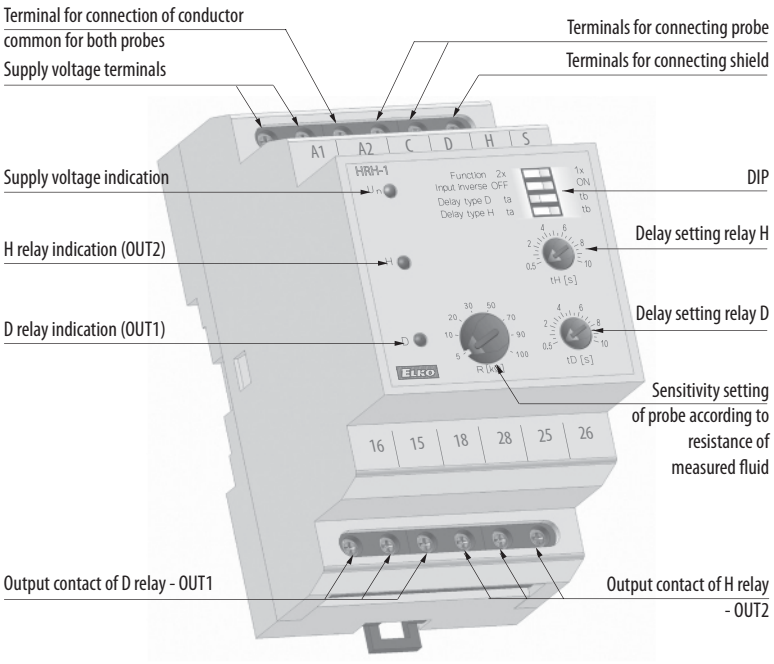
Symbol



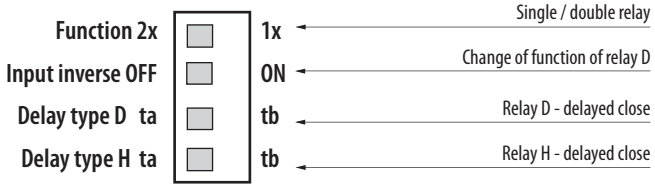
Connection



Description



Description and importance of DIP switches

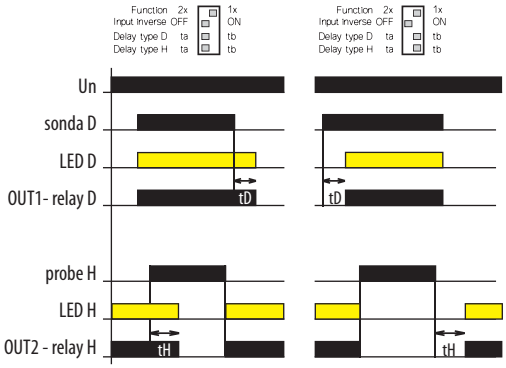


Measuring probes

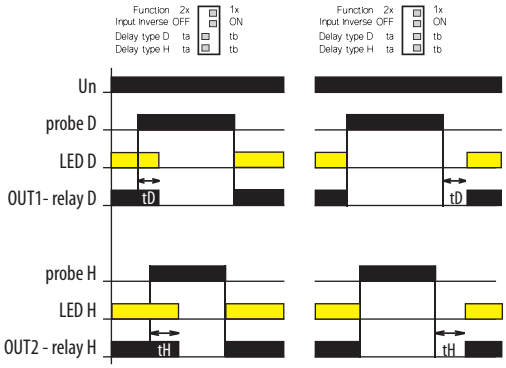
There can be any measuring probe (any conductive contact, it is recommended to use brass or stainless steel).
The probe wire does not need to be shielded, but it is recommended. When using a shielded wire, the shielding is connected to terminal S.

Functions

Two separate level switches

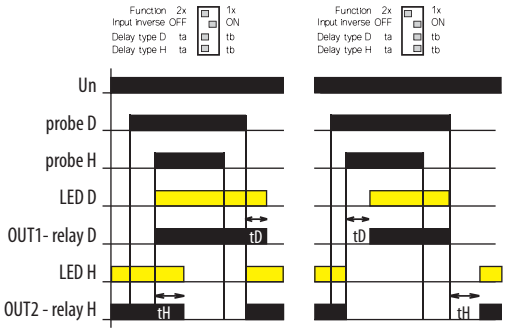


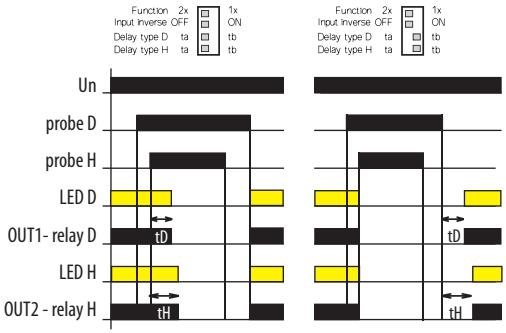
When the tank is empty relay D open, relay H is closed



When the tank is empty both relays are switched

Two probes in single tank

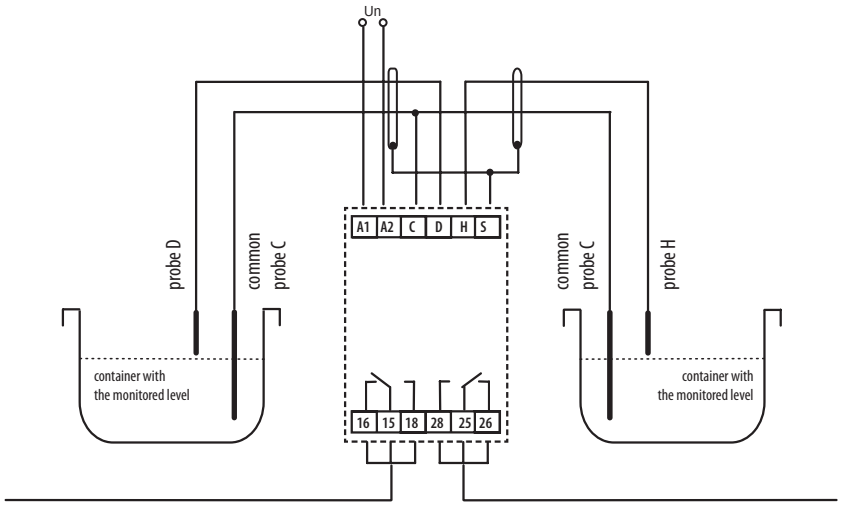




The relay, which is used to control the level liquids conductive (water, chemical solutions, food, etc.).
In this principle, it goes on about the measurement of liquids by measuring probes. As the measuring used signal is 5V AC/ 500Hz. Using an AC signal prevents the the increasing oxidation of probes and unwanted polarization and electrolysis liquid. During depending on the DIP settings configurations, switches can control two independent levels or use a combined function for one level (see diagram of functions).
The relay is equipped with regulation of the sensitivity to to liquid resistance. It's also possible to eliminate some of the unwanted switching in the sensitivity settings according to specific conditions (for example, pollution probe sediments, humidity, etc.). It's also possible for each probe to set the delay in the range of 0.5-10s, and using the DIP switch type delay (when you turn the relay on and off, depending on application).

Example of usage

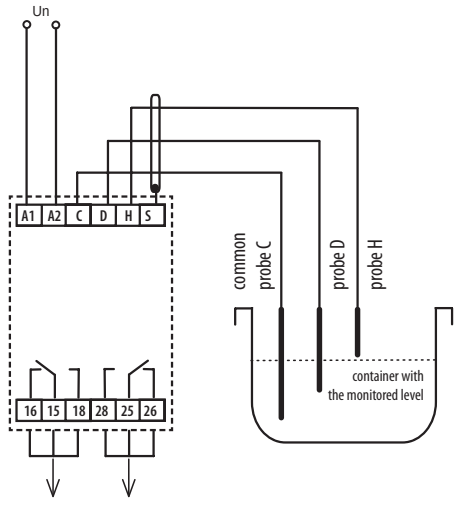
For controlling two independent tanks



Pump control or other output device

Pump control or other output device

For controlling the level combination of upper and bottom probe



Output relays for pump control or other output devices,
Selecting contacts is depending on the selected function

Note:
As a common probe, it could be used with an advantage such as metal pipes, tanks, etc.
Due to the isolation of probes from a supply voltage, and the measured voltage which is up to 5V, it is possible to connect probes using standard communication cables.

Level switch **HRH-7**

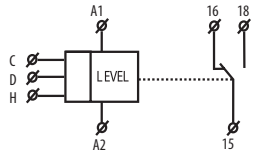
114x114
IP65

- Suitable to operate / work in harsh conditions due to the high degree of protection IP65
- Swich monitors the level changes in wells, reservoirs, tanks, tankers etc.
- It is possible to select the following configurations:
  - one-level switch of conductive liquids monitors one level (by connecting H and D)
  - two-level switch of conductive liquids monitors two levels (switches on at one level and switched off at another level)
- Choice of function PUMP-UP or PUMP-DOWN
- Adjustable time delay of output (0.5–10 s)
- Adjustable sensitivity using potentiometer (5–100 kΩ)
- Measuring frequency 10 Hz prevents liquid polarization and increased oxidation of measuring probes
- Measuring circuits are galvanically separated from the power source of the product and circuits of the relay contact by enhanced insulation according to EN 60664-1 for overvoltage category III.

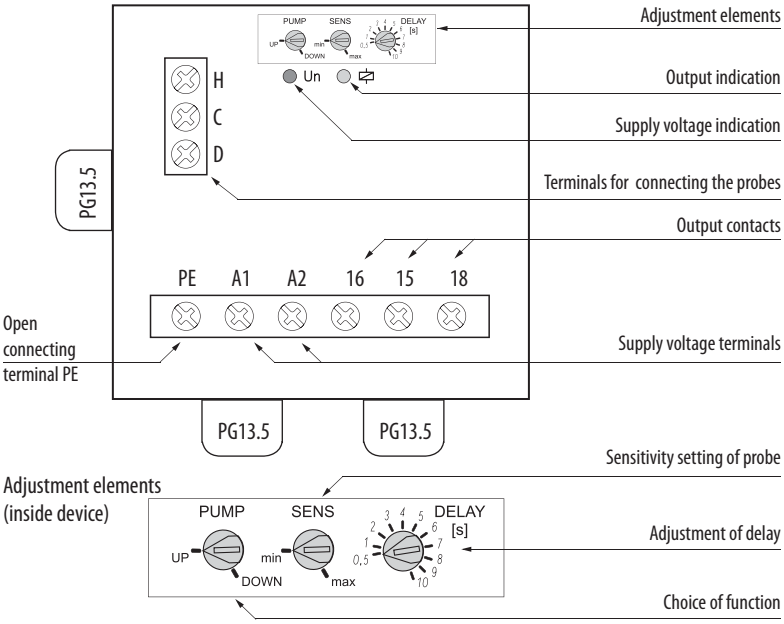
EAN code
HRH-7: 8595188149471

Technical parameters	HRH-7
Function:	2
Supply terminals:	A1 - A2
Supply voltage:	24... 240 V AC / DC (AC 50-60 Hz)
Burden:	max. 2 VA
Supply voltage tolerance:	-15 %; +10 %
Max. value of overcharge protection:	16 A
Measuring circuit	
Sensitivity (input resistance):	adjustable from 5 kΩ -100 kΩ
Voltage on electrodes:	max. AC 3.5 V
Current on probes:	AC < 0.1 mA
Time response:	max. 400 ms
Max. capacity of probe cable:	800 nF (sensitivity 5kΩ), 100 nF (sensitivity 100 kΩ)
Time delay (t):	adjustable, 0.5 -10 sec
Time delay (t1):	1.5 sec
Accuracy	
Setting accuracy (mechanical):	± 5 %
Output	
Number of contacts:	1x changeover / DPDT ($AgSnO_2$)
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC Inductive load: 1 HP / 240 V, 1/2 HP / 120V
Minimum switching capacity DC:	500 mW
Mechanical life:	$3x10^7$
Electrical life resistive load:	$0.7x10^5$
Other information	
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)
Electrical strength:	3.75 kV (supply - sensor)
Operating position:	any
Protection:	IP65
Overvoltage category:	III.
Contamination degree:	2
Cable size (mm^2):	max.1x 4, max.2x2.5 / with sleeve max. 1x2.5, 2x1.5 (AWG 12) (0.4 Nm)
Dimension:	4.5″ x 4.5″ x 2.2″ (114 x 114 x 56 mm)
Weight:	8.3 oz. (234 g)
Related standards:	EN 60255-6, EN 61010-1
Recommended measuring probes:	see pg. 62

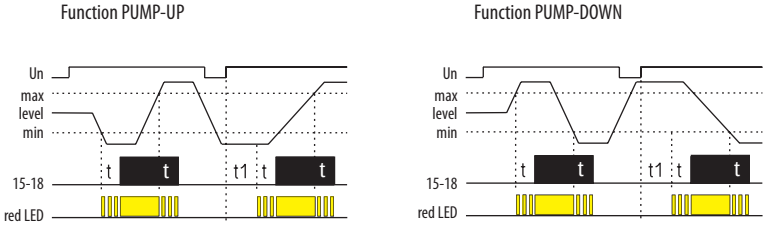
Symbol



Device description



Function



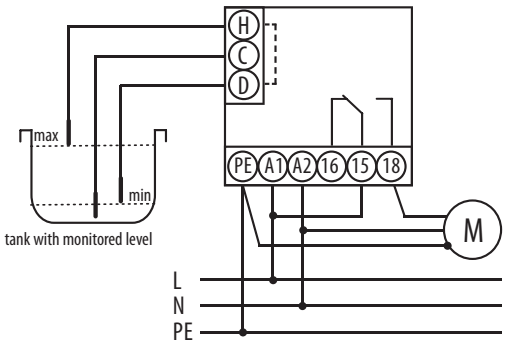
An AC current is used for measuring to prevent polarization and electrolysis of fluid and unwanted oxidation of measuring probes. Three probes are used for measuring: H - upper level, D - lower level and C - common probe. If using a tank made from conductive material, it is possible to use the tank itself as probe C.

If it is necessary to monitor only one level, there are two connection options:
1. Inputs H and D are connected to a single probe - in this case the sensitivity is decreased to half (2.5... 50kΩ).
2. Inputs H and C are connected and the probe is connected to input D - in this case, the original sensitivity remains (5... 100kΩ).

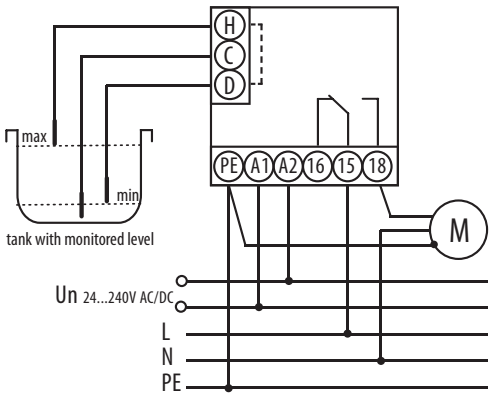
It is also possible to connect probe C with a protective conductor of the power system (PE).

Connection

connection for power supply 120V AC

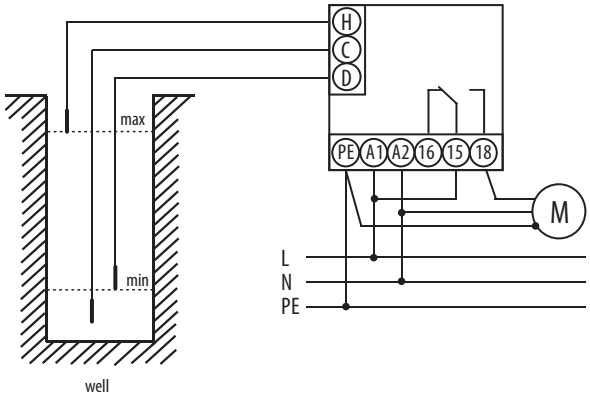


connection for power supply 24 ... 240V AC/DC



Example of connecting the level switch to a 1-phase pump at a well, borehole

wiring for supply 120 V AC (for monitoring two levels)



Monitoring TWO LEVELS of the FLUID LEVEL minimum / maximum– DRAINING function – (PUMP DOWN)

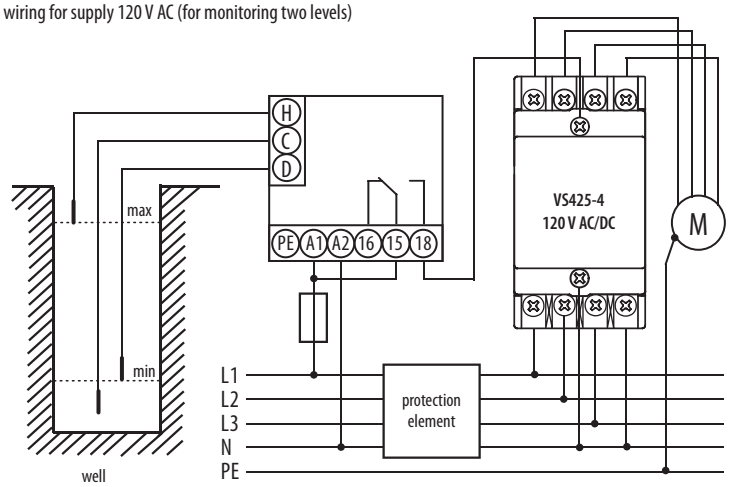
Description of draining function:
This function is used in a well or borehole where the difference between the upper and lower probes determines how much water the pump can pump out and protect against running dry.
After detecting the maximum level, the set reaction delay begins running. After this period, the output contact immediately switches on the pump until the minimum level is reached, when the set delay begins running once again. The pump then switches off.

Monitoring TWO LEVELS minimum / maximum– REPLENISHING function – (PUMP UP)

Description of replenishing function:
This function is used when you need to regularly pump in water to a well or borehole, which is leaking.
After detecting the minimum level, the set reaction delay begins running. After this period, the output contact immediately switches on the pump for the period until it reaches the maximum level, where the set delay begins running once again. The pump then switches off.

Example of connecting the level switch to a 3-phase pump at the well, borehole

wiring for supply 120 V AC (for monitoring two levels)



Monitoring TWO LEVELS minimum / maximum– DRAINING function – (PUMP DOWN)

Description of draining function:
The function is used to protect against overflows and flooding of areas.
After detecting the maximum level, the set reaction delay begins running. After this period, the output contact immediately switches on the 3-phase pump until the minimum level is reached, when the set delay begins running once again. The pump then switches off.

Level switches accessories - Level sensors **SHR**

EAN code
SHR-1-M: 8595188110105
SHR-1-N: 8595188111379

SHR-1-M: brass sensor
SHR-1-N: stainless steel sensor

- Sensor to control flooding
- Electrode with diametr 0.2" (4 mm) is placed in plastic cover
- Panel or to holder mounting
- Conductor is connected to terminal board, shrink bushing for feeder place insulation is a part of device
- Max. wire profile: 2.5 mm^2 (AWG10)
- Installation: after connecting a wire to the sensor, run the shrink bushing over the wire onto the sensor.
- Heat the sensor and by shrinking the connection of sensor and wire will be hermetical
- Weight: 0.3 oz. (9.7 g)
- Operating temperature: -13 °F to 140 °F (-25 °C to 60 °C)
- Total sensor lenght: 2.58 " (65.5mm)

EAN code
SHR-2: 8595188111263

Level probe SHR-2

- Detection sensor is electrode, which in connection with switchable device is used for level detection for example in wells, tanks...
- To be ued in electric conductive fluids and mechanically polluted fluids with temperature: 33.8 °F to 176°F (1 °C to 80 °C)
- Stainless steel one-pole electrode reside in PVC cover, intended for tank wall mounting or mounting by socket
- To ensure corret function of the sensor, it is necessary to have the electrode without dirt which could disable the connection of the electrode and fluid and thus lead to malfunction
- Max. wire profile: 2.5 mm^2 (AWG10)
- Recomended wire D05V-K0.75/3.2
- Installation:
  - conductor wire is connected by feazing of two brass screws to stainless steel electrode
  - conductor is caulked by bushing Pg7 with protection degree IP68
- Weight: 1.7 oz. (48.6 g)
- Dimensions: max. diameter 0.8" (21 mm), lenght 3.8" (96 mm)

SHR-2 in open state

EAN code
SHR-3: 8595188111270

Level probe SHR-3

- Stainless probe to be used into demanding industrial environments, designated for screwing into tank wall or cover
- The probe is installed in horisontal, vertical or in sidelong position on tank side or in tank cover. Installation is done by soldering or by fixing nut. It is necessary to use 1" (24 mm) screw. It is necessary to use an adequate torque with regards to a seal and operational overpressure in a tank.
- Sensor has connecting wire - lenght 39.4" (3 m), which is connected to sensor to scan electrode and sensor bushing connecting wire is double-wire PVC AWG 18 (0.75 mm^2), connection of wires: brown - scan electrode, blue - sensor bushing.
- Connection M18x1.5 screw
- Protection degree IP 67
- Sensor weight without cable: 3.3 oz. (100 g)
- Operating surroundings: place without the danger of detonation, temperature on screw: max. 203 °F (95°C)
- Pressure immunity: on 77 °F (25 °C) 4 MPa, on 203 °F (95°C) 1.5 MPa
- Weight: 8.4 oz. (239 g)
- Material: bushing and sean electrode: stainless steel W.Nr. 1.4301, insulation insert of electrode: PTFE
- Internal material: self - extinguishing epoxide resin
- Operating temperature: -13 °F to 140 °F (-25 °C to 60 °C)
- Total sensor lenght: 2.58 " (65.5mm)
- Dimensions: see pg 85

Thermostats and hygrostats

Analog

TER

1M

TER-3A
-22 °F to 50 °F
(-30 to 10 °C)
external NTC

TER-3B
32 °F to 104 °F
(0 °C to 40 °C)
external NTC

TER-3C
86 °F to 158 °F
(30 °C to 70 °C)
external NTC

TER-3D
32 °F to 140 °F
(0 °C to 60 °C)
external NTC

TER-3E
32 °F to 140 °F
(0 °C to 60 °C)
external NTC

TER-3F
32 °F to 140 °F
(0 °C to 60 °C)
in-built NTC

TER-3G
32 °F to 140 °F
(0 °C to 60 °C)
external PT100

TER-3H
5 °F to 113 °F
(-15 °C to 45 °C)
external NTC

3M

TER-4
Wide and accurate range of setting -40 °F to 230 °F (-40 to 110 °C) in ten ranges in one device, fine temperature setting. 2 inputs for NTC senzor, 2 outputs 15 A changeover / SPDT, additional function (memory, hysteresis, indication of faulty sensor). Supply: AC/DC 24 V (galv. separated).

1M

TER-7
Monitoring heating of motor winding in range given by resistance of in-built PTC thermistor (1.8-3.3 kΩ), additional function (memory, reset), output contact 2x 8A changeover / DPDT, supply: AC/ DC 24-240 V.

Digital

TER

2M

TER-9 Digital
2 temperature inputs, 2 outputs 8A changeover / SPDT, 6 functions, in-built time switch clock, LCD with back light, galvanically sep. supply voltage AC 120 V or AC/DC 24V, 2 MODULE. Temperature range: -40 to 230 °F (-40 °C to 110 °C).

Thermovalve

ATV-1
Energy-saving digital thermostat for radiators, with temperature range 46.. 82°F (8..28°C).

Hygro-thermostat

1M

RHT-1
Hygro-thermostat for temperature monitoring and regulation in range 32 to 140 °F (0 to 60 °C) and relative humidity monitoring and regulation in range 50...90%.

Accessories

TC, TZ , PT-100
External temperature sensors for thermostats in lengths 9.8´ (3m), 19.7´ (6m), 39.4´(12m)
TC/TZ: thermistor NTC 12 kΩ / 77°F (25°C)
PT: element PT-100 (only TER-3G).

Overview table

Type	Design	Type		Sensor			Supply				Temperature range	Hysteresis	Relative humidity	Designation	Page of catalogue
		Analog	Digital	In-built	External	Type	AC 230V	AC 24V	AC/DC 24 ..240V	Galv. separated					
TER-3A	1M-DIN	●	x	x	●	NTC	x	x	●	x	-22 °F to 50 °F (-30 to 10 °C)	32.9 to 41 °F (0.5 to 5 °C)	x	single thermostat into a switchboard with external sensor for temperature in cooling and against freezing	65
TER-3B	1M-DIN	●	x	x	●	NTC	x	x	●	x	32 °F to 104 °F (0 to 40 °C)	32.9 to 41 °F (0.5 to 5 °C)	x	single thermostat into a switchboards with external sensor for sensing room and operational temperature	
TER-3C	1M-DIN	●	x	x	●	NTC	x	x	●	x	86 °F to 158 °F (30 to 70 °C)	32.9 to 41 °F (0.5 to 5 °C)	x	single thermostat into a switchboards with external sensor for sensing temperature in devices (overheating...)	
TER-3D	1M-DIN	●	x	x	●	NTC	x	x	●	x	32 °F to 140 °F (0 to +60 °C)	32.9 to 41 °F (0.5 to 5 °C)	x	single thermostat into a switchboard with external sensor for sensing operational temperature of machines and devices	
TER-3E	1M-DIN	●	x	x	●	NTC	x	x	●	x	32 °F to 140 °F (0 to 60 °C))	34 °F (1 °C)	x	as TER-3D but with fixed hysteresis	66
TER-3F	1M-DIN	●	x	●	x	NTC	x	x	●	x	32 °F to 140 °F (0 to 60 °C)	34 °F (1 °C)	x	single thermostat into a switchboard with in-built sensor, monitors operational temperature in a switchboard	
TER-3G	1M-DIN	●	x	x	●	PT100	x	x	●	x	32 °F to 140 °F (0 to 60 °C)	32.9 to 41 °F (0.5 to 5 °C)	x	as TER-3D but with input for sensor PT100	65
TER-3H	1M-DIN	●	x	x	●	NTC	x	x	●	x	5 °F to 113 °F (-15 to 45 °C)	32.9 to 41 °F (0.5 to 5 °C)	x	as TER-3A but with a different temperature range - for cooling and heating	
TER-4	3M-DIN	●	x	x	● (2x)	NTC	●	●	x	●	-40 °F to 230 °F (-40 to 110 °C)	32.9 to 37 °F (0.5 to 2.5 °C)	x	two-state thermostat (2 inputs, 2 outputs), two independent or dependent thermostats, accurate setting, wide temperature range	67
TER-9	2M-DIN	x	●	x	● (2x)	NTC	●	●	x	●	-40 °F to 230 °F (-40 to 110 °C)	32.9 to 41 °F (0.5 to 5 °C)	x	multifunction (6 thermo functions) digital thermostat with in-built time switch clock, 2 inputs / 2 outputs	68
TER-7	1M-DIN	●	x	x	●	PTC	x	x	●	x	x	Resistance 1.8 - 3.3 kΩ	x	thermistor relay for protection of motor overheating, input designated for sensor PTC in-built in motor winding	70
ATV-1	valve	x	●	●	x	built -in	x	x	x	x	46.4°F to 82.4°F (8 to 28 °C)	x	x	thermostatic direction valves, temperature regulation 46.4°F to 82.4°F (8..28°C)	71
RHT-1	1M-DIN	●	x	●	x	built -in	x	x	●	x	32 °F to 140 °F (0 to 60 °C)	H - 4 % T- 36.5 °F (2.5 °C)	50.. 90%	hygro-thermostat for temperature monitoring and regulation in range 32 to 140 °F (0 °C to 60 °C) and relative humidity in range 50.. 90%	72

Thermostats range **TER-3 (A, B, C, D, G, H)**

1M

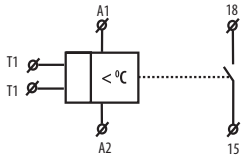
EAN code

TER-3A: 8595188138390
TER-3B: 8595188138406
TER-3C: 8595188138413
TER-3D: 8595188138420
TER-3G: 8595188138451
TER-3H: 8595188138468

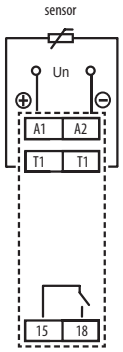
- Single thermostat for temperature monitoring and regulation in range -22 °F to 158 °F (-30 °C to 70 °C) in six ranges
- It can be used for monitoring temperature e.g. in switchboards, heating systems, cooling systems, liquids, radiators, motors, devices, open spaces, etc.
- Function of short-circuit or sensor disconnection monitoring
- Possibility to set function "heating" / "cooling" (setting is done by DIP switch)
- Adjustable hysteresis (sensitivity), switching by potentiometer in range 32.9 to 41 °F (0.5 to 5°C)
- Choice of external temperature sensors with double insulation in standard lengths 9.8´,19.7´ and 39.4´ (3, 6 and 12 m)
- It is possible to place sensor directly on terminal block - for temperature monitoring in a switchboard or in its surroundings
- Multivoltage supply AC/DC 24 -240 V, not galvanically separated
- Red LED indicates status of output, green LED indicates energization of the device
- 1-MODULE, DIN rail mounting

Technical parameters	TER-3
Function:	single level
Supply terminals:	A1-A2
Voltage range:	AC/DC 24 - 240V (galvanically unseparated) (AC 50-60Hz)
Burden:	2 VA
Operating range:	- 15 %; + 10 %
Measuring circuit	
Measuring terminals:	T1 - T1
Temperature range: (according to product type sensitivity)	TER-3A -22 °F to 50 °F (-30 °C to 10 °C); TER-3B 32 °F to 104 °F (0 °C to 40 °C); TER-3C 86 °F to 158 °F (30 °C to 70 °C); TER-3D 32 °F to 140 °F (0 °C to 60 °C); TER-3G 32 °F to 140 °F (0 °C to 60 °C); TER-3H 5 °F to 113 °F (-15 °C to 45 °C)
Hysteresis:	ajustable in range 32.9 to 41 °F (0.5 to 5°C)
Sensor:	external, thermistor NTC, except for TER-3G (Pt100)
Sensor fault indication (short circuit/disconnect):	flashing red LED
Accuracy	
Setting accuracy (mech.):	5 %
Switching difference:	32.9 °F (0.5 °C)
Temperature dependance:	< 0.1 % / °F (°C)
Output	
Number of contacts:	1x NO-SPST ($AgSnO_2$)
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC; Inductive load: 1 HP / 240 V, 1/2 HP / 120V
Min. breaking capacity DC:	500 mW
Output indication:	red LED
Mechanical life:	$3x10^7$
Electrical life resistive load:	$0.7x10^5$
Other information	
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)
Electrical strength:	2.5 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 10 terminals
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm^2):	solid wire max. 2x 2.5 or 1x4, with sleeve max. 1x2.5 or 2x 1.5 (AWG 12) (0.4 Nm)
Dimensions:	3.5˝ x 0.7˝ x 2.5˝ (90 x 17.6 x 64 mm)
Weight:	2.6 oz. (73 g)
Standards:	EN 60730-2-9, EN 61010-1

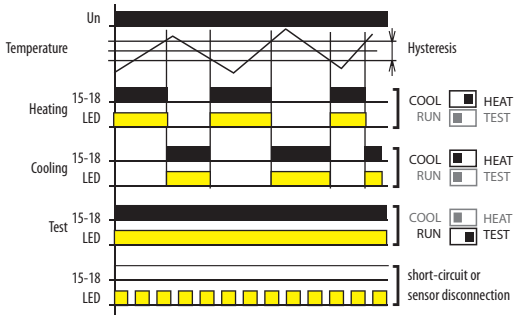
Symbol



Connection

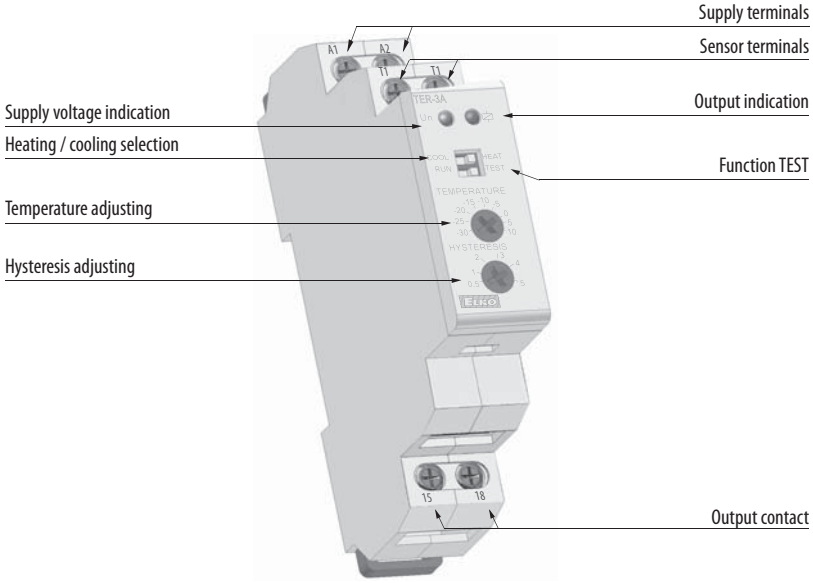


Function



It is a single but practical thermostat with separated sensor for monitoring temperature. Device is placed in a switchboard and external sensor senses temperature of required space, object, or liquid. Supply is not galvanically separated from sensor. Sensor is double insulated. Maximal length of delivered sensor is 39.4´ (12m). Device has in-built indication of sensor damage, which means that in case of short-circuit or disconnection red LED flashes. Thanks to adjustable hysteresis, it is advantageous to regulate width of the range and thus define sensitivity of load switching. Sensed temperature is decreased by set hysteresis. When installing it is necessary to keep in mind that hysteresis is increased by temperature gradient between sensor's jacket and thermistor.

Description



Example of an order

Please specify a type of thermostat in your order (TER-3A, TER-3B .. or TER-3H) types differ in temperature range and supply voltage.

Thermostats range **TER-3 (E, F)**

1M

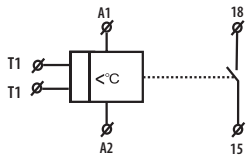
- Single thermostat for temperature monitoring and regulation in range 32 °F to 140 °F (0 to 60 °C)
- It can be used for temperature monitoring e.g. in switchboards, heating systems, liquids, radiators, motors, devices, open spaces, etc.
- Fixed hysteresis at 34 °F (1 °C)
- TER-3E - choice of external temperature sensors with double insulation in standard lengths 9.8´, 19.7´ and 39.4´ (3, 6 and 12 m)
- TER-3F - sensor is a part of device, serves for monitoring temperature in a switchboard
- Supply voltage AC /DC 24 - 240 V
- Output status is indicated by red LED
- 1-MODULE, DIN rail mounting

EAN code

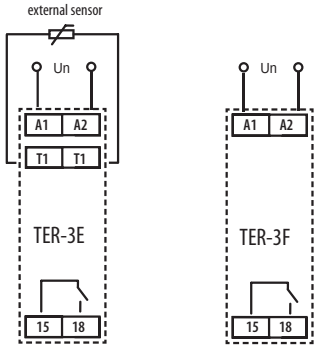
TER-3E:	8595188138437
TER-3F:	8595188138444

Technical parameters	TER-3E	TER-3F
Function:	single level	
Supply terminals:	A1-A2	
Voltage range:	AC /DC 24 - 240 V (AC 50-60Hz)	
Burden:	2 VA	
Operating range:	- 15 %; +10 %	
Measuring circuit		
Measuring terminals:	T1 - T1	x
Temperature range:	32 °F to 140 °F (0 to 60 °C)	
Hysteresis:	fixed 34 °F (1 °C)	
Sensor:	thermistor NTC	in-built
Sensor fault indic. (short-circuit / disconnection):	flashing red LED	
Accuracy		
Setting accuracy (mech.):	5%	
Switching difference:	32.9 °F (0.5 °C)	
Temperature dependance:	< 0.1 % / °F (°C)	
Output		
Number of contacts:	1x NO- SPST ($AgSnO_2$)	
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC	
	Inductive load: 1 HP / 240 V, 1/2 HP / 120V	
Min. breaking capacity DC:	500mW	
Output indication:	red LED	
Mechanical life:	$3x10^7$	
Electrical life resistive load:	$0.7x10^5$	
Other information		
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)	
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)	
Electrical strength:	2.5 kV (supply - output)	
Operating position:	any	
Mounting:	DIN rail EN 60715	
Protection degree:	IP 40 from front panel / IP 10 terminals	
Overvoltage category:	III.	
Pollution degree:	2	
Max. cable size (mm^2):	solid wire max. 2x 2.5 or 1x4, with sleeve max. 1x2.5 or 2x 1.5 (AWG 12) (0.4 Nm)	
Dimensions:	3.5˝ x 0.7˝ x 2.5˝ (90 x 17.6 x 64 mm)	
Weight:	2.58 oz. (73 g)	2.61 oz. (74 g)
Standards:	EN 60730-2-9, EN 61010-1	

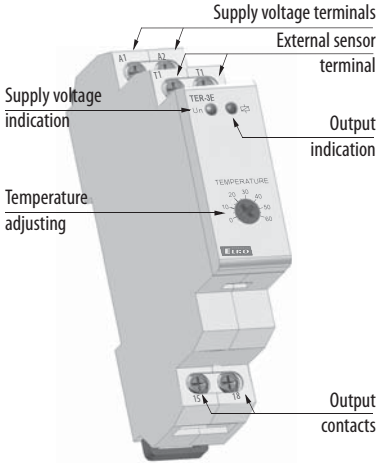
Symbol

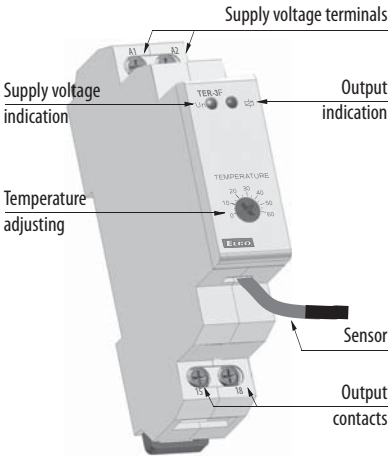


Connection



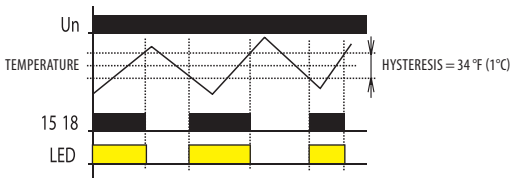
Description





Function

TER-3E, TER-3F



Example of an order

Please specify a type of thermostat in your order (TER-3E , TER-3F).

It is a single thermostat for temperature monitoring with separated sensor (except for TER-3F). Device is located in a switchboard and external sensor senses temperature of required space, object or liquid. Supply is not galvanically separated from sensor but sensor is double insulated. Maximal length of sensor cable is 39.4´ (12 m). Temperature sensing is decreased by set hysteresis. When installing it is necessary to keep in mind that hysteresis is increased by temperature gradient between sensor's jacket and thermistor.

2-stage thermostat **TER-4**

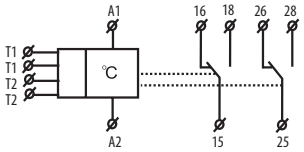
3M

EAN code
TER-4 /24V: 8594030338148

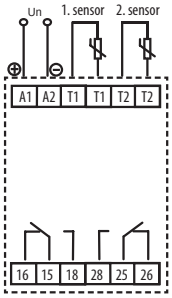
- Two-state thermostat for temperature monitoring and regulation in a wide range -40 °F to 230 °F (-40 °C to 110 °C) with a switch for temperature ranges shift and fine temperature setting (high accuracy of setting)
- It can be used for temperature monitoring in e.g. switchboards, heating systems, cooling systems, open spaces, objects, liquids, radiators, etc.
- 2 thermo inputs for sensor NTC 12 kΩ / 77 °F (25 °C)
- Possibility to choose if both thermostats should work independently or dependently (by DIP switch)
- Function of short-circuit or sensor disconnection monitoring
- Possibility to set functions "heating" / "cooling" (setting is done by DIP switch)
- Adjustable hysteresis (sensitivity) of switching 32.9 or 37 °F (0.5 or 2.5 °C) (DIP switch)
- Choice of external thermo sensors with double insulation in standard lengths 9.8´,19.7´ and 39.4´ (3, 6 and 12 m)
- It is possible to place the sensor directly on terminal block – to monitor temperature in a switchboard or in its surroundings
- Galvanically separated supply AC/DC 24 V
- Output status indicated by red LED, faulty status of sensor by yellow LED
- 3-MODULE, DIN rail mounting

Technical parameters	TER-4	
Function:	double thermostat	
Supply terminals:	A1-A2	
Voltage range:	AC/DC 24V galvanically separated	
Burden:	max. 4.5 VA	
Supply voltage tolerance:	- 15 %; + 10 %	
Measuring circuit		
Measuring terminals:	T1-T1 and T2-T2	
Temperatue ranges (set via switch individually for each level):	-40 to 77 °F (-40 to -25 °C) 77 to 50 °F (-25 to -10 °C) 50 to 41 °F (-10 to 5 °C) 41 to 70 °F (5 to20 °C) 70 to 95 °F (20 to 35 °C)	95 to 122 °F (35 to 50 °C) 122 to 149 °F (50 to 65 °C) 149 to 176 °F (65 to 80 °C) 176 to 203 °F (80 to 95 °C) 203 to 230 °F (95 to 110 °C)
Fine temperature setting:	32-59 °F (0-15 °C), in selected range	
Hysteresis for T1:	adjustable, 32.9 or 37 °F (0.5 or 2.5 °C) (DIP switch)	
Hysteresis for T2:	adjustable, 32.9 or 37 °F (0.5 or 2.5 °C) (DIP switch)	
Sensor:	thermistor NTC 12 kΩ / 77 °F (25 °C)	
Sensor failure indication:	yellow LED	
Accuracy		
Setting accuracy (mech.):	5 %	
Repeat accuracy:	32.9 °F (0.5 °C)	
Temperature dependance:	< 0.1 % / °F (°C)	
Output		
Number of contacts:	2x changeover / SPDT (AgNI / Silver Alloy)	
Current rating:	Resistive load: 15 A / 240 V AC / 24 V DC Inductive load: 1 HP / 240 V, 1/2 HP / 120V	
Inrush current:	30 A /< 3 s	
Min. breaking capacity DC:	500mW	
Output indication:	red LED	
Mechanical life:	$3x10^7$	
Electrical life resistive load:	$0.7x10^5$	
Other information		
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)	
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)	
Electrical strength:	4 kV (supply - output)	
Operating position:	any	
Mounting:	DIN rail EN 60715	
Protection degree:	IP 40 from front panel / IP 20 terminals	
Overvoltage category:	III.	
Pollution degree:	2	
Max. cable size (mm^2):	solid wire max.1x 2.5 or 2x1.5, with sleeve max. 1x1.5 (AWG 12) (0.4 Nm)	
Dimensions:	3.5˝ x 2˝ x 2.6˝ (90 x 52 x 65 mm)	
Weight:	8.4 oz. (238 g)	
Standards:	EN 60730-2-9, EN 61010-1	

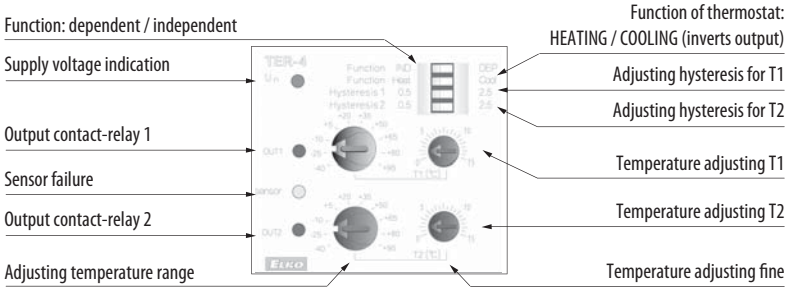
Symbol



Connection

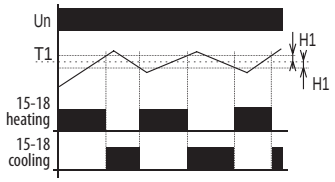


Description

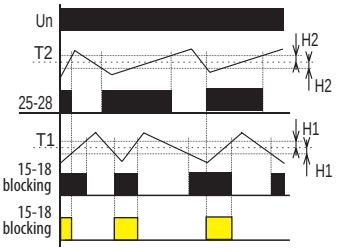


Function

Independent function



Dependent function



Blocking function:
When DIP switch 4 is in position ON, condition for thermostat switching is switching output 15-18 at both individual thermostats (series function). Thus it is possible to use e.g. first thermostat as operational and the other as an emergency one. Output 25-28 operates normally, according to T2.

This device includes 2 thermostats in one. Thermostat has 2 thermo inputs, 2 outputs and individual temperature setting. It offers two possibilities of use. Firstly it can be used as two individual thermostats (e.g. for monitoring two temperature levels of one device or as a control of individual devices), secondly it is possible to set depending function of both thermostats, when thermostat 2 blocks thermostat No.1 Advantage of this thermostats is a wide temperature range -40.. 230 °F (- 40.. 110 °C) (in one device) with very good mechanical accuracy of setting. It is due to 10-state switch for thermo ranges and its scale by 59 °F (15 °C). VIt is possible to use fine tuning by potentiometer by 32-59 °F (0-15 °C) with accuracy ± 34 °F (1 °C). Device has in-built control of sensor fault (yellow LED). It is possible to set hysteresis 32.9 or 37 °F (0.5 or 2.5 °C).
It is possible to operate the thermostat only with one sensor. In that case it is necessary to connect a resistor 10 kΩ to the other input. This is included in the package.

Chart information:
Un –supply voltage
T1 –set temperature of thermostat 1
T2 –set temperature of thermostat 2
H1 –set hysteresis of thermostat 1
H2 –set hysteresis of thermostat 2
15-18 output contact of thermostat 1
25-28 output contact of thermostat 2

Multifunction digital thermostat **TER-9**

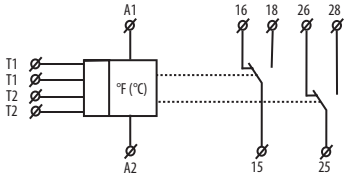
2M

EAN code
TER-9 /120V: 8595188155632
TER-9 /24V: 8595188129190

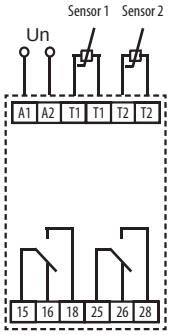
- Digital thermostat with 6 functions and built-in time switch clock with day, week and year program. You can also limit temperature functions and courses this way in real time.
- Complex control of home and water heating, solar heating, etc.
- Two thermostats in one, two temperature inputs, two outputs with dry contact
- Maximum universal and variable thermostat including all ordinary thermostat functions
- Functions: two independent thermostats, dependent thermostat, differential thermostat, two level thermostat, zone-based thermostat, dead zone thermostat
- Program setting of output functions, calibration of sensors according to reference temperature (offset)
- The thermostat is subject to the digital clock programs
- Wide operating range of temperature settings, the possibility of measuring in °F and °C
- Clear display of set and measured data on a backlit LCD
- Power supply: AC 120 V or 24V AC/DC (based on type of device)
- The time switch clock has a battery backup, which retains data in case of a power outage (reserve backup time - up to 3 years)
- Easy replacement of the backup battery through the plug-in module, no disassembling is required
- 2-MODULE, DIN rail mounting

Technical parameters	TER-9
Supply	
Number of function:	6
Supply terminals:	A1 - A2
Voltage range:	AC 120 V or AC/DC 24V (AC 50-60Hz) galvanically unseparated
Burden:	max. 4 VA
Operating range:	-15 %; +10 %
Type backup battery:	CR 2032 (3V)
Measuring circuit	
Measuring terminals:	T1-T1 and T2-T2
Temperature range:	-40.. 230 °F (-40.. 110 °C)
Hysteresis (sensitivity):	in an adjustable range 32.9.. 41 °F (0.5.. 5 °C)
Diference temperature:	adjustable 34..122 °F (1.. 50 °C)
Sensor:	thermistor NTC 12 kΩ at 77 °F (25 °C)
Sensor failure indication:	displayed on the LCD
Accuracy	
Measuring accuracy:	5 %
Repeat accuracy:	< 32 °F (0.5 °C)
Temperature dependance:	< 0.1 % / °F (°C)
Output	
Number of contacts:	2x changeover for each output / SPDT, (AgNi)
Current rating:	Resistive load: 8 A / 240 V AC / 24 V DC Inductive load: 1/2 HP / 240 V, 1/4 HP / 120V
Output indication:	symbol ON/OFF
Mechanical life:	$1x10^7$
Electrical life resistive load:	$1x10^5$
Time circuit	
Power back-up:	up to 3 year
Accuracy:	max. ±1 s per day, at 73.4 °F (23°C)
Min. switching interval:	1 min
Data stored for:	min. 10 years
Program circuit	
Number of memory places:	100
Program:	daily, weekly, yearly
Data readout:	LCD display, with back light
Other information	
Operating temperature:	14 °F to 131 °F (-10 °C to 55 °C)
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)
Electrical strength:	4 kV (power supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 20 terminals, IP 40 from front panel
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm^2):	solid wire max.1x 2.5 or 2x1.5, with sleeve max. 1x2.5 (AWG 12) (0.4 Nm)
Dimensions:	3.5˝ x 1.4˝ x 2.5˝ (90 x 35.6 x 64 mm)
Weight:	4.2 oz. (120 g)
Standards:	EN 61812-1; EN 61010-1; EN 60730-2-9; EN 60730-1; EN 60730-2-7

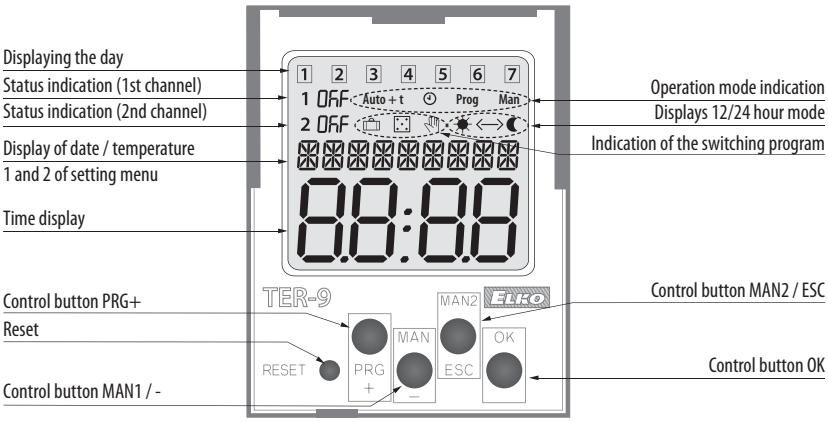
Symbol



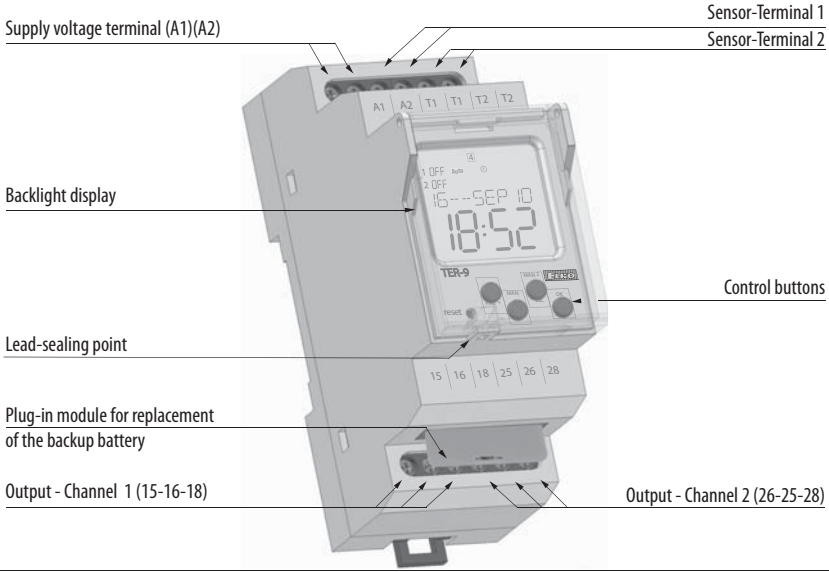
Connection



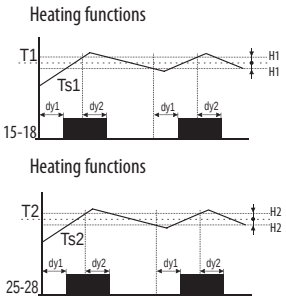
Description of visual elements on the display



Device description



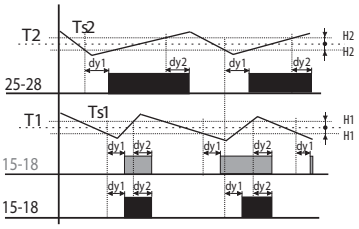
2 independent single-stage thermostats



Legend:
Ts1 - real (measured) temperature 1
Ts2 - real (measured) temperature 2
T1 - adjusted temperature T1
T2 - adjusted temperature T2
H1 - adjusted hysteresis for T1
H2 - adjusted hysteresis for T2
dy1 - set switching delay of the output
dy2 - set delay on output breaking
15-18 output contact (for T1)
25-28 output contact (for T2)

Classic function of thermostat, output contact switched until adjusted temperature is reached. Hysteresis eliminates frequent switching - output oscillation.

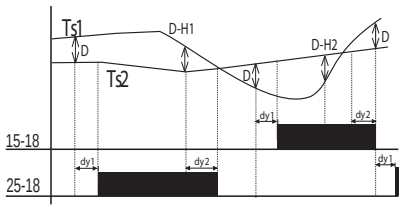
Depending functions of 2 thermostats



Legend:
Ts1 - real (measured) temperature 1
Ts2 - real (measured) temperature 2
T1 - adjusted temperature T1
T2 - adjusted temperature T2
H1 - adjusted hysteresis for T1
H2 - adjusted hysteresis for T2
dy1- set switching delay of the output
dy2 - set delay on output breaking
25-28 output contact (for T2)
15-18 output contact (intersection T1 and T2)

Output 15-18 is closed, if temperature of both thermostats is bellow an adjusted level. When any thermostat reaches adjusted level, the contact 15-18 opens.
Serial inner connection of thermostats (logic function AND).

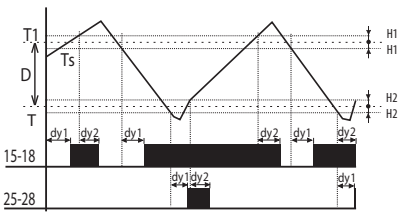
Differential thermostat



Legend:
Ts1 - real (measured) temperature T1
Ts2 - real (measured) temperature T2
D - adjusted difference
dy1- set switching delay of the output
dy2 - set delay on output breaking
15-18 output contact (for T1)
25-28 output contact (for T2)

Switching of output corresponds with input, which has lower temperatures when diffference is exceeded. Differencial thermostat is used for keeping two identical temperature e.g. in heating systems (boiler and reservoir), solar systems (collector - reservoir, exchanger), water heating (water heater, water distribution)etc.

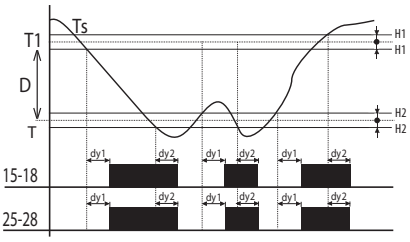
2-stage thermostat



Legend:
Ts - real (measured) temperature
T1 - adjusted temperature
D - adjusted difference
H1 - adjusted hysteresis for T1
H2 - T=T1-D
dy1- set switching delay of the output
dy2 - set delay on output breaking
15-18 output contact
25-28 output contact

Typical example of use for two-stage thermostat is e.g in boiler-room, where there are two biolers from which one is main and the other one is auxiliary. The main boiler is managed according to set temperature and auxiliary boiler is switched in case temperature falls under set difference. Thus it helps to the main boiler in case outside temperature dramatically falls.
In the range of set difference (D) output 15-18 functions as normal thermostat to input 1 (type 1). In case temperature falls under set difference, second output switches too.

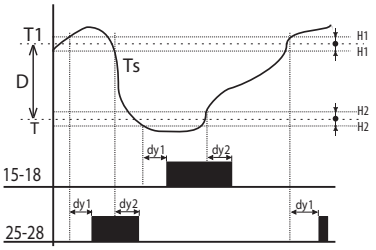
Thermostat with "WINDOW"



Legend:
Ts - real (measured) temperature
T1 - adjusted temperature
T2 - adjusted temperature T=T1-D
H1 - adjusted hysteresis for T1
H2 - adjusted hysteresis for T2
dy1- set switching delay of the output
dy2 - set delay on output breaking
15-18 output contact
25-28 output contact

Output is closed (heating) only if temperature is within adjusted range. If temperature is out of range, the contact opens. T is set as T1-D.
The function is used for protection of gutters against freezing.

Thermostat with dead zone



Legend:
Ts - real (measured) temperature
T1 - adjusted temperature
T2- T=T1-D
H1 - adjusted hysteresis for T1
H2 - adjusted hysteresis for T2
dy1- set switching delay of the output
dy2 - set delay on output breaking
15-18 output contact (heating)
25-28 output contact (cooling)

In case of thermostat with a „dead zone", it is possible to set temperature T1 and a difference (respectively a width of dead zone D). If temperature is higher than T1, output contact of cooling switches ON; if the temperature gets bellow T1, the contact switches OFF.
If the temperature gets bellow temperature T, the contact of heating switches ON and it switches OFF when temperature T is exceeded. This function can be used for example for automatic air warming and cooling in ventilation so the sit is always within the range T1 and T.

Thermostat for monitoring temperature of motor winding **TER-7**

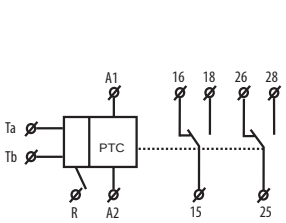
1M

EAN code
TER-7: 8595188137164

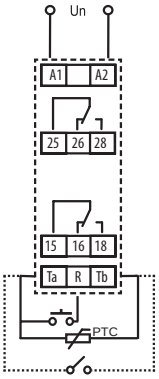
- It monitors motor coil temperature
- Fixed levels of switching
- PTC sensor is used for sensing, it is in-built in motor winding by its manufacturer or there is used an external PTC sensor
- MEMORY function - relay is blocked in an error state until until operator intervention (press RESET button)
- RESET of faulty state:
  - a) button on the front panel
  - b) by external contact (remote by two wires)
- Function of short-circuit or sensor disconnection monitoring, red LED flashing indicates faulty sensor
- Red LED shines and indicates exceeded temperature
- Terminals of sensor are galvanically separated, they can be shorted out by terminal PE without damaging the device
- Multivoltage supply AC/DC 24-240 V
- 1-MODULE, DIN rail mounting

Technical parameters	TER-7
Function:	monitoring temperature of motor winding
Supply terminals:	A1-A2
Voltage range:	AC/DC 24 - 240 V (AC 50-60Hz)
Burden:	max. 2 VA
Operating range:	-15 %; +10 %
Measuring circuit	
Measuring terminals:	Ta-Tb
Cold sensor resistance:	50 Ω - 1.5 kΩ
Upper level:	3.3 kΩ
Botton level:	1.8 kΩ
Sensor:	PTC temperature of motor winding
Sensor failure indication:	blinking red LED
Accuracy	
Accuracy in repetition:	< 5%
Switching difference:	± 5 %
Temperature dependance:	< 0.1 % / °F (°C)
Output	
Number of contacts:	2x changeover / DPDT (AgNi / Silver Alloy)
Current rating:	Resistive load: 8 A / 240 V AC / 24 V DC Inductive load: 1/2 HP / 240 V, 1/4 HP / 120V
Inrush current:	10 A / < 3 s
Min. breaking capacity DC:	500mW
Mechanical life:	$3x10^7$
Electrical life (resistive):	$0.7x10^5$
Other information	
Operating temperature:	-4 °F to 131 °F (-20 °C to 55 °C)
Storage temperature:	-22 °F to 158 °F (-30 °C to 70 °C)
Electrical strength:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 20 terminals
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm^2):	solid wire max.1x 2.5 or 2x1.5 with sleeve max. 1x2.5 (AWG 12) (0.4 Nm)
Dimensions:	3.5˝ x 0.7˝ x 2.5˝ (90 x 17.6 x 64 mm)
Weight:	2.9 oz. (83 g)
Standards:	EN 60730-2-9, EN 61010-1

Symbol



Connection

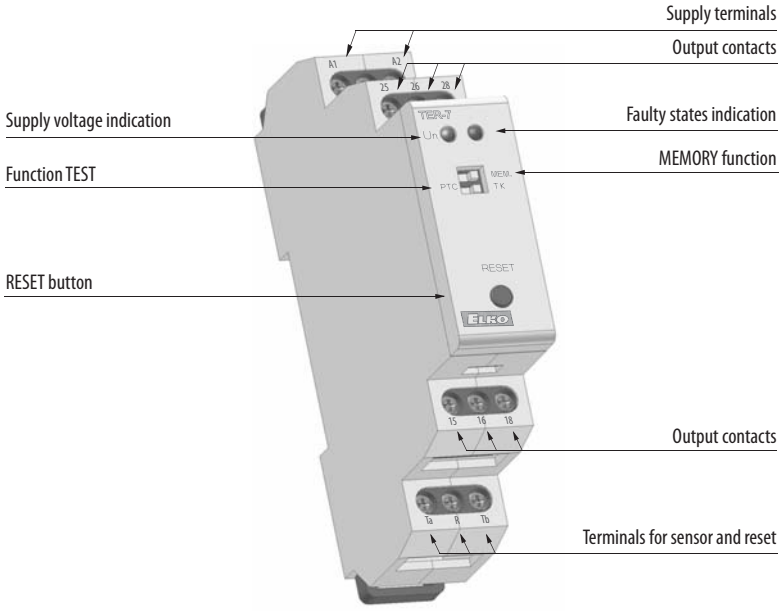


Note

Sensors could be in series in abide with conditions in technical specification - switching limits.

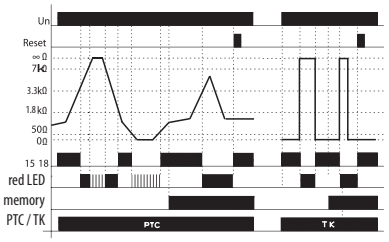
Warning!: In case of supply from the main, neutral wire must be connected to terminal A2.

Description



Function

The device controls temperature of motor winding with PTC thermistor which is mostly placed in motor winding or very close to it. Resistance of PTC thermistor run to max 1.5 kΩ in cold stage.



By temperature increase the resistance goes strongly up and by overrun the limit of 3.3 kΩ the contact of output relay switch off - mostly contactor controlling a motor. By temperature decrease and thereby decrease of thermistor resistance under 1.8 kΩ the output contact of relay again switches on. The relay has function "Control of sensor fault". This controls interruption or disconnection of sensor.When switch is in position "TK" monitoring of faulty sensor is not functional - it is possibel to connect bimetal sensor with only 2 states: ON or OFF. The device can work with bi-metal sensor in this position.
Other safety unit is function "Memory". By temperature overrun (and output switches off) the output is hold in faulty stage until service hit. This bring the relay to normal stage (with RESET button) on front panel or by external contact (remote).

Energy-saving digital thermo-valve **ATV-1**

- This energy-saving digital thermo-valve is a programmable regulation device for various heaters, but mainly radiators
- It can be used to regulate temperature in closed rooms, thus helping to lower heat energy consumption
- Functions:

  Manual mode - measuring and checking a manually set temperature

  Automatic mode - control between two temperatures based on a set time program:

  - comfort temperature (factory settings 70°F / 21°C)
  - energy-saving temperature (factory settings 61 °F / 16°C)
- Intervals of heating and energy-saving operation can be set using a freely adjustable time program
- 8 individually programmable switching times per day:
  - 4 heating intervals
  - 4 energy-saving intervals
- The device features very quiet operation and long battery life (up 5 years)
- Quick and easy installation

EAN code

ATV-1: 8595188160889

USB programming adapter: 8595188160995

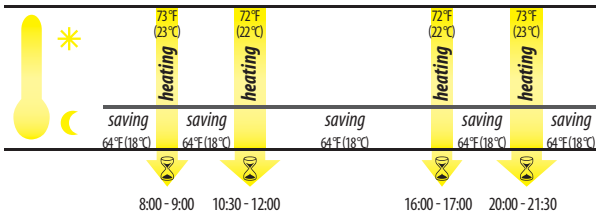
Technical parameters	ATV-1
Operating voltage:	3 V / DC (2 AA batteries 1.5 V / DC AA)
Temperature range:	46.. 82 °F (8.. 28 °C)
Color:	white
Dimensions (L x W x H):	3˝ x 2.1˝ x 2.4˝ (76.5 x 53.5 x 63 mm)
Design:	thermostatic direction valves, electronic

Other functions

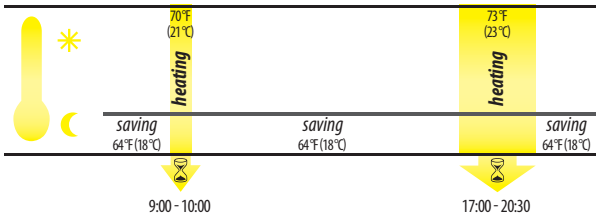
1. Time function - the desired temperature can be set for a certain adjustable time interval
2. Vacation function - while you're gone, you can set and maintain the desired temperature
3. Open window function - when the temperature drops, the heating valve automatically closes in order to save energy
4. Child safety block - blocking against undesired interference with the thermostat
5. Freeze protection - if the temperature drops below 43 °F (6 °C), the valve opens until the temperature again exceeds 46 °F (8 °C). This keeps heaters from freezing.

Examples of daily heating program

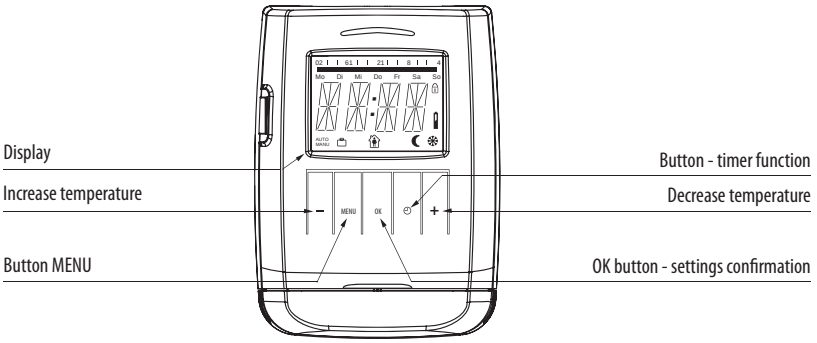
BATHROOM



LIVING ROOM



Description of device



Adjustment ATV-1

- manual
- via USB programming adapter PROG matic

Using the programming port, in seconds your settings will be transferred into the thermostat.

Adapters

Type of valve	Type of adapter
Heimeier, Junkers Landys+Gyr, MNG, Honeywell, Braukmann thread size M 30x1.5	No adapter necessary + enclosed pin; only for RAV
Danfoss RAV (the valve plunger must be fitted with the enclosed pin)	
Danfoss RA	
Danfoss RAVL	

Package content

Thermo-valve	
2x battery AA1.5V	
Adaptors	
Manual	

Hygro-thermostat **RHT-1**

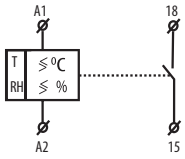
1M

- Hygro-thermostat for temperature monitoring and regulation in range 32 °F to 140 °F (0 °C to 60 °C) and relative humidity monitoring and regulation in range 50...90%
- Possibility of setting of up to 8 conditions for contact switching and function permanently ON/OFF
- Sensor is a part of the device - designated for measuring in switchboards
- Function of sensor control (damage, disturbances...)
- Fixed setting of temperature hysteresis at 36.5 °F (2.5 °C) and humidity at 4%
- Output state is indicated by red LED
- Supply voltage AC/DC 24-240 V
- 1-MODULE, DIN rail mounting

EAN code
RHT-1: 8595188137263

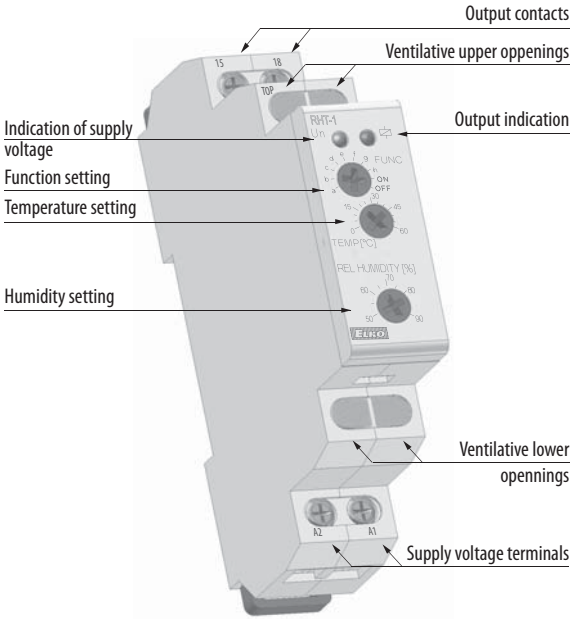
Technical parameters	RHT-1	
Function:	hygro-thermostat	
Supply terminals:	A1 - A2	
Input:	1VA	
Voltage range:	24-240V AC / DC (AC 50 - 60 Hz)	
Tolerance of voltage range:	-15%; +10%	
Measuring circuit		
Temperature range:	32 °F to 140 °F (0 °C to 60 °C)	
Humidity range:	50.. 90%	
Temperature hysterisis:	36.5 °F (2.5 °C)	
Humidity hysterisis:	4%	
Sensor:	internal	
Indication of sensor´s fault:	red LED flashing	
Accuracy		
Setting accuracy (mechanical):	5%	
Long-term stability of humidity:	typical < 0.8 % / year	
Output		
Number of contacts:	1x NO-SPST ($AgSnO_2$)	
Current rating:	Resistive load:	15 A / 240 V AC / 24 V DC
	Inductive load:	1 HP / 240 V, 1/2 HP / 120V
Output indication:	red LED shines	
Mechanical life:	$3x10^7$	
Electrical life:	$0.7x10^5$	
Other information		
Operational temperature:	-4 °F to 140 °F (-20 °C to 60 °C)	
Storing temperature:	-22 °F to 158 °F (-30 °C to 70 °C)	
Electrical strengh:	2.5 kV (supply-output)	
Operational position:	vertical, with correct orientation	
Mounting:	DIN rail EN 60715	
Protection degree:	IP40 from front panel, IP10 on terminals	
Overvoltage category:	III.	
Pollution degree:	2	
Max. cable size (mm^2):	max. 2x2.5, max. 1x4, with sleeve max. 1x2.5, max. 2x1.5 (AWG 12) (0.4 Nm)	
Dimensions:	3.5˝ x 0.7˝ x 2.5˝ (90 x 17.6 x 64 mm)	
Weight:	2.4 oz. (69 g)	
Standards:	EN 60730-2-9, EN 61010-1	

Symbol



Connection

Device description



Funcions

Choice of function	Relay switched under the following conditions		
A	T > Tset	or	RH > RHset
B	T < Tset	or	RH > RHset
C	T > Tset	or	RH < RHset
D	T < Tset	or	RH < RHset
E	T < Tset	and	RH < RHset
F	T > Tset	and	RH < RHset
G	T < Tset	and	RH > RHset
H	T > Tset	and	RH > RHset
ON	relay permanently ON		
OFF	relay permanently OFF		

This device is designated for monitoring of parameters of environment (meaning temperature and relative humidity) in switchboards. It enables setting of eight conditions of constact closing and therefore it is usable for various types of load (e.g. fans, heating, air-conditioning, dehydrating units...).
While installing it is neccessary to take into account the fact that hysterisis rises by persistence of measured values between sensor and ambient environment.
The device is equipped by sensor fault detection. In case of sensor fault, exceeding allowed limits (for temperature -22 °F / -30°C and 176 °F / 80°C; for humidity 5% and 95%) or in case of faulty internal communcation higher than 50% (due to e.g. high ambient disturbances) contact opens and sensor fault is indicated. Sensor fault doesn´t have influence on function permanently ON or pemanently OFF.
Note: In case the conditions for switching are not applied, relay is open.

Accessories to Thermostats - Temperature sensors **TC, TZ, PT100**

TC TZ Pt100

- Thermister temperature sensors are made of Negative Temperature Co-efficient (NTC) embedded in a PVC or metal sleeve with a thermally-conductive sealer
- Sensor TC - lead-in cable to sensor TC is made of wire CYSY 2Dx 0.02" (0.5 mm)
- Sensor TZ - cable VO3SS-F 2Dx 0.02" (0.5mm) with silicone insulation for use in high temperature applications
  - silicone insulation for use in high temperature applications
- Sensor PT100 - shielded silicon 2x 0.22 mm ^{2} (AWG 21), shielding connected with a case

EAN code

TC-0:	8595188110075	TZ-0:	8595188140591		
TC-3:	8595188110617	TZ-3:	8595188110600	Pt100-3:	8595188136136
TC-6:	8595188110082	TZ-6:	8595188110594	Pt100-6:	8595188136143
TC-12:	8595188110099	TZ-12:	8595188110587	Pt100-12:	8595188136150

Technical parameters	TC	TZ	Pt100
Range:	32 °F to 158 °F (0 °C to 70 °C)	-40°F to 257°F (-40°C to 125°C)	-22°F to 392°F (-30°C to 200°C)
Scanning element:	NTC 12K 5 %	NTC 12K 5 %	PT 100
In air / in water:	(τ65) 92 s / 23 s	(τ65) 62 s / 8 s	(τ0.5) - / 7 s
In air / in water:	(τ95) 306 s / 56 s	(τ95) 216 s / 23 s	(τ0.9) - / 19 s
Cable material:	High temperature PVC	Silicone	Silicone
Terminal material:	High temperature PVC	Nickel plated copper	Copper
Protection degree:	IP 67	IP 67	IP 67
Insulation:	-	-	Double insulation by silicone
Types of temperature sensors:			
	TC-0	TZ-0	-
- length:	3.9˝ (100 mm)	4.3˝ (110 mm)	-
- weight:	0.17 oz. (5 g)	0.15 oz. (4.5 g)	-
	TC-3	TZ-3	Pt100-3
- length:	9.8´ (3 m)	9.8´ (3 m)	9.8´ (3 m)
- weight:	3.8 oz. (108 g)	3.7 oz. (106 g)	2.3 oz. (68 g)
	TC-6	TZ-6	Pt100-6
- length:	19.6´ (6 m)	19.6´ (6 m)	19.6´ (6 m)
- weight:	7.5 oz. (213 g)	7.5 oz. (216 g)	5.2 oz. (149 g)
	TC-12	TZ1-2	Pt100-12
- length:	39.4´ (12 m)	39.4´ (12 m)	39.4´ (12 m)
- weight:	16.4 oz. (466 g)	14.7 oz. (418 g)	8.7 oz. (249 g)

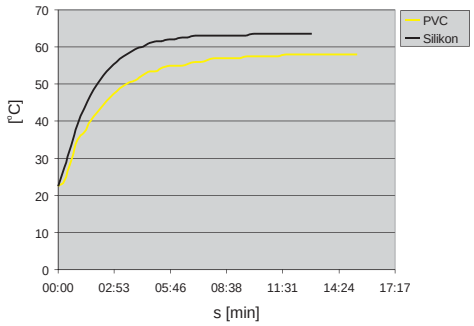
τ65 (95): time, which sensor needs to heat up on 65 (95) % of ambient temperature of environment, in which is located

Resistive values of sensors in dependance on temperature

Temperature (°C / °F)	Sensor NTC (kΩ)	Sensor PT100 (Ω)
20 / 68	14.7	107.8
30 / 86	9.8	111.7
40 / 104	6.6	115.5
50 / 122	4.6	119.4
60 / 140	3.2	123.2
70 / 158	2.3	127.1

Tolerance of sensor NTC 12 kΩ is ± 5% by 77°F (25 °C).
Long-term resistence stability by sensor PT100 is 0.05% (10 000 hours).

Diagramm of sensor warm up via air



PVC -reaction to water temperature from 72.5 °F to 136.4 °F (from 22.5 1 °C to 58 °C).
Silicone - reaction to water temperature from 72.5 °F to 144.5 °F (from 22.5 °C to 63.5 °C).

Sensor photo

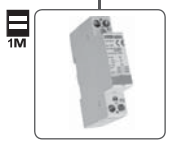
TC

TZ

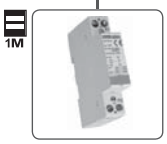
Pt100

Installation contactors

Installation contactors VS

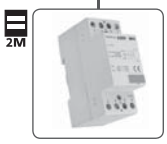


VS120
Number of contacts: 1x20 A
Configuration of switching and breaking contacts: 10, 01.

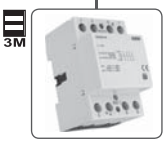


VS220
Number of contacts: 2x20 A
Configuration of switching and breaking contacts: 20, 11, 02.

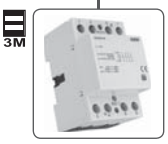
VS420
Number of contacts: 4x20 A
Configuration of switching and breaking contacts: 40, 31.



VS425
Number of contacts: 4x25 A
Configuration of switching and breaking contacts: 40, 31, 22, 04.

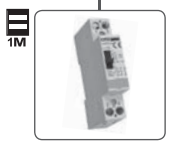


VS440
Number of contacts: 4x40 A
Configuration of switching and breaking contacts: 40, 31, 22, 04.

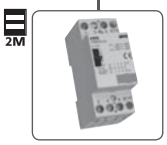


VS463
Number of contacts: 4x63 A
Configuration of switching and breaking contacts: 40, 31, 22.

Installation contactors with manual control VSM

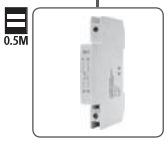


VSM220
Number of contacts: 2x20 A
Configuration of switching and breaking contacts: 20, 11, 02.

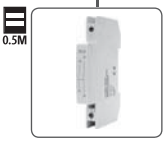


VSM425
Number of contacts: 4x25 A
Configuration of switching and breaking contacts: 40, 31, 22, 04

Accessories



VSK-11
Auxiliary contacts: 1x switching, 1x breaking.



VSK-20
Auxiliary contacts: 2x switching.

Installation contactors **VS120, VS220, VS420, VS425, VS440, VS463**

1M

2M

EAN code
see page 78

- For switching electric circuits, especially for resistave loads and three-phase induction motors
  number of contacts VS120: 1
  number of contacts VS220: 2
  number of contacts VS420, VS425, VS440, VS463: 4
- It is produced in configuration of switching and breaking contacts:

VS120:	10, 01	VS425:	40, 31, 22, 04
VS220:	20, 11, 02	VS440:	40, 31, 22, 04
VS420:	40, 31	VS463:	40, 31, 22

- Protection IP 20 - on request we deliver covers that ensure protection IP 40 for all terminals
- DIN rail or panel mounting

Technical parameters	VS120	VS220	VS420	VS425	VS440	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
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 $U_e = 24$ V:	20 A	20 A	20 A	25 A	40 A	63 A
DC1 $U_e = 110$ V:	6 A	6 A	2 A	6 A	4 A	4 A
DC1 $U_e = 220$ V:	0.6 A	0.6 A	0.5 A	0.6 A	1.2 A	1.2 A
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 :	$0.2x10^6$	$0.2x10^6$	$0.2x10^6$	$0.2x10^6$	$0.1x10^6$	$0.1x10^6$
AC-3-power load:	$0.3x10^6$	$0.3x10^6$	$0.3x10^6$	$0.5x10^6$	$0.15x10^6$	$0.15x10^6$
AC-5a - high-intensity discharge lamp:	$0.1x10^6$ by 30 µF	$0.1x10^6$ by 30 µF	$0.3x10^6$ by 36 µF	$0.1x10^6$ by 36 µF	$0.1x10^6$ by 220 µF	$0.1x10^6$ by 330 µF
AC-5b - incandescent lamps :	$0.1x10^6$ by 2 kW	$0.1x10^6$ by 2 kW	$0.1x10^6$ by 2 kW	$0.1x10^6$ by 2 kW	$0.1x10^6$ by 4 kW	$0.1x10^6$ by 5 kW
AC-7a - resistive household devices:	$0.2x10^6$	$0.2x10^6$	$0.2x10^6$	$0.2x10^6$	$0.1x10^6$	$0.1x10^6$
AC-7b - inductive household devices:	$0.3x10^6$	$0.3x10^6$	$0.3x10^6$	$0.3x10^6$	$0.15x10^6$	$0.15x10^6$
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
Electrical strenght:	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 10 (2.5 mm^2)	AWG 7 (10 mm^2)	AWG 3 (25 mm^2)	AWG 3 (25 mm^2)
Stranded conductor:	6 mm^2	6 mm^2	2.5 mm^2	6 mm^2	16 mm^2	16 mm^2
Maximal torque:	1.2 Nm	1.2 Nm	1.2 Nm	1.2 Nm	3.5 Nm	3.5 Nm
Coil - max. cable size:						
Solid conductor:	AWG 10 (2.5 mm^2)	AWG 10 (2.5 mm^2)	AWG 10 (2.5 mm^2)	AWG 10 (2.5 mm^2)	AWG 10 (2.5 mm^2)	AWG 10 (2.5 mm^2)
Stranded conductor:	2.5 mm^2	2.5 mm^2	2.5 mm^2	2.5 mm^2	2.5 mm^2	2.5 mm^2
Max. torque:	0.6 Nm	0.6 Nm	0.6 Nm	0.6 Nm	0.6 Nm	0.6 Nm
Operating						
Coil control voltage:	AC/DC 24 V	AC/DC 24 V, 48 V, 110 V	AC 12 V, 24 V, 48 V	AC/DC 24 V, 48 V, 110 V	AC/DC 24 V, 110 V	AC/DC 24 V, 48 V, 110 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:	23.. 131 °F (-5.. 55 °C)					
Storing temperature:	-22.. 176 °F (-30.. 80 °C)					
Weight:	4.2 oz. (120 g)	4.6 oz. (130 g)	6 oz. (170 g)	7.5 oz. (213 g)	14 oz. (400 g)	14 oz. (400 g)
Dimensions:	0.7″x 3.35″x 2.4″ (17.5 x 85 x 60 mm)	0.7″x 3.35″x 2.4″ (17.5 x 85 x 60 mm)	1.4″x 2.7″x 2.24″ (35 x 62.5 x 57 mm)	1.4″x 3.35″x 2.4″ (35 x 85 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″ (53.3 x 84 x 60 mm)
Standards:	IEC 60947-4-1, IEC 60947-5-1, IEC 61095, EN 60947-4-1, EN 60947-5-1, EN 61095, VDE 0660					

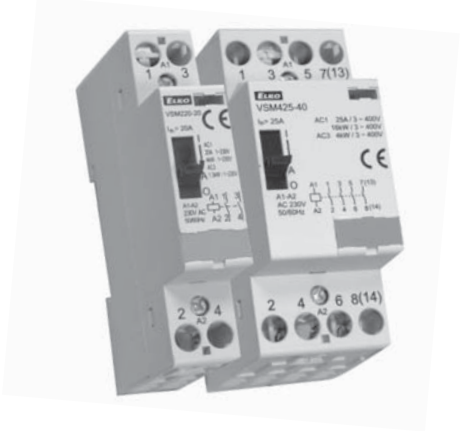
* 3.8 VA/3.8 W for -04 version of contacts

** Note: In case several contactors are mounted close to each other, you need to use a installation spacer between every other contactor.

Installation contactors with manual control **VSM220, VSM425**

1M

2M



EAN code
see page 78

- Special version of installation contactors with not only basic functions but also with manual control
- For switching accumulative appliances for heating and service water warming
- Description of individual positions of manual control

  AUTO: common function as with installation contactors without manualcontrol

  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: ON-OFF
- It is produced in configuration of making and breaking contacts:

  VSM220: 20, 11, 02

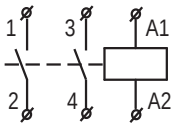
  VSM425: 40, 31, 22, 04
- It is possible to connect auxiliary contacts VSK to contactors VSM220, VSM425

Technical parameters	VSM220	VSM425
Rated insulation voltage (Ui):	230 V	440 V
Rated thermo-current I_{th} (in AC):	20 A	25 A
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
The max. number of switching for max. load:	600 switch/hr.	600 switch/hr.
Electrical life in 230 / 400 V		
AC-1- resistive load :	$0.2x10^6$	$0.2x10^6$
AC-3-power load:	$0.3x10^6$	$0.5x10^6$
AC-5a - high-intensity discharge lamp:	$0.1x10^6$ by 30 µF	$0.1x10^6$ by 36 µF
AC-5b - incandescent lamps :	$0.1\ 10^6$ by 1.5 kW	$0.1x10^6$ by1.5 kW
AC-7a - resistive household devices:	$0.2x10^6$	$0.2x10^6$
AC-7b - inductive household devices:	$0.3x10^6$	$0.5x10^6$
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, 110 V	AC 12 V, 24 V, 42 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:	23.. 131 °F (-5.. 55 °C)	
Storing temperature:	-22.. 176 °F (-30.. 80 °C)	
Weight:	4.9 oz. (140 g)	260 g (9.17 oz.)
Dimensions:	0.7˝x 3.35˝x 2.4˝ (17.5 x 85 x 60 mm)	1.4˝x 3.35˝x 2.4˝ (35 x 85 x 60 mm)
Standards:	IEC 60947-4-1, IEC 60947-5-1, IEC 61095, EN 60947-4-1, EN 61095, VDE 0660	

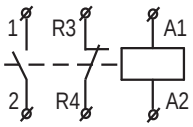
Connection VSM220

VSM220 - only AC supply voltage

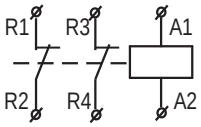
VSM220-20



VSM220-11



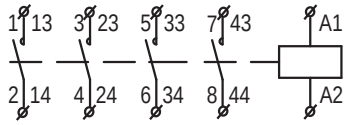
VSM220-02



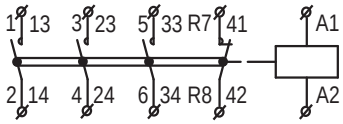
Connection VSM425

VSM425 - only AC supply voltage

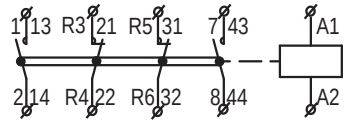
VSM425-40



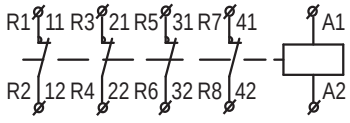
VS425-31



VSM425-22



VSM425-04



Auxiliary contacts VSK-11 and VSK-20

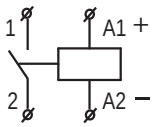
Datas of auxiliary contacts for VSK-11 and VSK-20 see page 77

*Note: In case several contactors are mounted close to each other, you need to use a installation spacer between every other contactor.

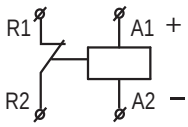
Connection

VS120

VS120-10

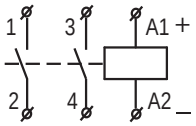


VS120-01

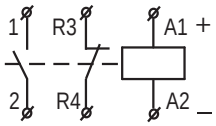


VS220

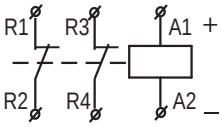
VS220-20



VS220-11

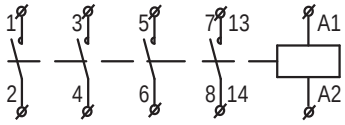


VS220-02

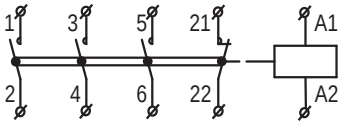


VS420

VS420-40

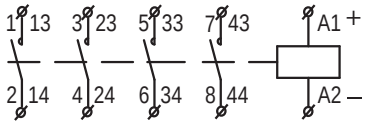


VS420-31

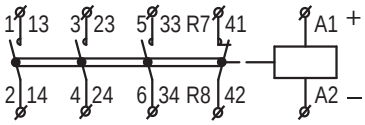


VS425

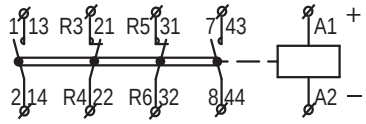
VS425-40



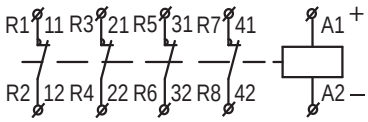
VS425-31



VS425-22

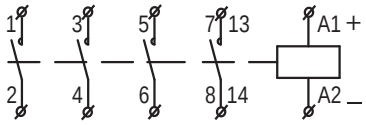


VS425-04

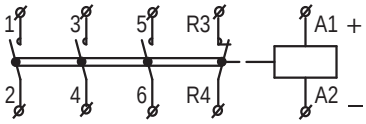


VS440

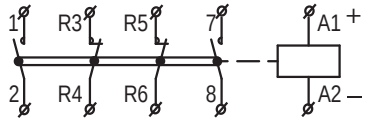
VS440-40



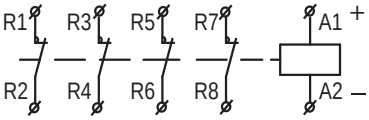
VS440-31



VS440-22

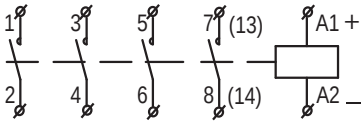


VS440-04

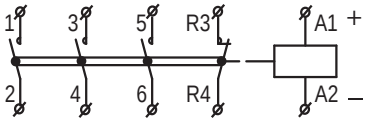


VS463

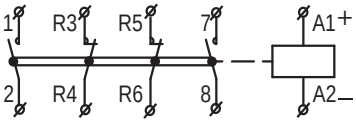
VS463-40



VS463-31



VS463-22



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

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

Ambient temperature:	23 °F to 131 °F (-5 °C to 55 °C)
Rated insulation voltage (Ui):	500 V
Electrical strength:	4 kV
Rated current 230 V (AC 15):	6 A
Rated current 400 V (AC 15):	4 A
Max. switching frequence:	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 (AWG 10) / 2.5 mm^2 (AWG 10)
Maximal torque:	0.8 Nm
Weight:	0.35 oz. (10 g)
Dimensions:	0.4˝x 3.35˝x 2.4˝ (10 x 85 x 60 mm)

Connection of auxiliary contact VSK-11 and VSK-20

EAN code
see page 78

VSK-11

VSK-20

EAN codes

EAN codes for VS

VS120

VS120-01 24V AC/DC: 8595188129848

VS120-10 24V AC/DC: 8595188129367

VS220

VS220-02 24V AC/DC: 8595188129381
VS220-02 110V AC/DC: 8595188138628

VS220-11 24V AC/DC: 8595188129374
VS220-11 48V AC/DC: 8595188129398
VS220-11 110V AC/DC: 8595188130790

VS220-20 24V AC/DC: 8595188125253
VS220-20 48V AC/DC: 8595188129411
VS220-20 110V AC/DC: 8595188129428

VS420

VS420-31 24V AC: 8595188129442
VS420-31 110V AC: 8595188129466

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

VS425

VS425-04 24V AC/DC: 8595188129527
VS425-04 48V AC/DC: 8595188129558
VS425-04 110V AC/DC: 8595188160032

VS425-22 24V AC/DC: 8595188129541

VS425-31 24V AC/DC: 8595188129497
VS425-31 48V AC/DC: 8595188137898
VS425-31 110V AC/DC: 8595188129534

VS425-40 24V AC/DC: 8595188129480
VS425-40 48V AC/DC: 8595188136174

VS440

VS440-04 24V AC/DC: 8595188129299
VS440-04 110V AC/DC: 8595188129305

VS440-22 24V AC/DC: 8595188129787

VS440-31 24V AC/DC: 8595188129572

VS440-40 24V AC/DC: 8595188129565
VS440-40 110V AC/DC: 8595188138567

VS463

VS463-22 24V AC/DC: 8595188129794

VS463-31 24V AC/DC: 8595188129596
VS463-31 110V AC/DC: 8595188137904

VS463-40 24V AC/DC: 8595188129589
VS463-40 48V AC/DC: 8595188160612
VS463-40 110V AC/DC: 8595188140652

EAN codes for VSM

VSM220

VSM220-02 24V AC: 8595188129817

VSM220-11 24V AC: 8595188129800

VSM220-20 12V AC: 8595188138369
VSM220-20 24V AC: 8595188128117
VSM220-20 110V AC: 8595188160223

VSM425

VSM425-04 24V AC: 8595188129831

VSM425-22 24V AC: 8595188129336

VSM425-31 24V AC: 8595188129824

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

EAN codes for VSK

VSK-11: 8595188121613

VSK-20: 8595188121606

TECHNICAL INFORMATION

- Main regulations for correct use of products
- Product loadability
- Electro-magnectic compatibility of products
- EMC chart
- Overview of tested types of light sources and the loads
- Products packing
- Dimensions
- Examples of usage
- Support of project designing
- Production technology

Main instructions for correct use of ELKO EP products

To ensure correct and perfect function of a device and its safe operation, it is necessary to ensure and observe several main regulations:

1.) Device supply
- it is necessary to ensure continuous supply of the device without drops and voltage peaks. It is mainly important for device (e.g. dimmers) where there is synchronization managed by sine wave of the main and fault in the main ca cause unreliable function of the device
- it is necessary to observe correct connection of terminals, and in case of DC supply voltage also polarity
- it is necessary to observe allowed tolerance of the size of supply voltage which is given by technical parameters of individual devices

2.) Protection of the device
- it is necessary to ensure protection of the device by adequate elements of overvoltage protection – by fuses, by surge arrestors

3.) Elimination of disturbances on input circuits
- it is recommended to eliminate disturbances on control inputs of devices by suitable elements (R-C elements) and thus minimize creation of inductive voltage on incoming wires
- pay attention when connecting control inputs and keep in mind max. current and min. voltage at rest, which can cause spontaneous switching of device

4.) Opereting conditions
- to assure the granted life and correct functions of device, there is not recommended to leave the device in extreme conditions that could negative way influence the correct device functions - permanent temperature influence over 70°C, aggressive exhalations, chemicals, high relative humadity over 95%, high electromagnetic field or microwave radiation
- for error-free function it is necessary to avoid device placement close to electromagnetic interference source
- all mentioned products fulfill the EMC requirements in accordance with EU Directive 89/336/EEC. Notwithstanding it is necessary to pay attention when devices are connected to circuit with electrical appliances that produce electromagnetic interference (contactors, motors), and pay attention to close power cables. It is recommended that device connecting cables (supply and control inputs) are possibly short and go separately from power cables. In case the device is connected to circuit with contactors or motors, it is necessary to protect the device with appropriate extern protection components - RC members, varistors or surge voltage protector.
- when you use AL wires, it is necessary to follow requirements of ČSN standard 370606: 1959 and ČSN 370606 amendment 2: 1992

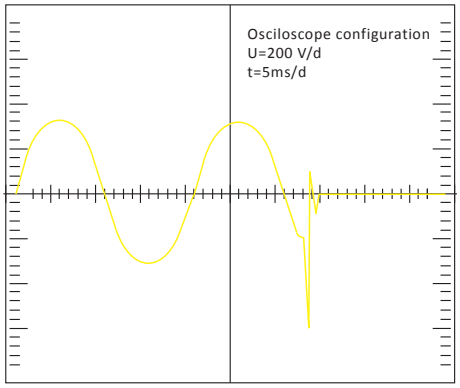
5.) Device handling and using
- input terminals do not fill-in with high power (for serial terminals max 0.5 N/m), do not give excessive pressure to carrier terminal parts to avoid demage of inner device construction
- protect the device before falls and excessive vibrations that could demage relays contacts
- do not overload input relay´s contacts, especially when using loads with other category then AC1
- when at switching of big loads the relay contacts get sealed it is necessary to use inserted contactor or power relay tuned to required load for given application

Description of used protection elements in device

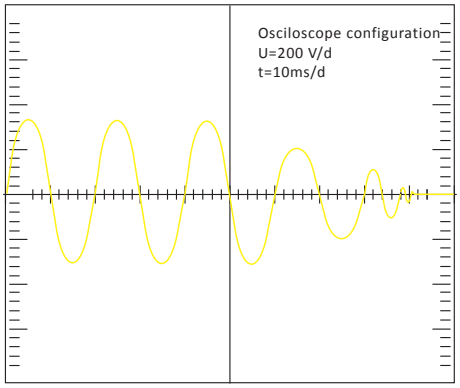
All time and monitoring relays from our assortment are equipped with protective elements (varistors) against possible overvoltage in supply main. Limit voltage of used varistors is 275 V. At short-time overvoltage in supply main varistor decrease its leak resistor and accumulate arosen overvoltage. When this overvoltage behave as short-time peak, varistor is able to react and protect the device against negative influences. As other protection elements there are used transils and zener diodes that eliminate overvoltage impulses in supply and input circuits of device (e.g. when switching inductive loads). In case of switching inductive loads it is recommended to separate a supply of power element (motors, contactors etc.) from supply of measuring and control device inputs.

On the charts bellow you can see oscilographic running of disconnecting of loads (contactors) and reaction of protective elements to arosen voltage pikes.

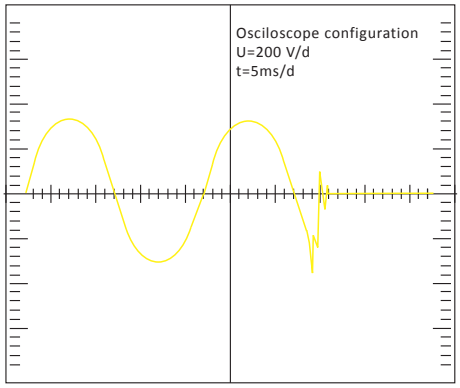
Process of disconnection of contactor with coil on 230V/AC without R-C member



Process of disconnection of contactor with coil on 230V/AC and R-C member 390 Ohm-330 nF



Process of disconnection of contactor with coil and limited varistor on 230V/AC

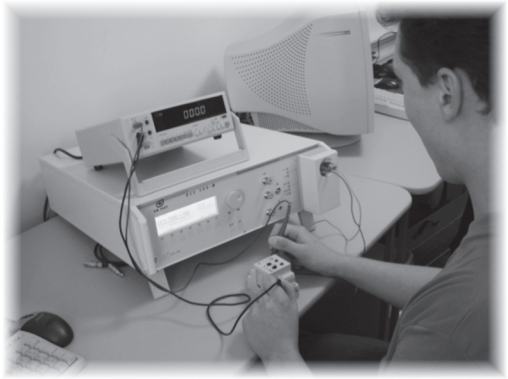


Electromagnetic compatibility of ELKO EP, s.r.o. products

Electromagnetic compatability (EMC) is a new scientific field which was founded in the 60s last century. It had been known only to a small number of specialists working in a military and cosmic research.

Electromagnetic compatability EMC is defined as an ability of a device, system or a machine to show the correct operation even in an environment in which there are other sources of electromagnetic signals (natural or artificial), and also an ability not to influence negatively the environment by its own "electromagnetic action" and not to radiate signals that would disturb other devices. It is an indicator of good quality and reliability. Breach of such EMC requirements may cause several damages with catastrophical consequences.

When testing EMC of a device or system (technical and biological), it is based on so called " fundamental chain of EMC" shown in the picture. This chain shows a system problematic of EMC and we inspect all three components.



SOURCE OF ELECTROMAGNETIC DISTURBANCES	→	ENVIRONMENT OF DISTRIBUTION, ELECTROMAGNETIC STRUCTURE	→	DISTURBED OBJECT, DISTURBING RECEIVER
motors, switches, relays, power distributions, semi-conducting alternators, fluorescent tubes, arc furnances, welding machines, oscillators, PC, digital systems, electrostatic discharge...		air space, energy cables, supply convection, convection, grounding, screening, signaling conductors, data condutors...		digital devices, PC, measuring devices, automatization device, telecommunication system, data transmission system, wireless set, television receivers...

Test SURGE

For guarantee the immunity of our devices against to electromagnetic disturbance we are doing EMC tests and according results we are still innovating our product to be accoding the EMC norms with reserve.
The most important test is immunity against gust of high-energy voltage and current impulse (SURGE), what is made according the norm IEC 61000-4-5.
By this our products are controlled in case of short time pulse, what is apllicated as to input as to output circuits of divices, to switching inputs, sensing inputs, etc. Our produts pass all criterias and are fully competitive to foreign products.
Test SURGE is used in practice mainly for 1-phase devices with take-off current to 16 A. It makes use of voltage impulse 1,2/50 ms no load and current impulse 8/20 ms for short time. Size of used voltage impulse is 0.5 kV, 1 kV, 2 kV and 4 kV, size of used current impulse is 2kA on 4kV with choise of changing polarity. For testing by impulses is as coup mode specify capacitive coupling.

Test BURST

Other very important test is test immunity against quick short-lived effect (couple of impulses- BURST), which dissimulated influence if industry disturbance. Test is made according to the norm IEC 61000-4-4.
Disturbance signal is injected to supply circuits and communication cabling. Coupling is made by 1-phase capacitive circuit or coupling capacitive ribband to supply, signalling or data convection of tested device. Size of testing impulses is 0.5 kV, 1 kV, 2 kV and 4 kV in possitive and negative polarity. Repeat frequence is 2.5 kHz, or 5 kHz. Period of testing 0 - 6 minut by steps for 0.1s.

Test POWERFAIL

For right function of products in industry is important POWERFAIL test - simulation of decreasing and failure of supply voltage. It is made according to the IEC 61000-4-11.
Short-time supply decreasing are random decreasing of supply voltage, which are more than 10 - 15 % of its nominal size and have short time existing 0.5 - 50 periodes of basic frequency 50 Hz.
Short breaks of voltage are short time decreasing over 100 %. Mentioned changes of supply circuit voltage are made in practise by disturbance in mains (high voltage, low voltage) and breaks on load of the main.

Test of EMC emissions

Electronic devices must be designed not to be a source of oversize electric or electromagnetic disturbances in its surroundings. Test is executed according to standard EN 55022.
Emissions are measured by wires or by air.

Test of electromagnetic high-frequency field and HF signal coming from the main

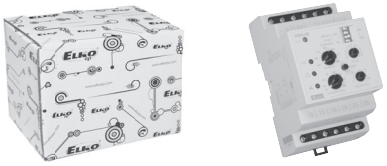
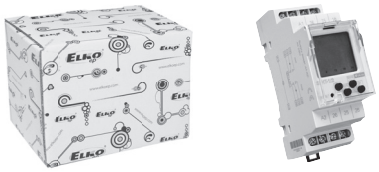
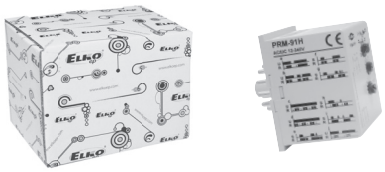
The purpose of this test is to verify immunity of the device against electromagnetic fields that are created by radio transmitters or by any other device which transmits electromagnetic energy by uninterrupted waves (walkie-talkies, radio and TV transmitters.)
Test is carried out against disturbances in the main and emissions. We apply testing level 3 which for HF field means intensity of field 10 V/m and for HF signal it is voltage level 10 V.

Test of electrostatic discharge

It is a test of resistance against discharges of electrostatic energy caused by servicing or by surrounding objects. Such discharge can damage a device or its components.
Test is carried out by direct or indirect application of discharges to a tested device. Test is carried out according to a standard EN 61000-4-2. Direct influence of discharges is targeted into such places and surfaces that are accessible to servicing during common use. Indirect influence of discharge is done by horizontal and vertical coupling board.
The device is treated by at least ten individual discharges for positive and negative polarity. Testing levels are 2kV, 4kV, 6kV, 8kV, 15kV.

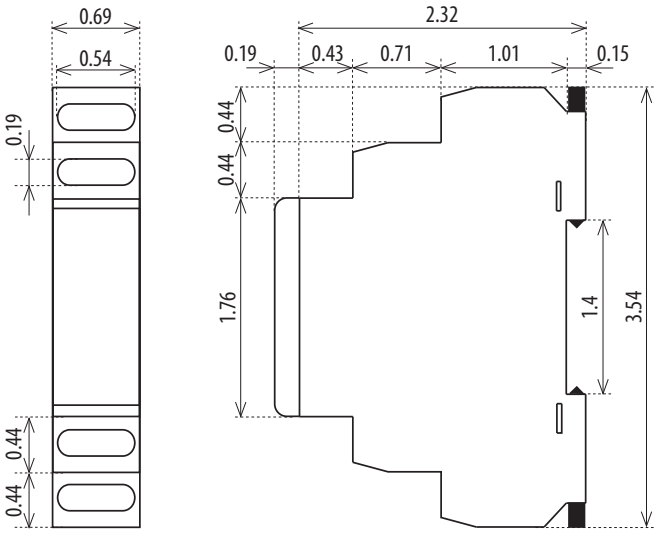
Company ELKO EP has its own test laboratory in which it carries out pre-certification for conditions that must be met by each of our products. Thus customers gets not only a product of a high quality, which is ensured by many years of experience in the field of switching relays, but also a product which can operate in demanding conditions of industrial environment. Product, tested this way, guarantees reliability and functionality to customer's full satisfaction.

Products packing

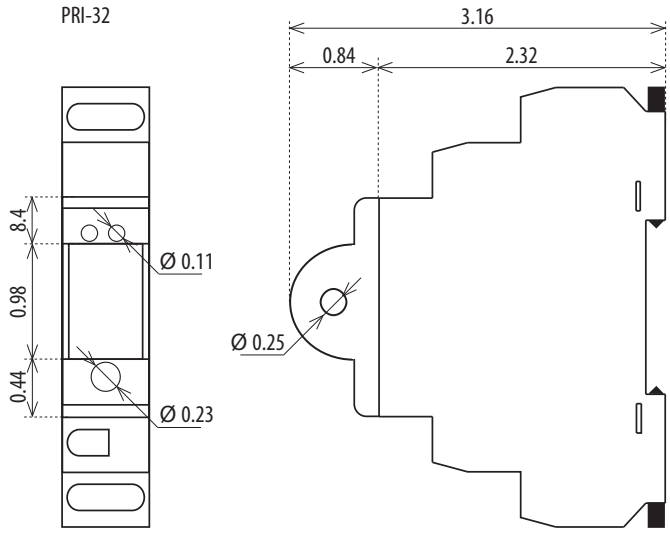
Products	Packing	Design
COS-1, HRH-1, HRN-41, HRN-42, HRN-43, PDR-2, PRI-41, PRI-42, PS-30-12, PS-30-24, PS-30-R	Packing of 3-MODULE relay - 1 pc	
SHT-1, SHT-3, SHT-1/2, SHT-3/2	Packing of 2-MODULE relay - 1 pc	
PRM-91H, PRM-92H, PRM-2H	Packing of plug - in relay - 2 pc	
SOU-1, LIC-2, CRM-91HE, CRM-2HE	Packing of 1-MODULE relay with accessories	
CRM-81J, CRM-83J, CRM-82TO, CRM-61, CRM-9S, CRM-2H, CRM-2T, CRM-4, SOU-1, HRH-5, HRN-33, HRN-34, HRN-35, HRN-55, HRN-55N, HRN-54, MR-41, MR-42, HRN-56, HRN-63, HRN-64, HRN-67, PRI-51, SJR-2, TER-3, TER-7, VS116U, VS316/24	Packing of 1-MODULE relay - 10 pcs	

Dimensions

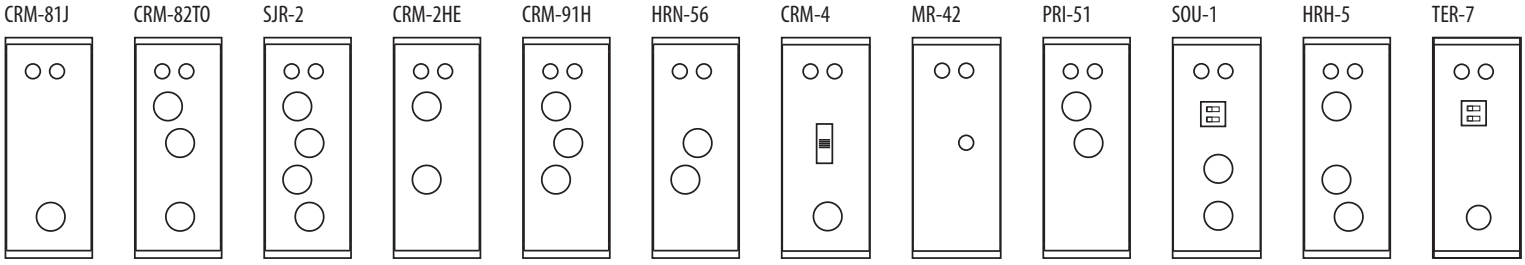
1-MODULE DESIGN



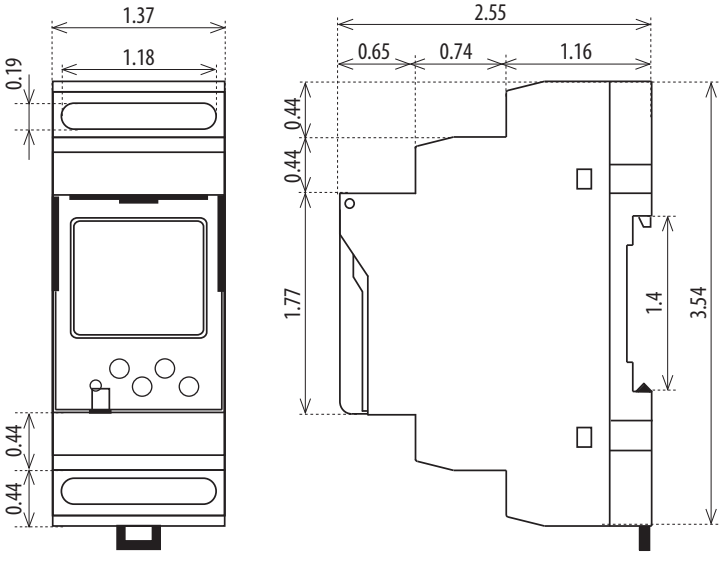
PRI-32



front panels 1-MODULE, examples of use:

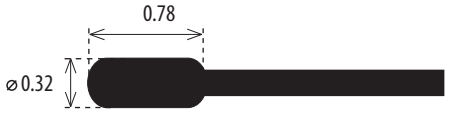


2-MODULE DESIGN

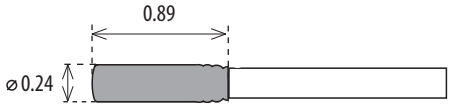


Temperature sensor

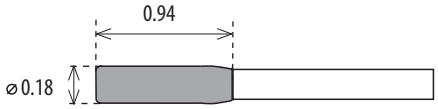
TC



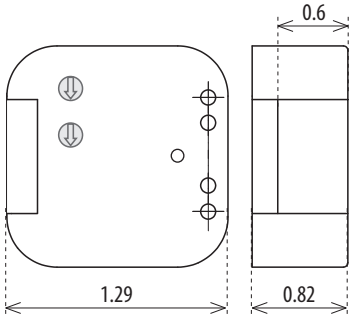
TZ



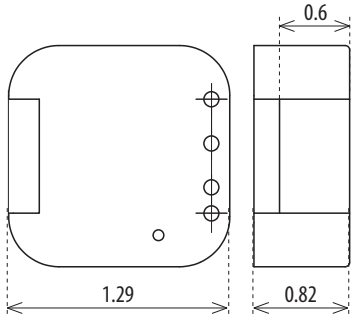
PT100



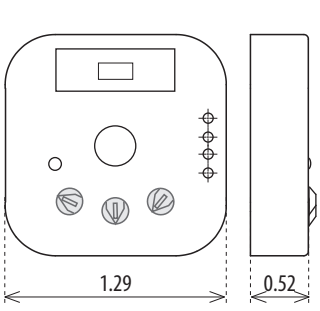
SMR-M



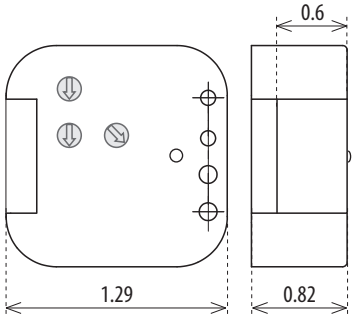
PSB



SMR-T

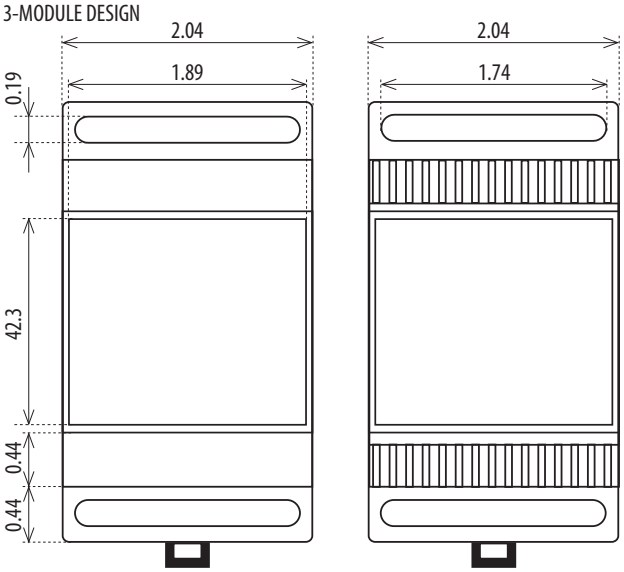


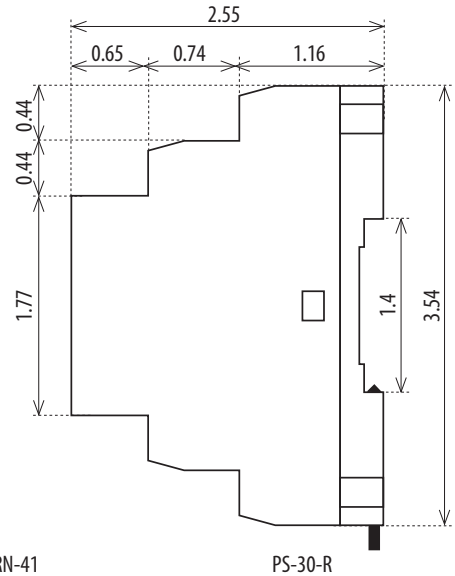
SMR-B



Dimensions

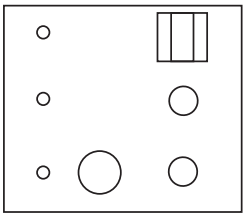
3-MODULE DESIGN



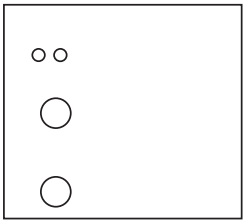


front panels 3-MODULE, examples of use:

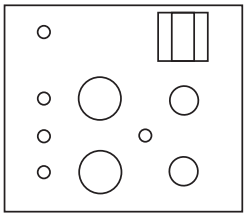
HRH-1



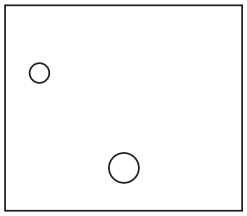
HRN-56



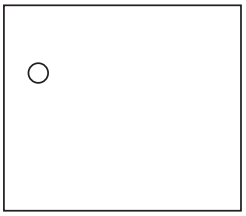
HRN-41



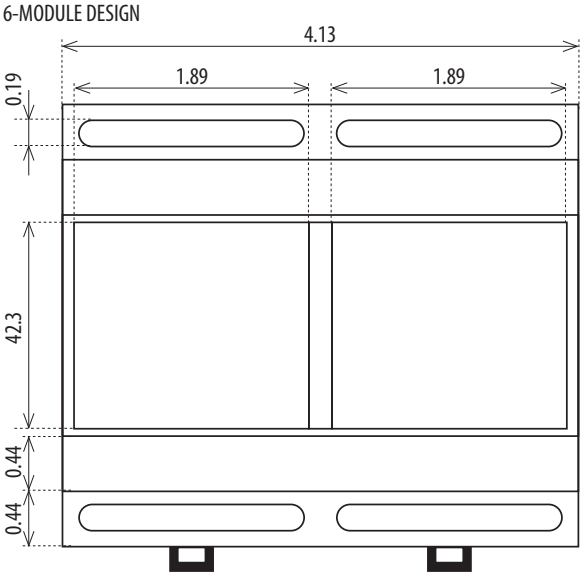
PS-30-R

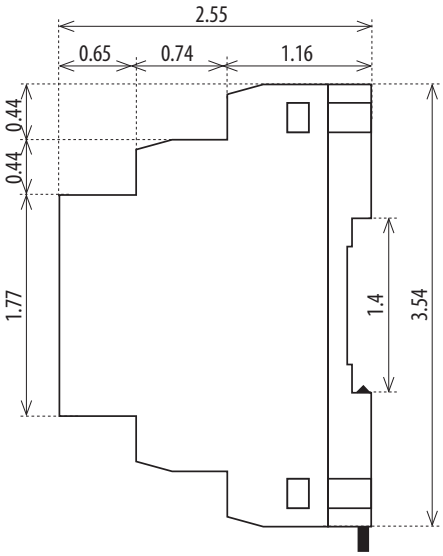


PS-30-12



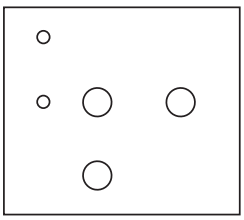
6-MODULE DESIGN



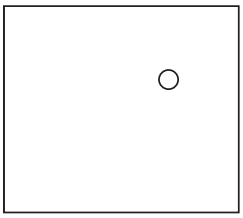


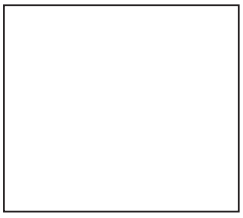
front panels 6-MODULE, examples of use:

PRI-53

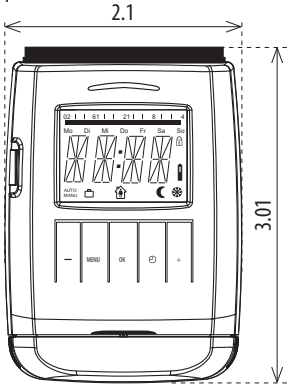


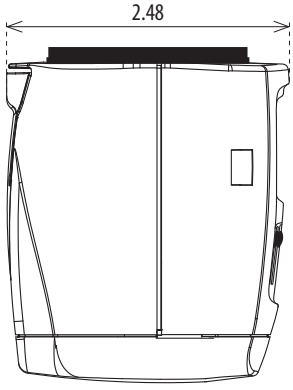
PS-100-12





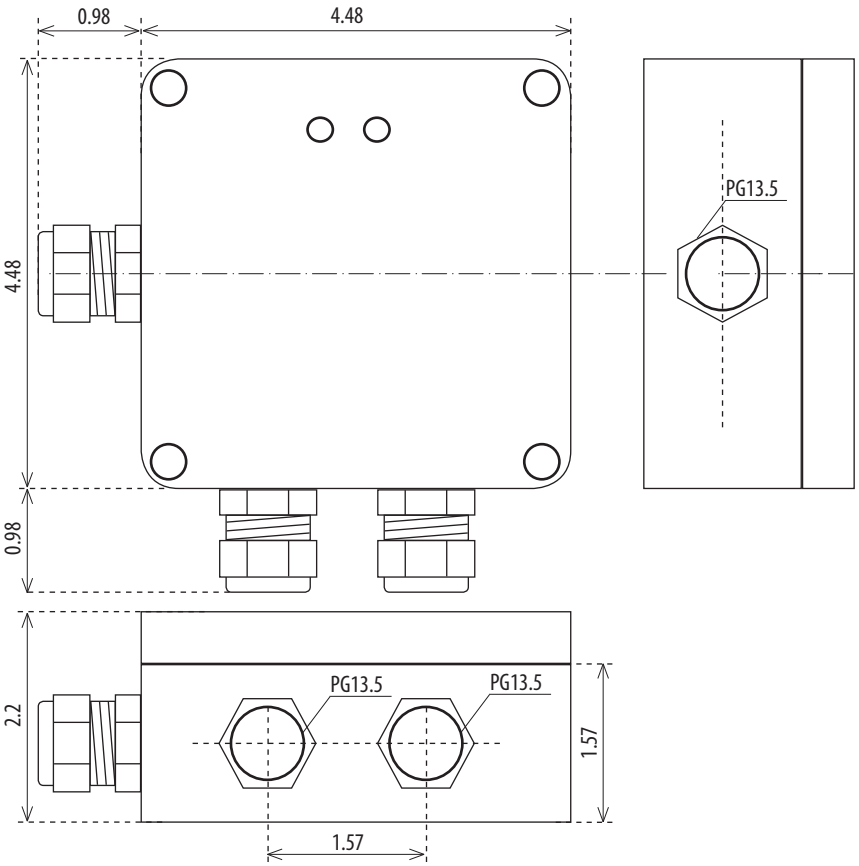
ATV-1



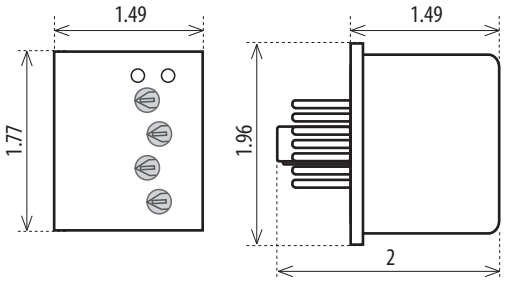


Dimensions

HRH-7

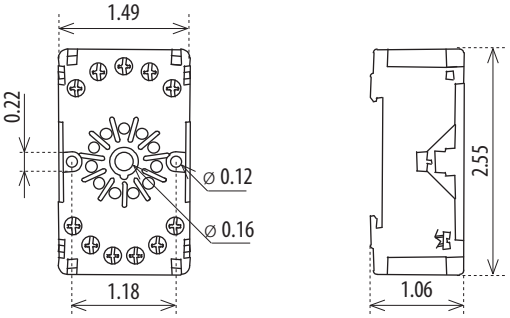


PRM-91H/11, PRM-91H/8, PRM-92H, PRM-2H



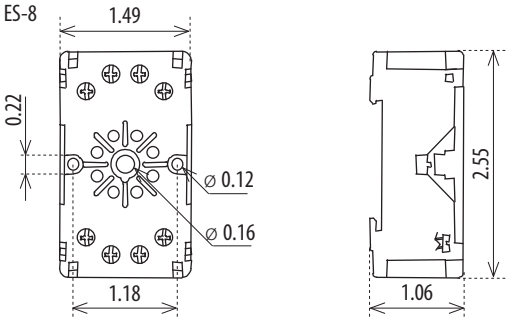
Socket for PRM-91H/11, PRM-92H, PRM-2H

ES-11

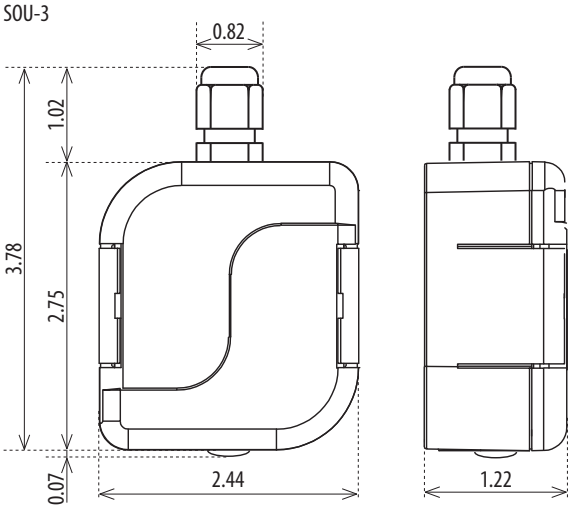


Socket for PRM-91/8

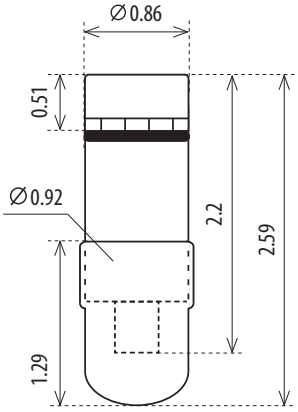
ES-8



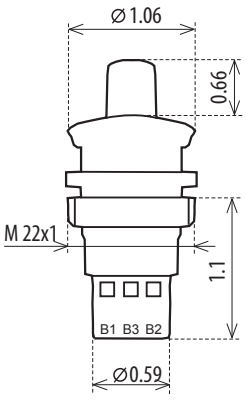
SOU-3



photosensor SKS

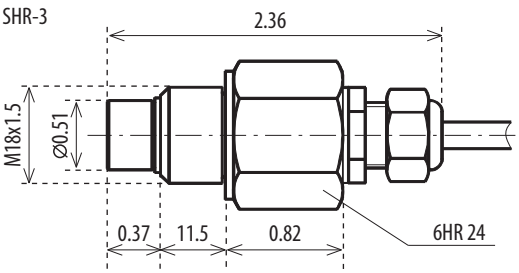


external potentiometer
for CRM-2HE, CRM-91HE



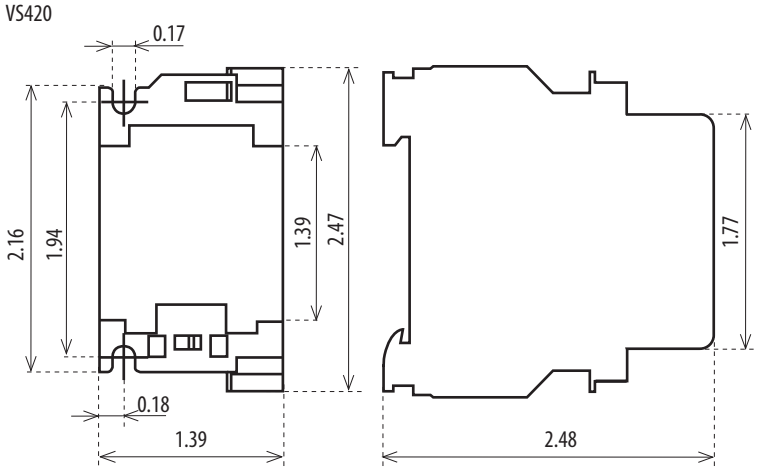
Level sensor

SHR-3

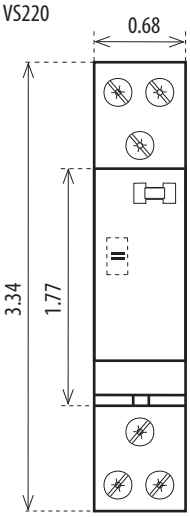


Dimensions

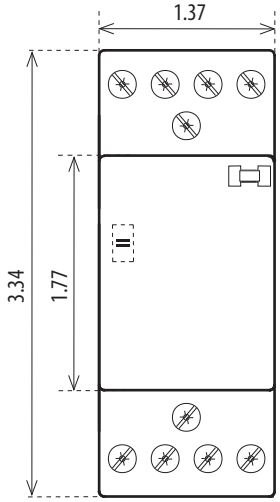
VS420



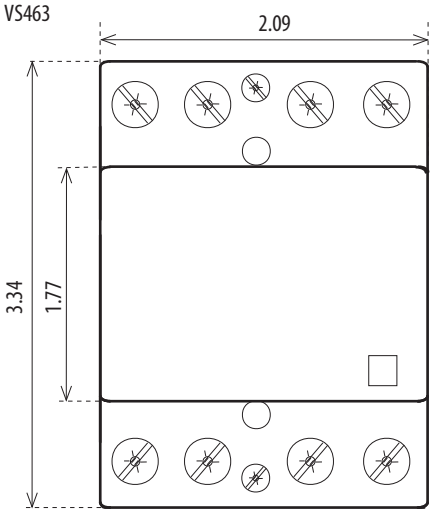
VS120
VS220

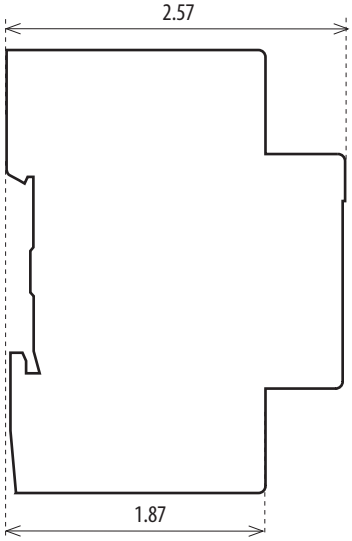


VS425



VS440
VS463





Support of project design

Our aim is to give a complete care to all electro project designers.

Our activities:
Our products are a part of the following programs:

Project programs

ecscad

ELCAD

ePLAN electric P8

PCschematic

CADdy++ elektrotechnika

TECHNODAT SPAC START

Award programs

VeroX

Obis

OCEP SELPO Broumy

DTB ELKO EP XLS

ELKO ep XLS

MARKS AND SYMBOLS DWG

DWG Autodesk

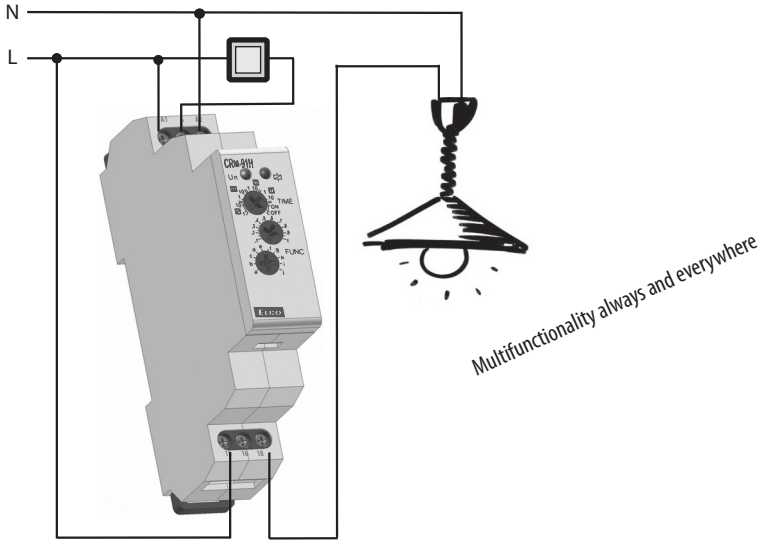
TRAINING
In case our products attracted your interest, do not hesitate to contact us at elko@elkoep.com or see our websites www.elkoep.com for more information.

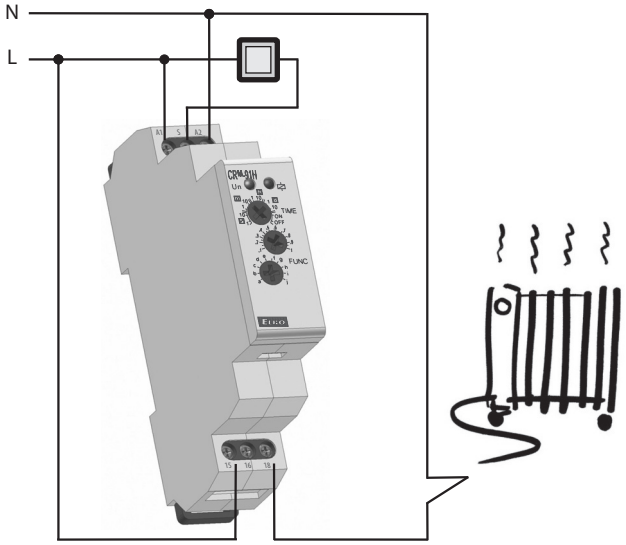
TECHNICAL SUPPORT
In case of any questions regarding use of our products for a particular project, contact us at support@elkoep.com.

Examples of usage

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

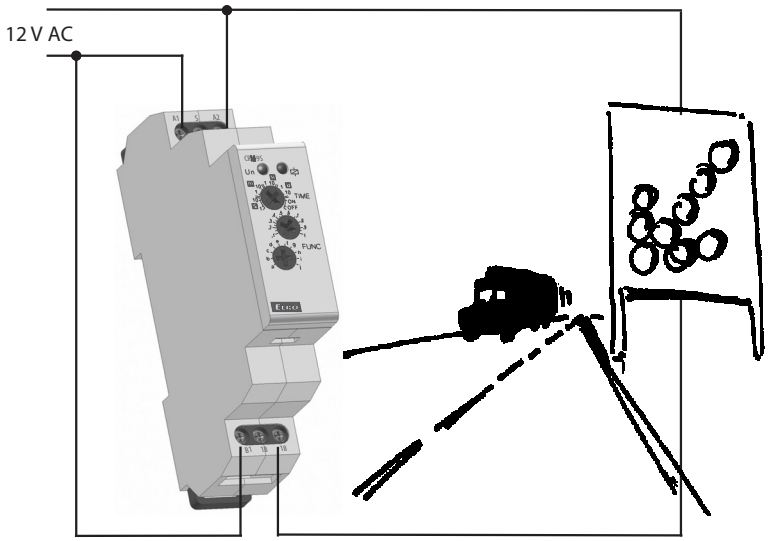
- for electric appliances, where is necessary to change the exact timing - controlling of the illumination, heating, motors, machines, ventilators, contactors...





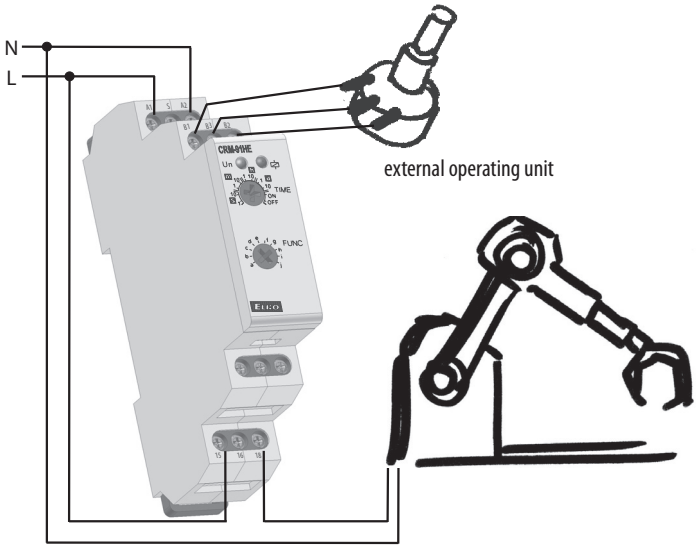
Multifunction time relay with contactless output CRM-9S

- using for warning illuminatin on the road, flashers, cyclers, often switched systems ...



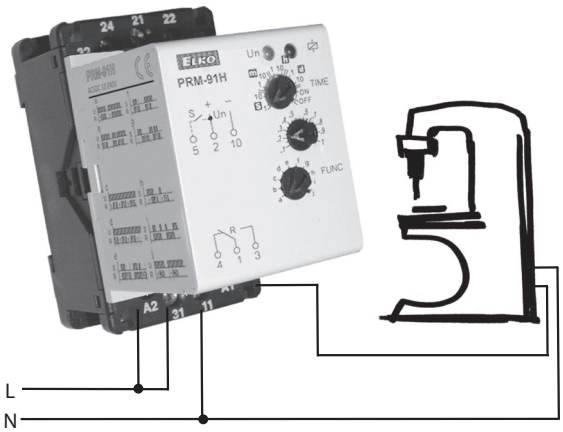
Multifunction time relay with external potentiometer CRM-91HE

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



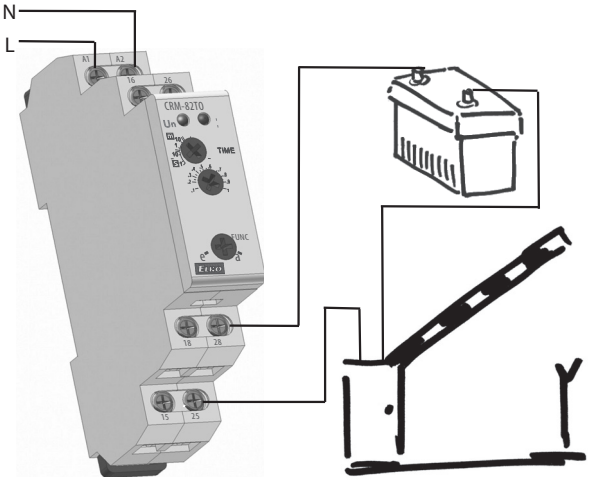
Time relay plug-in type PRM-91H, PRM-92H

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



Delay OFF without supply voltage CRM-82TO

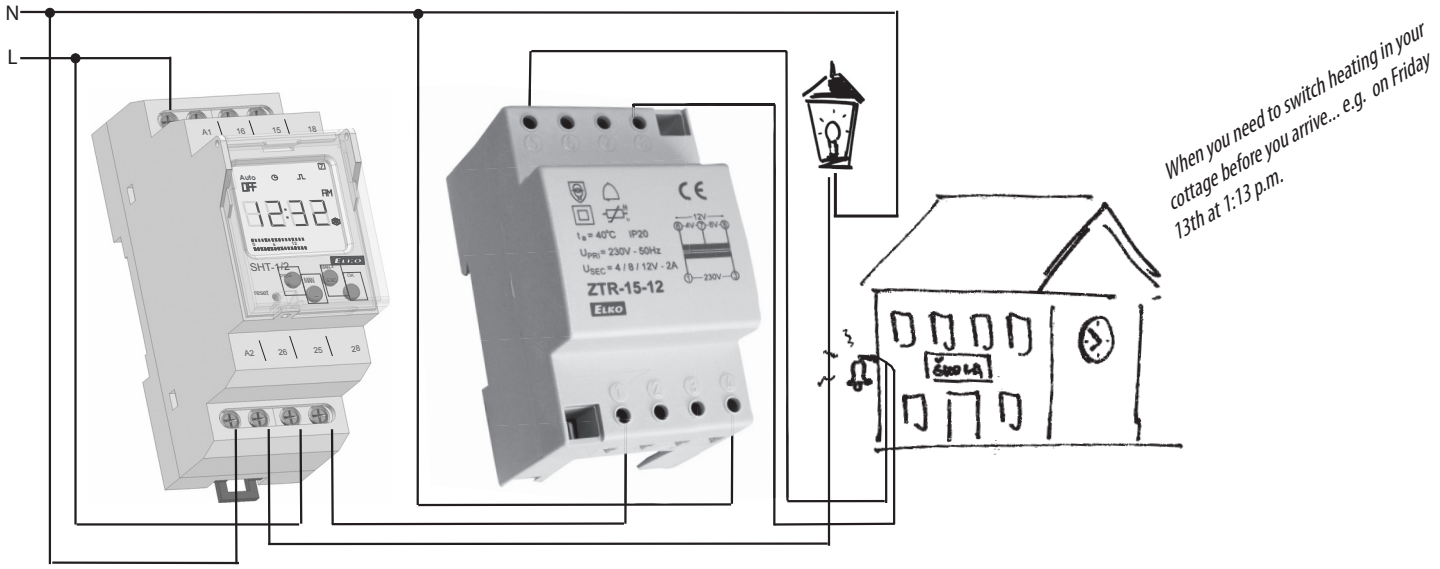
- delayed back-up switch off at current failure (emergency illumination, emergency respirator)



Examples of usage

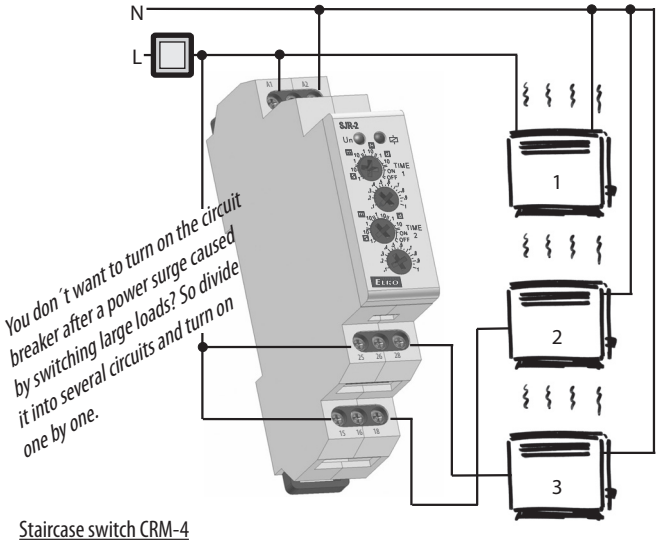
Digital time switch SHT-1/2

- for controlling of all appliances that depend on real time, appliances could be controlled in regular cycles, or according to adjusted program (blocking of main door out of working hours or night)
- in combination with other devices, controlling could be combinated (rooms ventilation, irrigation controlling, bell at school or in church...)



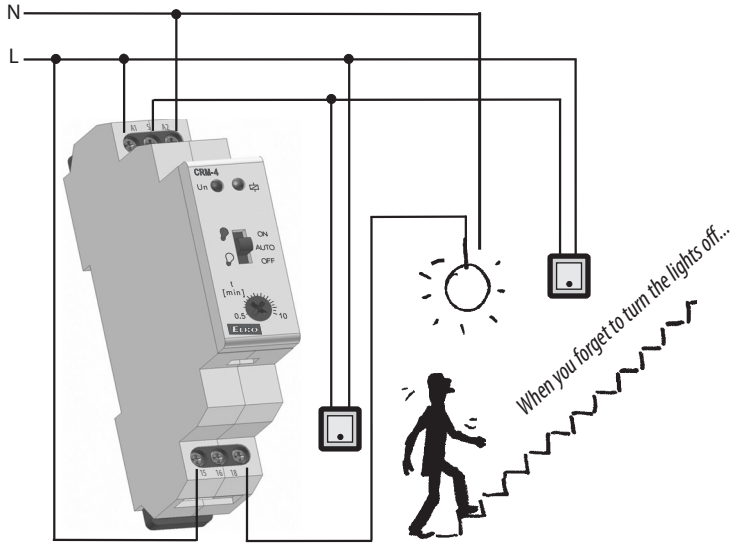
Doublestage delay unit SJR-2

- for sequential load switching, electric furnaces, heaters....



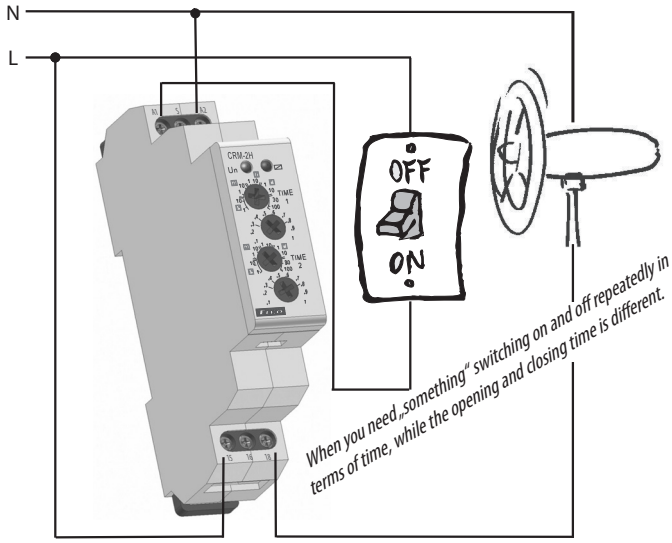
Staircase switch CRM-4

- staircase automatic systems, ventilators switching, for multiplace operating illumination on the staircases and halls...



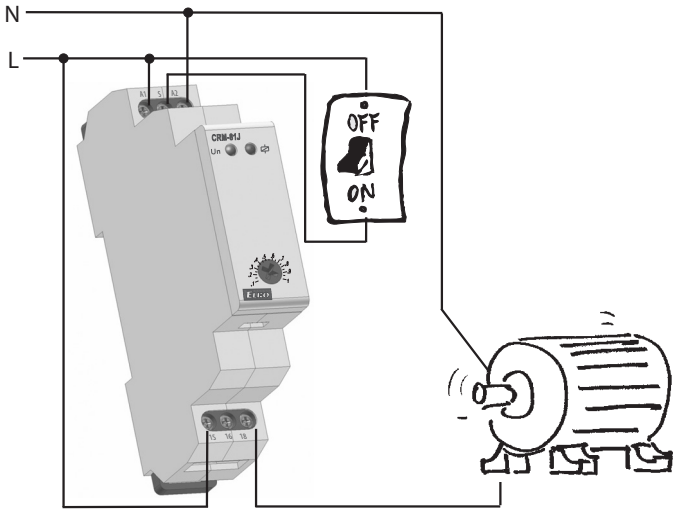
Asymmetric cycler CRM-2H

- 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-81J

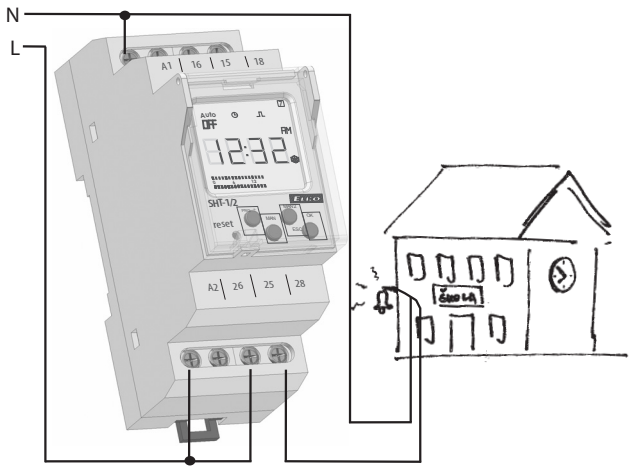
- time switch, using for run down the pump after switch off the heating, switching of ventilators ...



Examples of usage

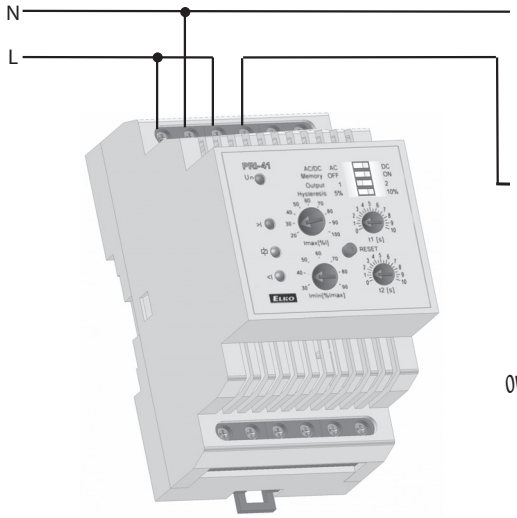
Digital time switch SHT-1, SHT-1/2

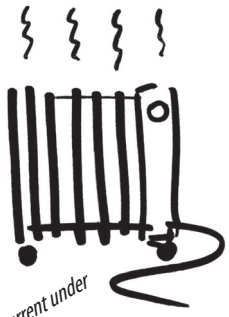
- for controlling of all appliances that depend on real time, in daily or weekly mode



Monitoring current relay PRI-41 (PRI-42)

- monitoring over-/-underload (machine, motor ...)
- monitoring consumption, diagnostics of distant appliance (short circuit, increased consump. ...)

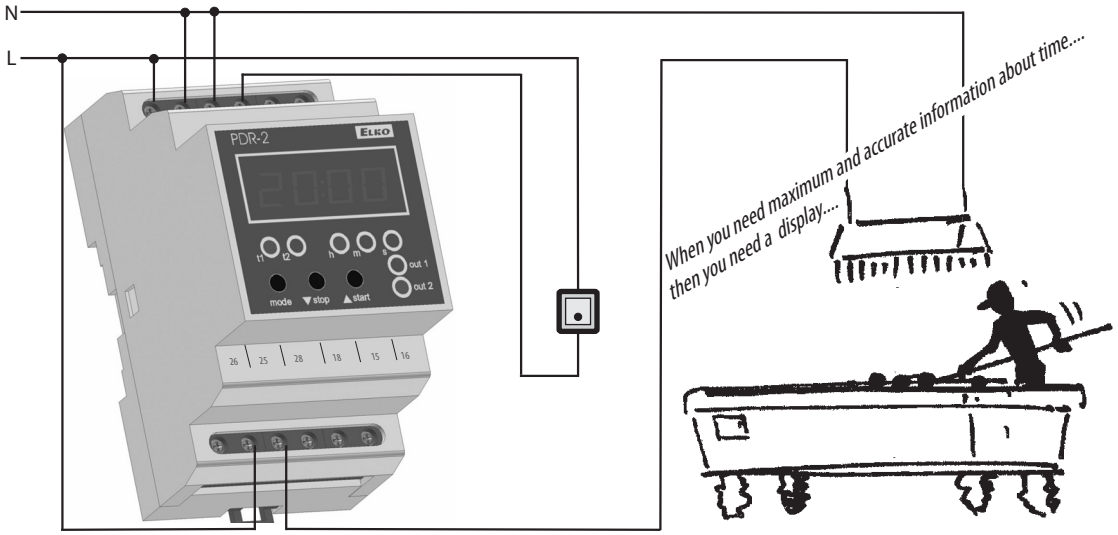




One-phase current under magnifying glass

Programmable digital relay PDR-2

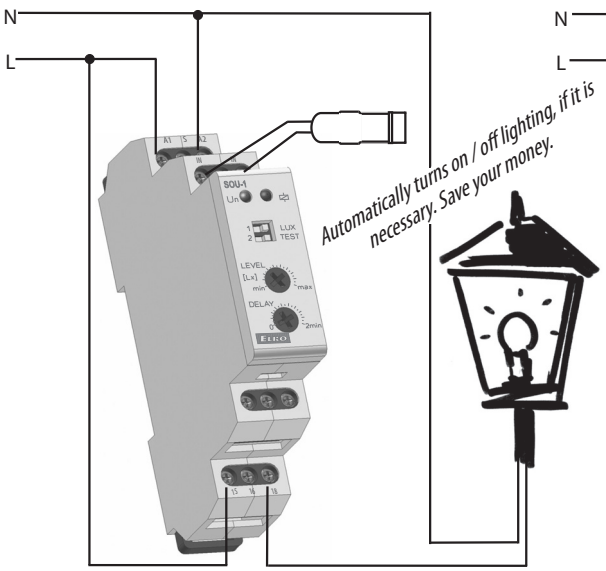
- illumination, ventilators, contactors controlling, controlling of interlocking plans, system of time abate and blocking (billiards, pin-balls....), away control via external buttons



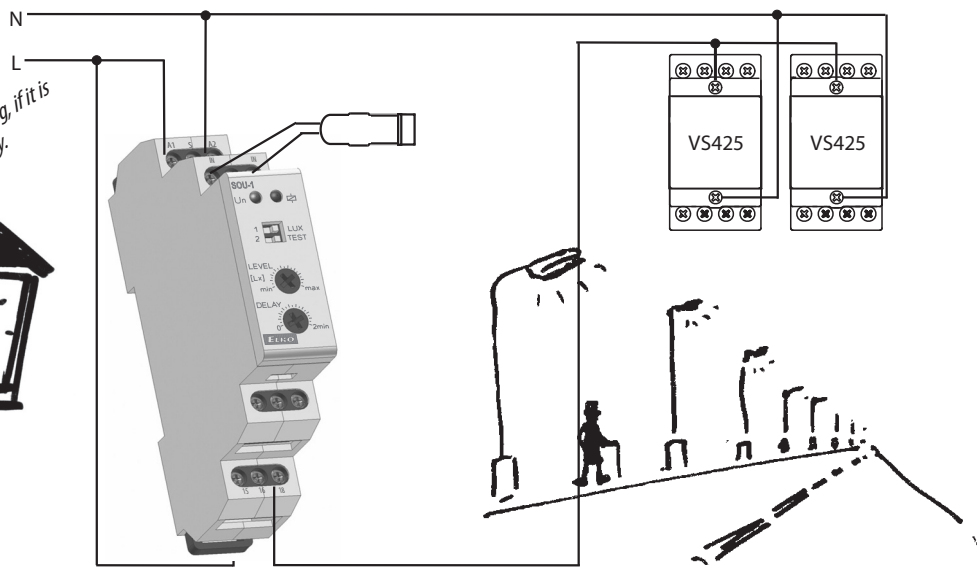
When you need maximum and accurate information about time.... then you need a display....

Twilight switch SOU-1

- outdoor illumination switching (garden illumination), flash, shop-window, hall and office illumination (switch off in desired light level, controlling of intensity)



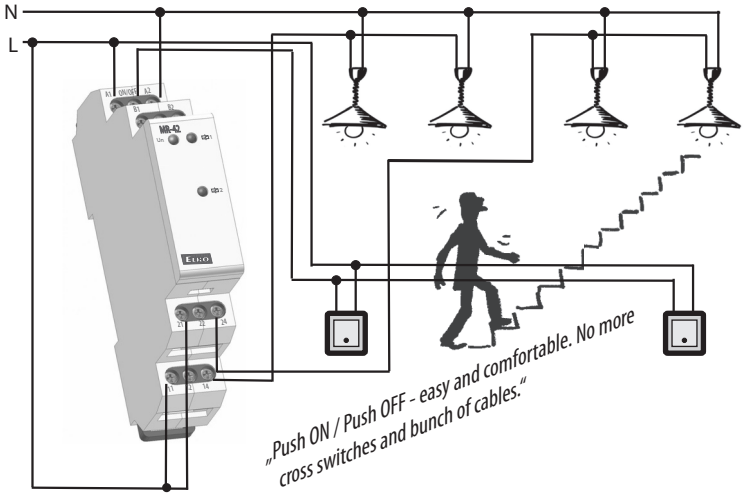
Automatically turns on / off lighting, if it is necessary. Save your money.



Examples of usage

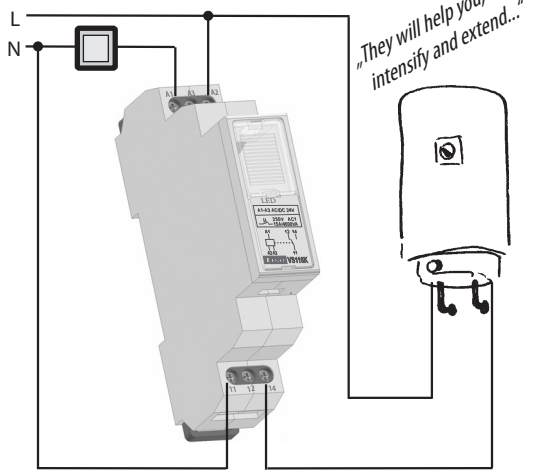
Memory relay MR-41, MR-42

- because of 2-wire parallel buttons connection save money, place and time during the installation
- light switching, hall, staircase, big rooms, controlling systems, automation



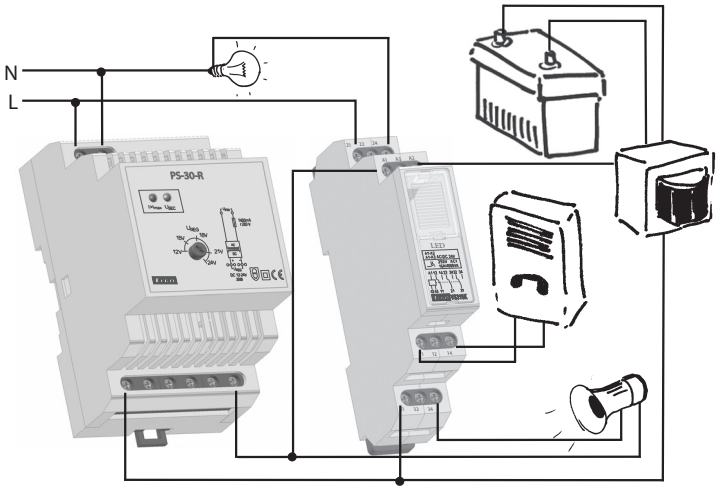
Power relays VS

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



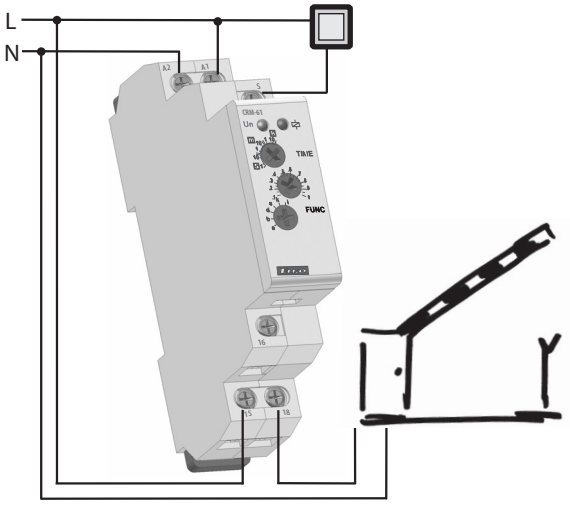
Switching power supply PS-30-R

- power supply of any devices and appliances via safe voltage with full galvanically separated from mains
- power supply of driving systems, interlocking plants and use in measurement and control



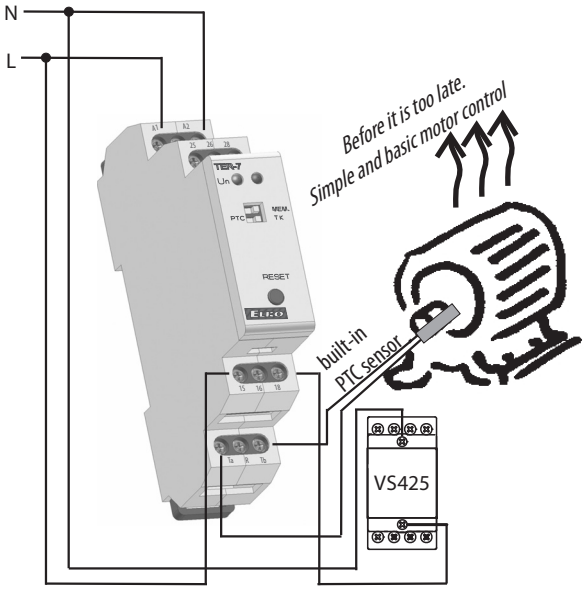
Multifunction time relay CRM-61

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



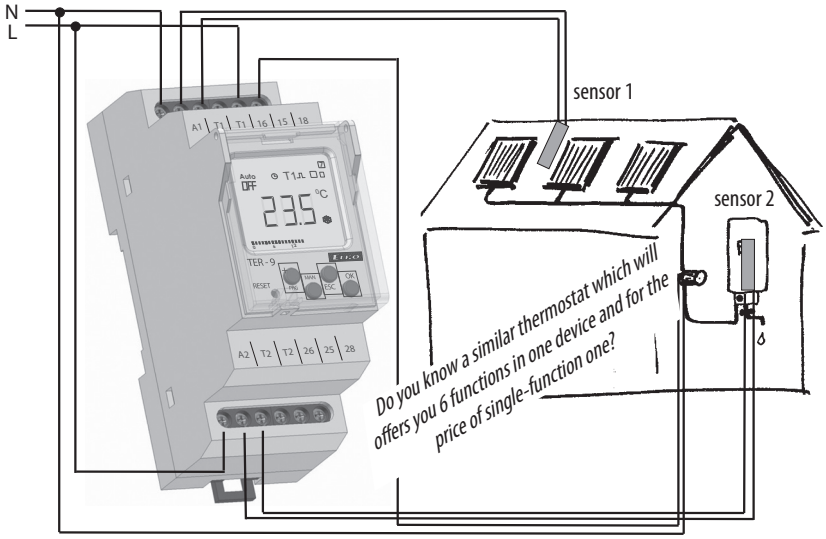
Thermostat for thermal protection of motors TER-7

- protection of motors against thermal overload



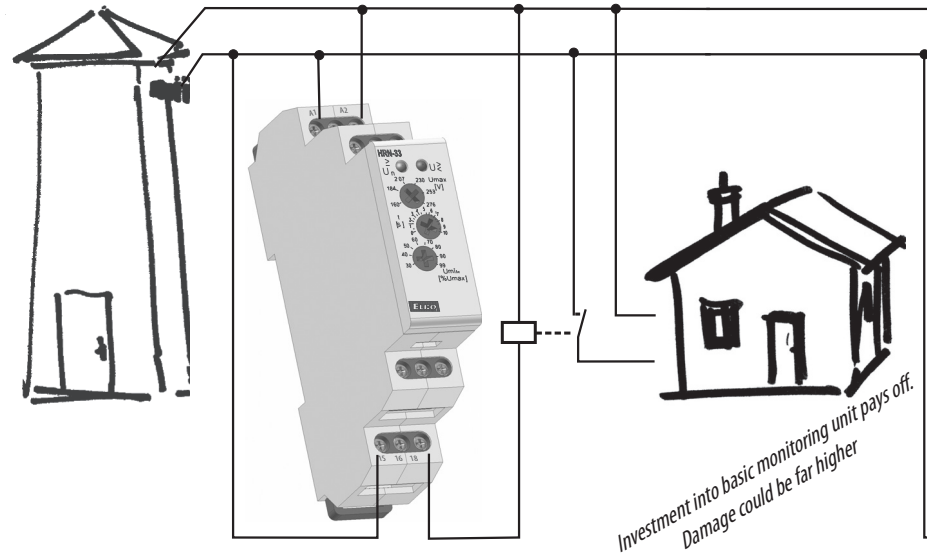
Multifunction digital thermostat TER-9

- complex control of heating and water heating in a house

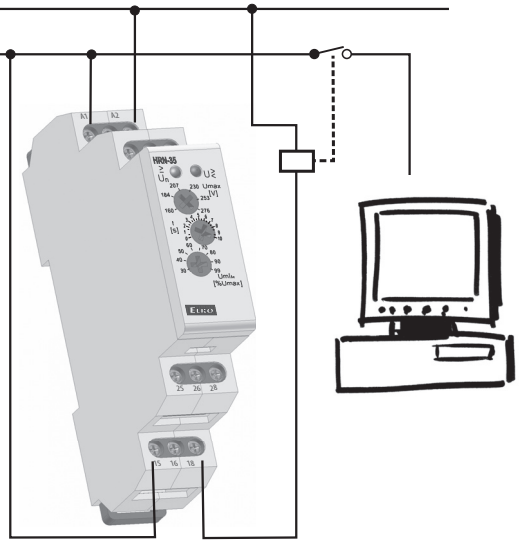


Examples of usage

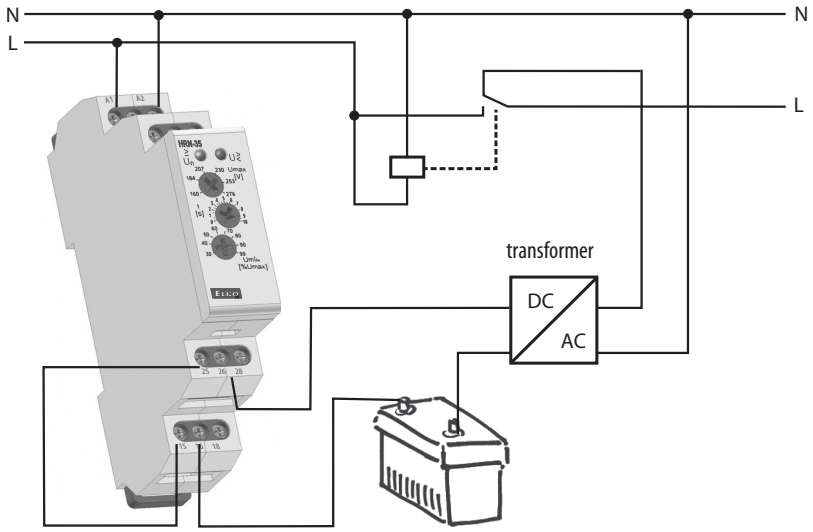
Monitoring voltage relay HRN-33 (35)
- monitoring of mains voltage for appliances inclinable to supply tolerance



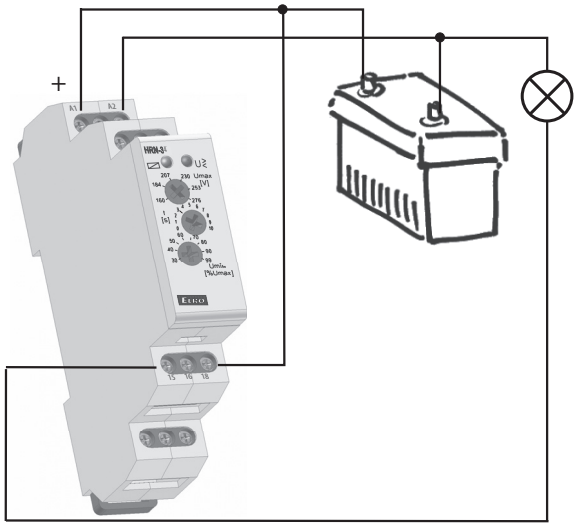
Monitoring voltage relay HRN-33 (35)
- protection of appliances against under-/overvoltage



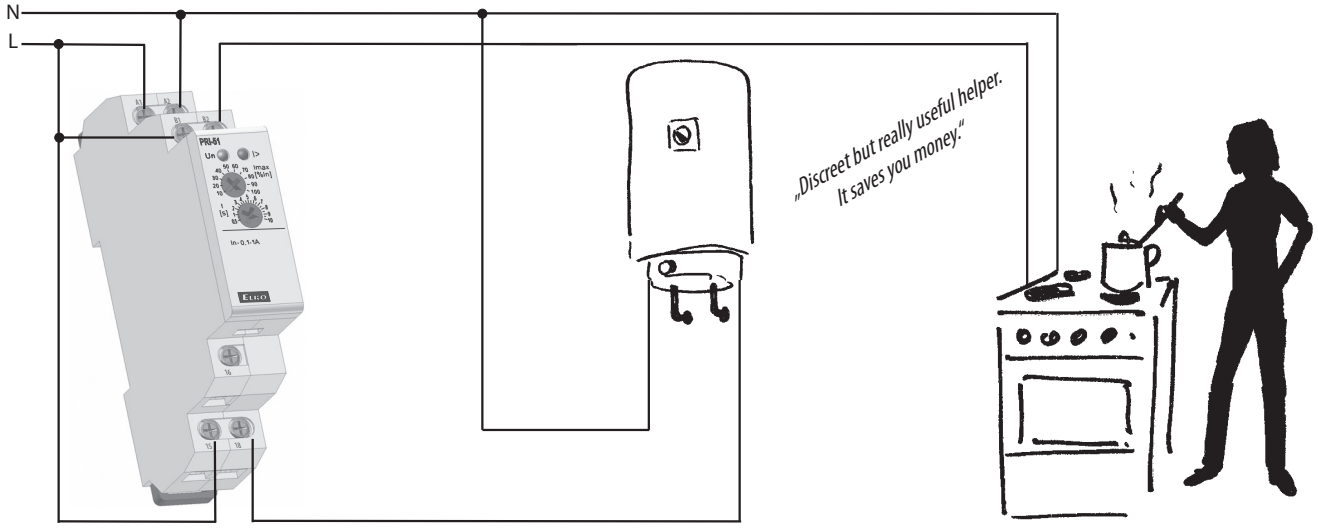
Monitoring voltage relay HRN-35
- start of back-up supply in case of failure



Monitoring voltage relay HRN-34
- load disconnected when voltage declines or battery is discharged

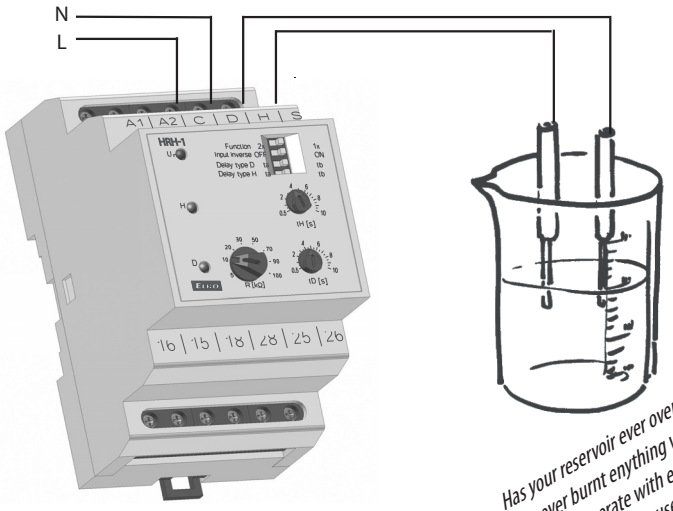


Monitoring current relay PRI-51, PRI-32
- current-limiting relay (on one branch two appliances, which never work together), controlling systems, motors, heating, current indication, controlling of 1-phase motor run down, during the installation of main housing switchboard could be controlled via eye, if the cooker is not switched
- in connection with current transformers, it is possible to extend current ranges up to 600 A, which makes more things possible



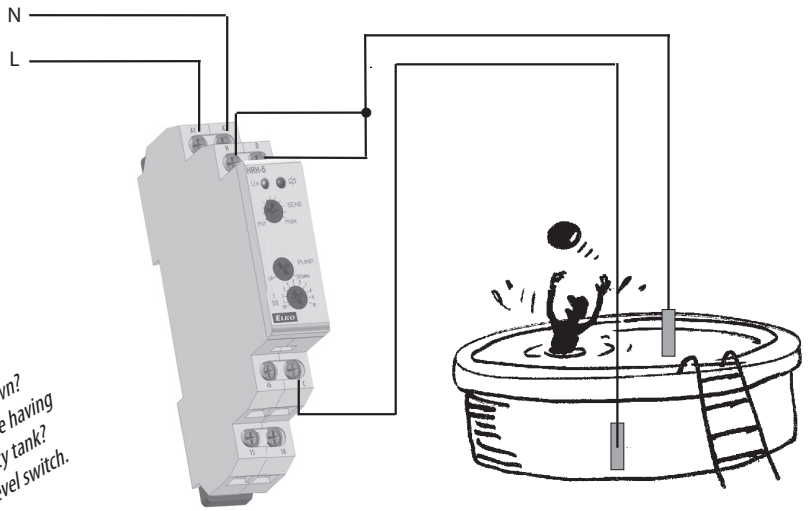
Examples of usage

Level switch HRH-1
- monitoring level in wells, tanks, pools, etc.

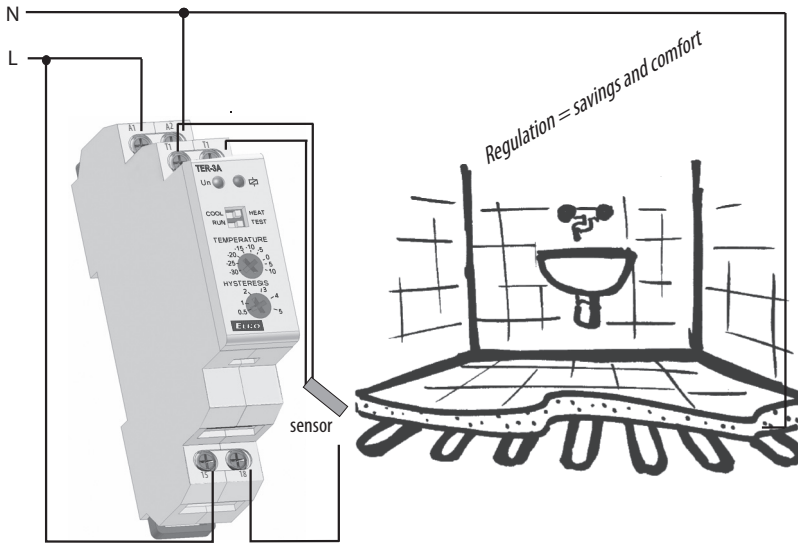


Has your reservoir ever overflown? Have you ever burnt enything while having your pump to operate with empty tank? If yes, you probaly have not used level switch.

Level switch HRH-5
- monitoring level in well, sump, tanks, pool, silo...



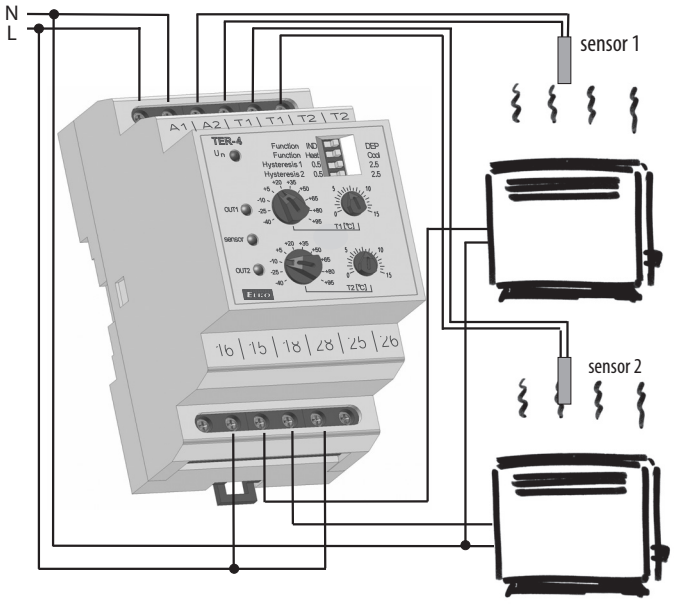
Thermostat TER-3 with external sensor
- control of temperature of floor heating



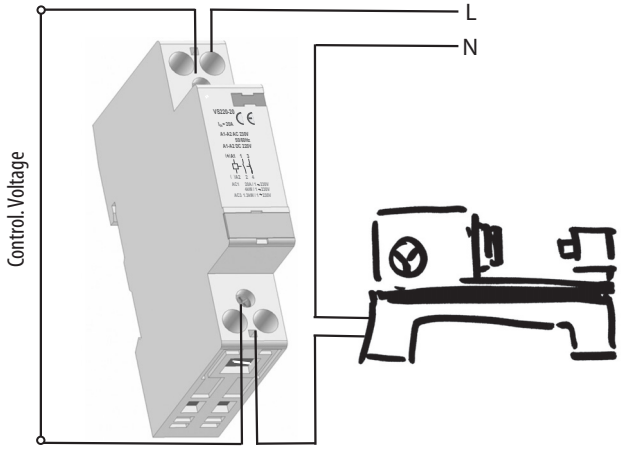
Regulation = savings and comfort

2 stage thermostat TER-4 with 2 external sensors
- control of temperature of e.g. gas/electric boiler

Save money and have two devices in one

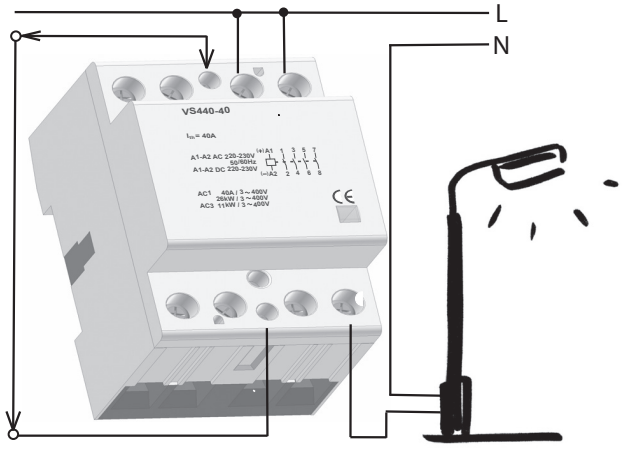


Modular contactor VS120, VS220, VS420, VS425
- to switch circuits for supply and control of heating, lights, air-conditioning and other el. devices. Switches loads AC-1, AC-3, AC-7a, AC-7b, AC-15.

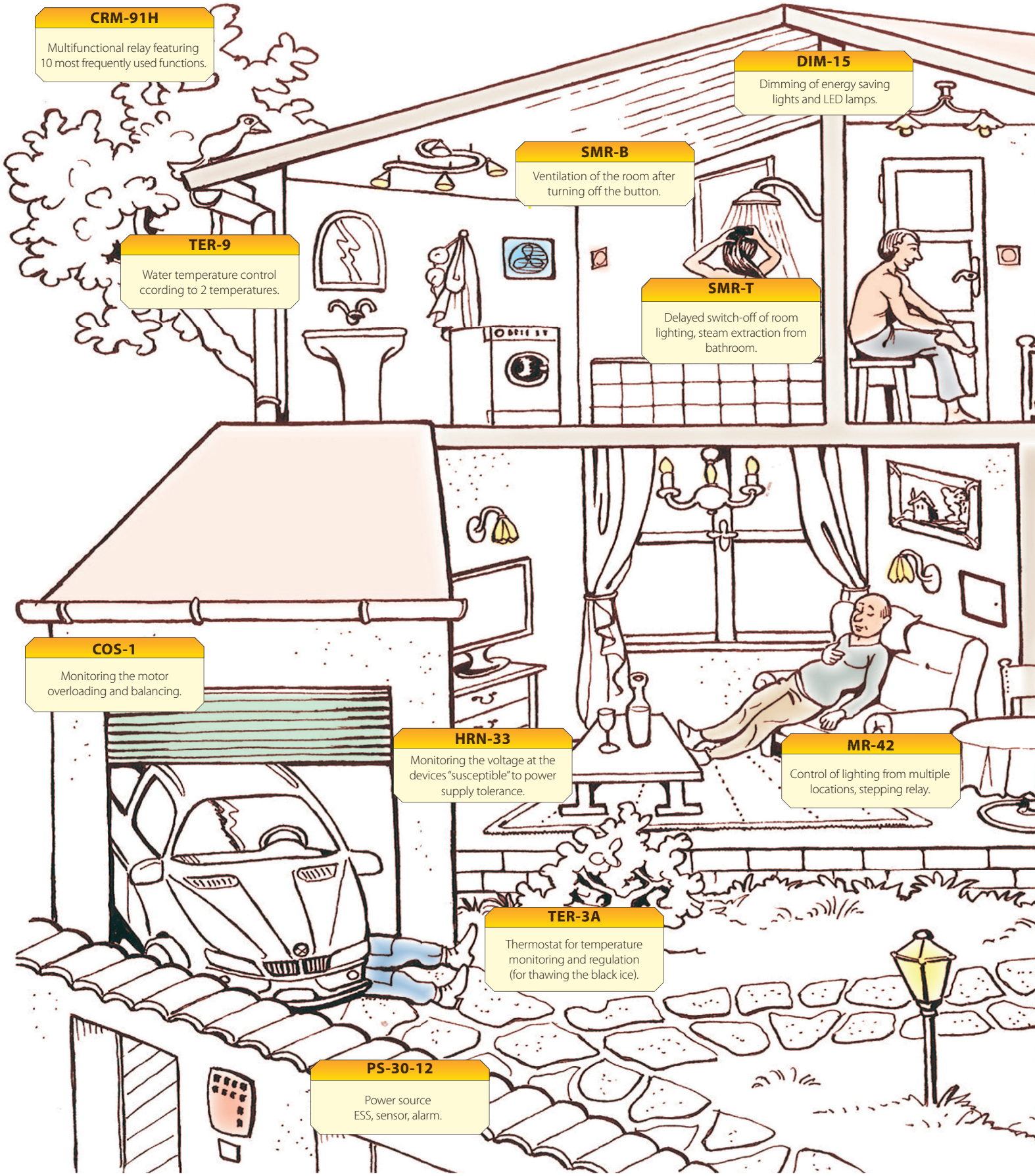


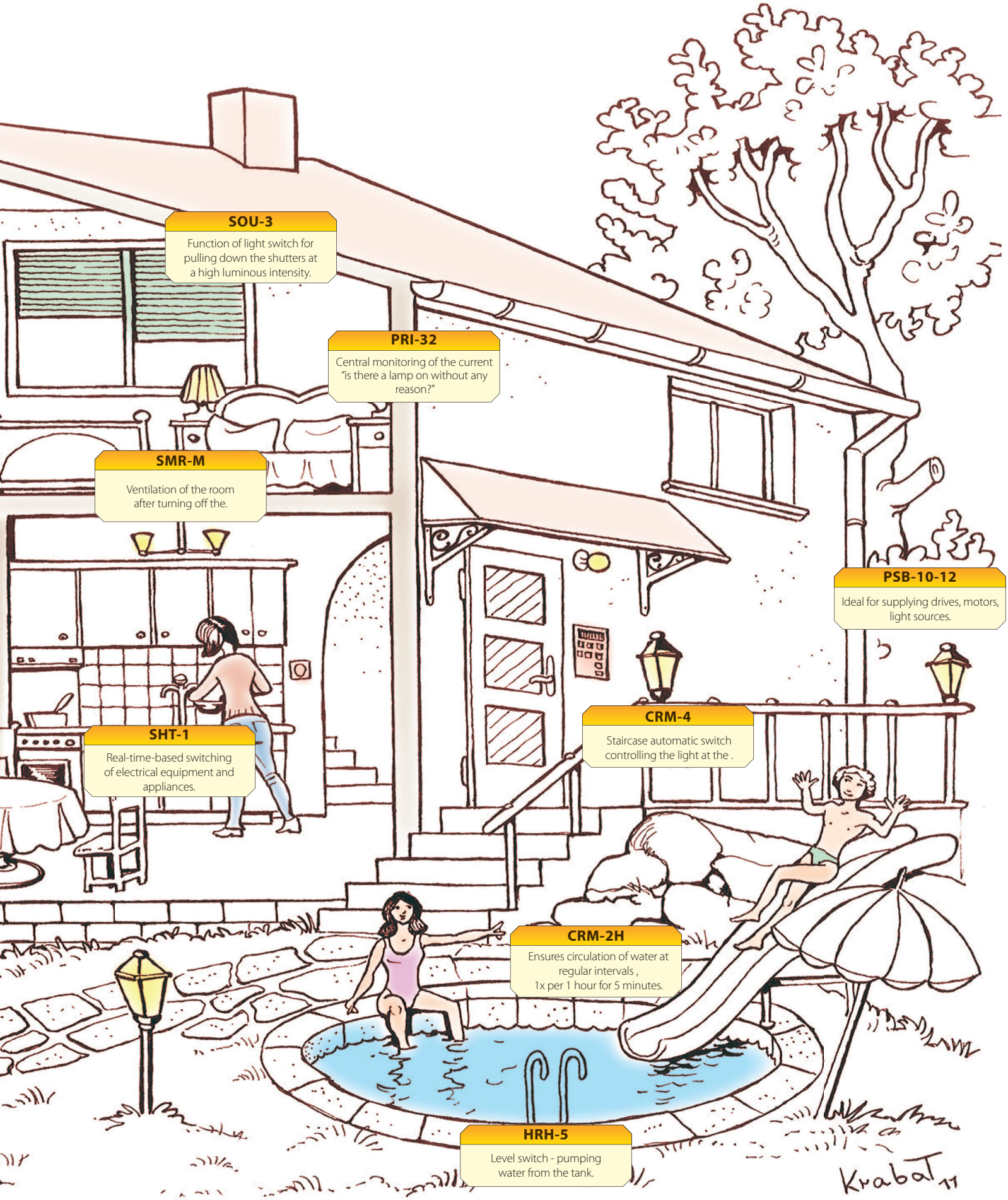
Modular contactors VS440, VS463
- to switch supply and control circuits for heating, air-conditioning and other el. devices, switching 3-phase motors

Switches loads A-1, AC-3, AC-7a, AC-7b, and AC-15

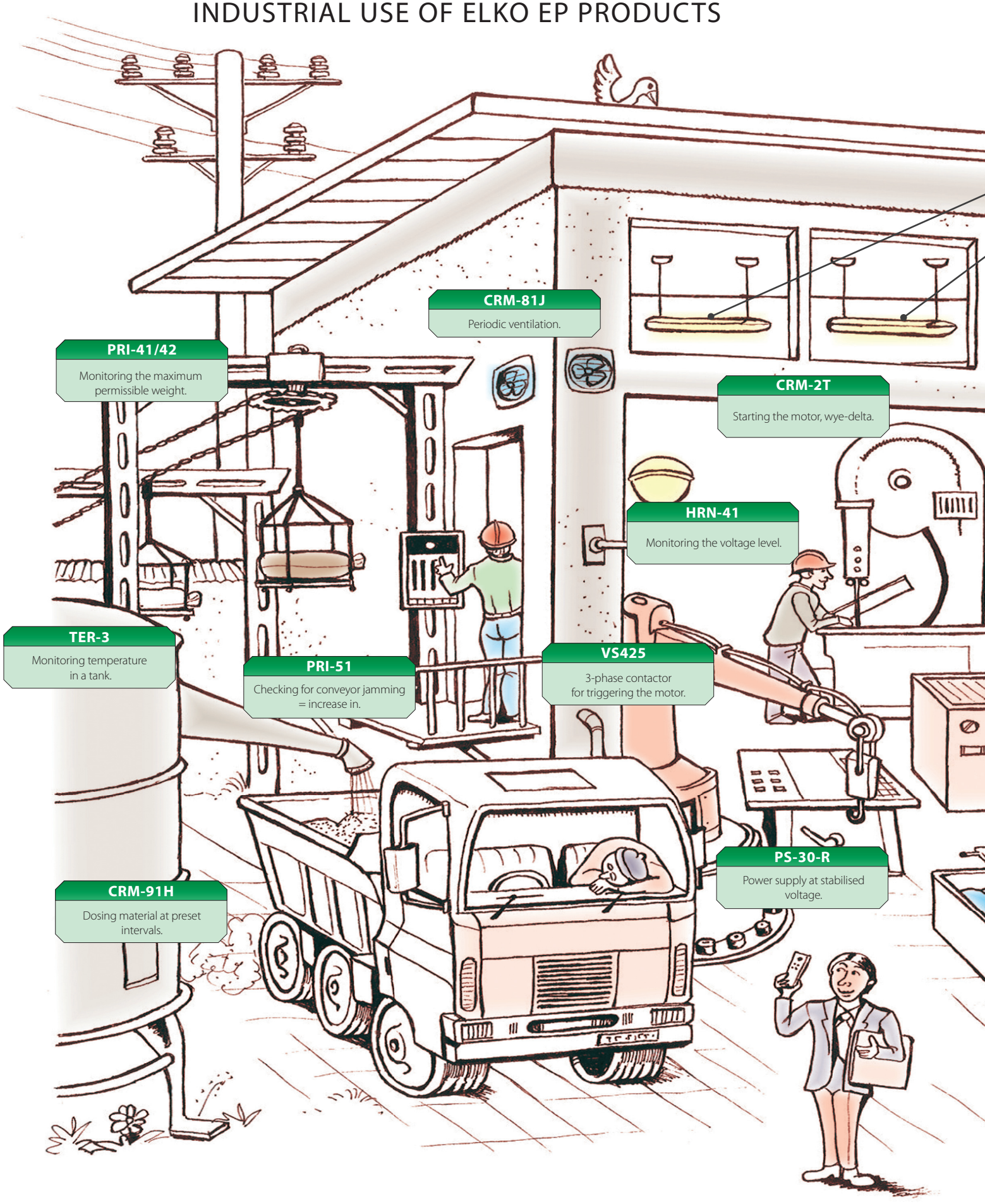


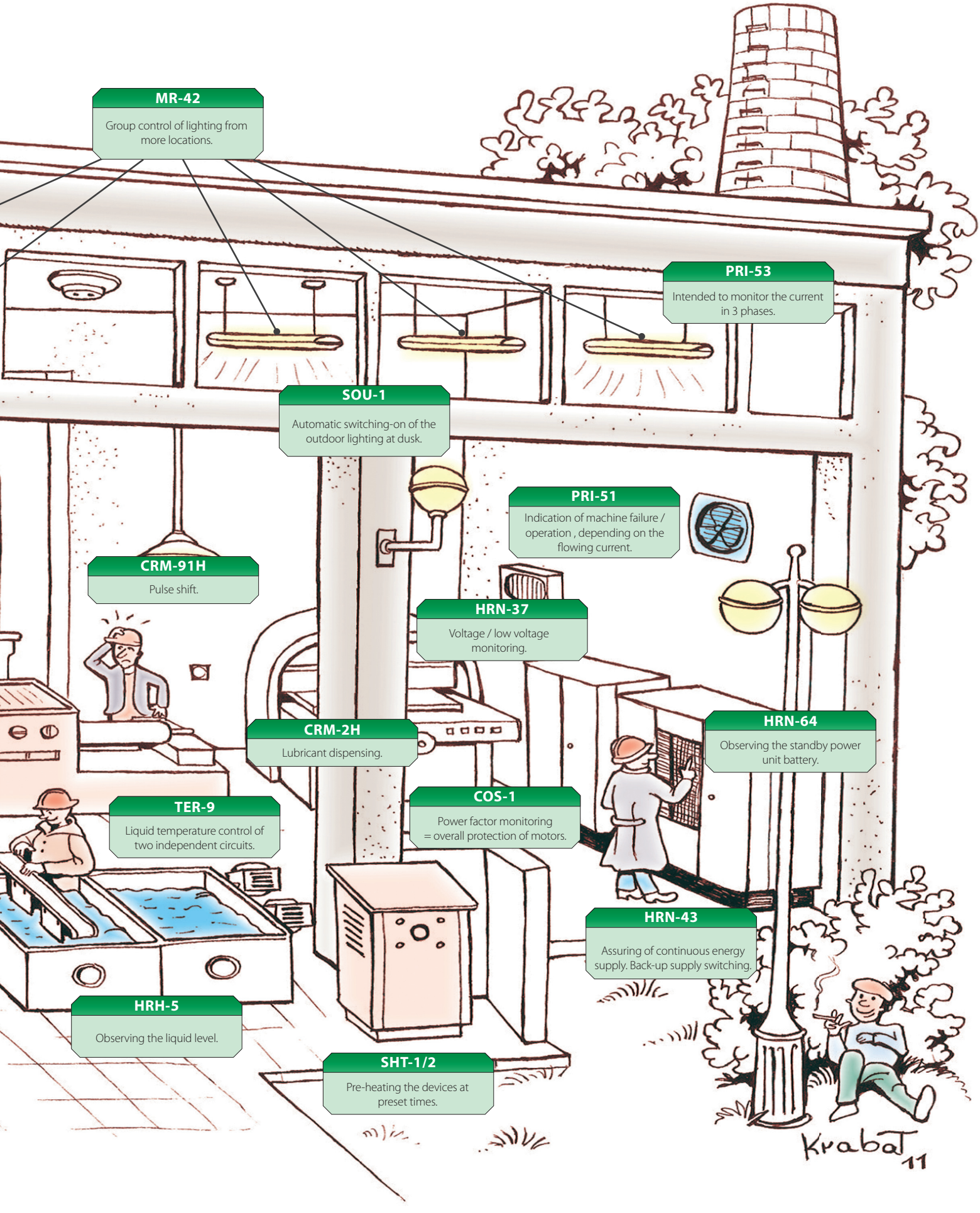
ENJOY THE COMPLETE HOUSEHOLD EQUIPMENT BY ELKO EP




SOU-3
Function of light switch for pulling down the shutters at a high luminous intensity.
PRI-32
Central monitoring of the current "is there a lamp on without any reason?"
SMR-M
Ventilation of the room after turning off the.
PSB-10-12
Ideal for supplying drives, motors, light sources.
CRM-4
Staircase automatic switch controlling the light at the .
SHT-1
Real-time-based switching of electrical equipment and appliances.
CRM-2H
Ensures circulation of water at regular intervals , 1x per 1 hour for 5 minutes.
HRH-5
Level switch - pumping water from the tank.

INDUSTRIAL USE OF ELKO EP PRODUCTS




MR-42
Group control of lighting from more locations.
PRI-53
Intended to monitor the current in 3 phases.
SOU-1
Automatic switching-on of the outdoor lighting at dusk.
PRI-51
Indication of machine failure / operation , depending on the flowing current.
CRM-91H
Pulse shift.
HRN-37
Voltage / low voltage monitoring.
HRN-64
Observing the standby power unit battery.
CRM-2H
Lubricant dispensing.
TER-9
Liquid temperature control of two independent circuits.
COS-1
Power factor monitoring = overall protection of motors.
HRN-43
Assuring of continuous energy supply. Back-up supply switching.
HRH-5
Observing the liquid level.
SHT-1/2
Pre-heating the devices at preset times.
Krabat 11

Other just resell

HOWEVER WE DEVELOP AND MANUFACTURE PRODUCTS OURSELVES!

23 years
on the market

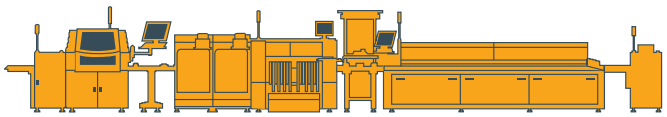
12 years
ISO certification

40 developers

200 proprietary plastic molds

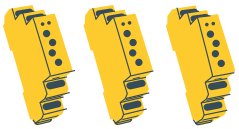
2 000 m²
manufacturing space

200 production workers



2
SMD lines

1 Mil.
components per day



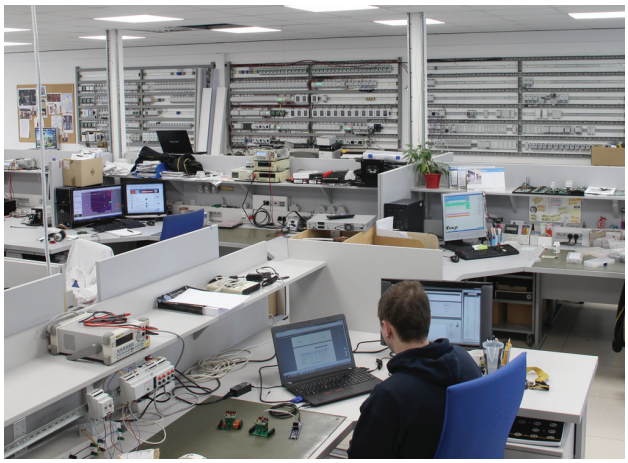
600 000
products per year

2000 m²
expedition space

2000
warehousing points

2 printing lasers

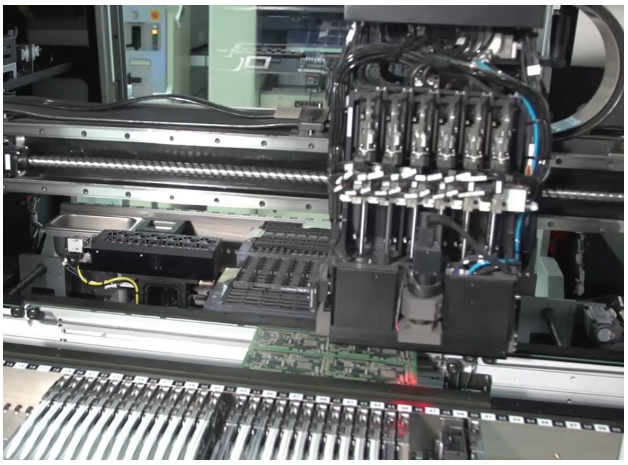
R&D overall view



Internal lab

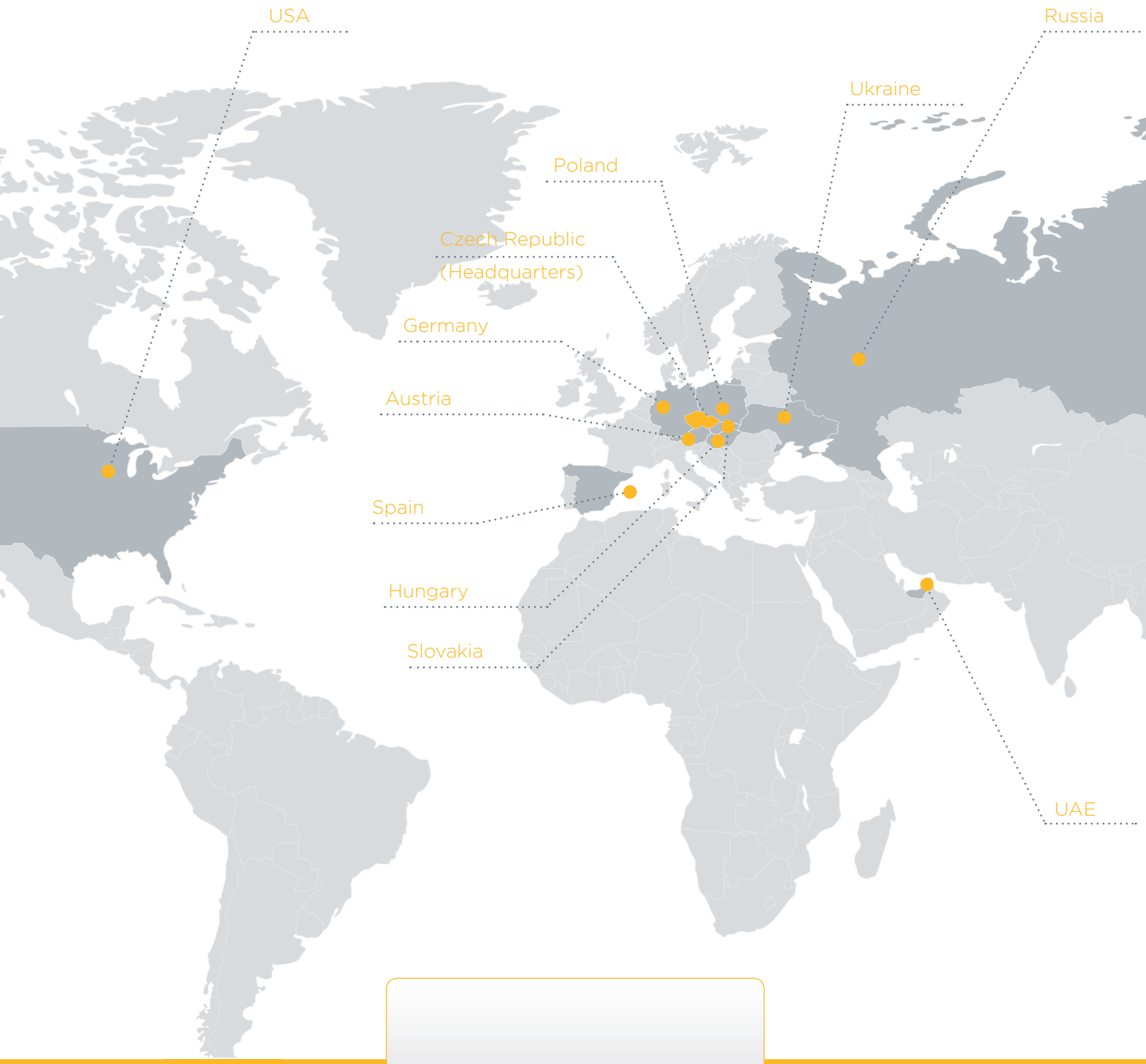
SMD production line

Chip placing



Production hall

Testing



iNELS SmartHome LLC a company of ELKO EP Holding
837 Peace Ln | Oregon, WI 53575 | USA
phone: 608-886-1744 | info@inelssmarthome.com | www.elkoepusa.com

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