ELKO ep®

MODULAR ELECTRONIC DEVICES

relay

TECHNICAL CATALOGUE

www.elkoep.com

Presentation of ELKO EP Company

ELKO EP, which is based in Holešov, has been with you on the electrical market for the past 20 years, covering a wide range of domestic equipments in the field of electrical installations. In the last few years there has been dynamic development of smart wiring, in which our company has been seven years developing and launching iNELS smart home system solutions. In modular devices, as well as in smart wiring, we have become market leaders. We're developing products that bring comfort to customers and safety for the environment.

The Parent ELKO EP company has gradually grown in 7 branches - Slovakia, Hungary, Poland, Russia, Ukraine, Romania and most recently Germany. At the same time we export to 60 countries around the world, and our products can be found under the world famous brand names (Schneider Electric, Eaton, HAGER, Siemens, MORS SMITT).

Our work is based on the development and modern technology. In practice, we appreciate you as our customers, because you're receiving good products and smart solutions, which meet your requirements. Our development facilities and precise production and distribution, all this gives you the opportunity to use solutions which are both innovative and practical. There are our modern manufacturing facilities to produce all our products. It was extended over the newest and fastest SMD line, which means for you guaranteed quality and flexibility of supply.

We have and supervise 80% share of the Czech market and the fourth position in Europe.
Current-year sales growth: 20%
Number of employees in Holešov: 170
Number of employees of ELKO EP Holding: 236

Awards and Recognition:
In 2011, the experts awarded the top products developed in ELKO EP: RF Touch - wireless touch control unit won a Golden Amper, Moravian Electrical and Electronic Association Award, Innovation Award of the year and PwC Special Award for Innovation. Also iNELS Multimedia - Multimedia control through television, won an award - honorable mention Grand Prix.
Providing the possibility for students in technical fields to do their thesis. In 2012, the company ELKO EP became THE Number ONE company in Zlín Region and in the national finals, we won second place.

Our range of products is divided into three product lines - relay (classical modular devices), RF Control (wireless), iNELS BUS system (Bus System). Each product line has its own technical catalogue, where you can find complete information on individual products.

Product Lines

RELAYS - Modular electronic devices **www.elkoep.com**
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 switches clocks, dimmers, thermostats, power supplies units, control and signalling devices, GSM gates, etc.

iNELS - Intelligent electro-installation System **www.inels.com**
iNELS 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 elegant iNELS Touch Panel (iTP).

iNELS RF Control - Wireless control **www.elkoep.com**
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.

LOGUS^{90} – Home switches and sockets **www.logus90.com**
We offer you exclusive switches, sockets and accessories in a standard plastic or metallic design. However, there are also charming luxury frames from purely natural materials such as genuine wood, metal, granite or hardened glass. Be especial!

iNELS system advantages

Advantages to classical electrical installation:

Comfort
- dimming function (gradual dim-up/dim-down, soft start, light scenes)
- control via touch-screen (built-in a wall) = complete information
- control via any remote controller (e.g. of your TV or stereo)
- control by voice (Sophy unit, listens to your voice commands)
- temperature regulation according to pre-set programs – in each room individually
- possibility to control by mobile phone, computer and Internet

Automatization
- function is executed automatically on the basis of set value (time, temperature, light intensity, movement of people, wind strength...)
- it is possible to execute several functions on the basis of one command or event (e.g. when it is dark - INELS rolls shutters down, switches lights on, increases room temperature and switches TV on, and many others ...)
- arrival/departure functions: after a code is entered (or a card read) to a keyboard, system automatically sets electrical appliances according to the identifi ed user.

Information
- system informs you about selected event/events by SMS text message
- anywhere you are and if you have an access to Internet, you can connect to your house and supervise or change its state
- integrated security system can be connected to a security agency

Security
- alarm with extended functions is a part of the system
- system is equipped by a keyboard which can be controlled by a code or by an access card
- all settings and accesses are subjects of passwords in several levels
- protection of a house in case of bad weather (shutters in strong winds or storm), unexpected events (irregularities in power supply, overload), natural disasters (sensor for flooding, smoke sensor)
- bio-installation: deconnection of unused electric circuit (e.g. socket outlets in bedroom while sleeping)
- setting ideal conditions for your children's sleep (gradual dimming off , pleasant temperature, motion monitoring = baby-sitting)
- touchable parts of sensors are supplied by a safe voltage 24V DC

Savings
- regulation of heating / cooling
- time or time-limited switching
- light regulation (possible energy savings up to 10%)
- dependant switching (e.g. when it is dark, for desired temperature etc...)
- blocking of selected appliances in case of high meter readings
- elimination of unwillingly switched appliances (e.g. when there is no motion – light switches off)

Design
- modern design of the switches and sockets, thermostat, voice activity detectors – optional designes of Elegant or LOGUS^{90}
- variety to combine diff erent colours also in multiframe versions
- touch panel screen – unique solution of elegant wireless home automation

Time for installation
- considerably lower thanks to bus installation (only 2 control wires)
- units are installed and later programmed

Flexibility of changes and extensions
- in future it is possible to add or change units easily
- functions can be changed by PC, also remotely through Internet

Available features for disabled people
- voice and remote control
- sound messages for blind (unit Sophy speaks pre-recorded messages)
- several actions can be done by one command
- control by computer from one spot

Choose the right one!

PRICE OF INSTALLATION

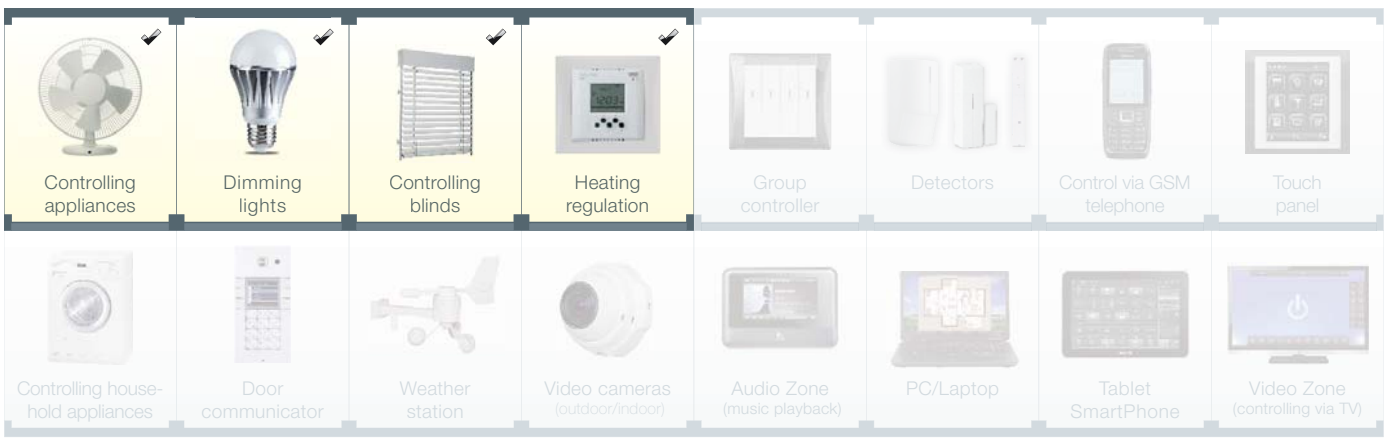
Control using the TV	-
Tablet / SmartPhone	-
PC / Laptop	-
Music playback	-
Video cameras	-
Weather station	-
Door communicator	-
Controlling home appliances	-
Touch panel	-
Control via GSM telephone	-
Detectors	-
Group controller	-
Heating regulation	●
Controlling blinds	●
Dimming lights	●
Controlling appliances	●

Classic electro-installation

Electricity is a necessary companion to our everyday life and follows us almost wherever we go. Not only does it provide us with light or a means of cooking, but it also gets us around from point A to point B. Everybody knows where to find the home electric control panel and what to do when the power goes out. We make all the devices that go into such control panels and switchboards, and have been selling them for almost 20 years.

Our assortment includes all modular electronic devices (time relays, installation contactors, staircase switches, timers, dimmers, thermostats, power sources, control and signaling devices).
Thanks to experience, we stand on solid foundations, and we are responsibly developing wide-ranging additions in the form of higher levels of electrical installations - either wireless or intelligent (bus-based).

Energy savings:



Choose the right one!

PRICE OF INSTALLATION

Control using the TV	-
Tablet	●
PC / Laptop	●
Music playback	-
Video cameras	-
Weather station	-
Door communicator	-
Controlling home appliances	-
Touch panel	●
Control via Smartphone	●
Detectors	●
Wireless switch	●
Heating regulation	●
Controlling blinds	●
Dimming lights	●
Controlling appliances	●

Wireless electrical installations

Most of you have already built a house or furnished an apartment. If you want to bring life into your home, we have an elegant wireless solution. As the name implies, the wireless communication is working with a range of up to 200 m (it depends on the internal structure of the house/apartment, and the used building materials.

The central brain is in this case the touch RF Touch unit, which can be placed anywhere within the range. It's possible not only to program entire system from this unit, but also to control it. Brightly replaces several thermostats and controllers. Within the system, you have an unlimited opportunity to add any drivers and placing them at the suitable places.

Energy savings:

PRICE OF INSTALLATIONONE

Control using the TV	●
Tablet	●
PC / Laptop	●
Music playback	●
Video cameras	●
Weather station	●
Door communicator	●
Controlling home appliances	●
Touch panel	●
Control via smartphone	●
Detectors	●
Group controller	●
Heating regulation	●
Controlling blinds	●
Dimming lights	●
Controlling appliances	●

Bus electrical installations

Are you building a new home? Then you should consider a bus-based solution. A bus in this sense is a data conductor that is distributed in the walls across the entire home. As opposed to a wireless solution, its advantage is range, because up to 6 x 550 m buses can be distributed in a single building.

Connection to a computer expands the scope of its available functions. This system may be expanded to include multimedia extensions and can connect third party devices (household appliances, A/C, etc.). Control and monitoring the system can be performed via PC, the Internet, telephone, tablet, etc.

The system offers a wider range of functions that can be applied. A computer is used to set the parameters.

Energy savings:

iNELS smart home solutions

iNELS® BUS System

10 reasons to choose bus system

1) Ideal solution for new buildings
2) Two-wire bus
3) Bus once stretched you can always expand
4) Security system, combined with detectors
5) Remote control (PC, mobile phone applications)
6) Imitation of presence
7) Regulation depending on the weather
8) Ecology and energy saving
9) Modern trends in controling
10) Media under control (can also be controlled via TV)

iNELS® RF Control

10 reasons to choose wireless system

1) Do you know that heating regulations save up to 30% from the energy costs
2) Without any reconstruction work
3) The fast duration for electrical installations's implementation
4) Convenient and affordable prices for everyone
5) The possibility of upgrading your system - gradually upgrade your installations
6) Battery - powered transmitters - no electrical injury
7) The variability of the features that you can change
8) The design, which inspires you
9) Professional assembly and service of our partners
10) We are the Czech company, which top priority is customer's satisfaction

House switches and sockets

LOGUS90

BASE	AQUARELLA	ANIMATO	CRYSTAL	METALLO	ARBORE	PETRA
Plastic	Metallic design	Plastic	Crystal	Metal	Wood	Stone
BR - White	GE - Ice	DG - Green/Ice	CG - Crystal/Ice	TP - Titanium/Pearl	FP - Beech Wood/Pearl	GG - Granite/Ice
MF - Ivory	PE - Pearl	ZG - Blue/Ice	CP - CRYSTAL/Pearl	IA - Inox/Aluminium	JP - Cherry Tree/Pearl	GP - Granite/Pearl
	AL - Aluminium	JG - Orange/Ice	CA - Crystal/Aluminium	OP - Gold/Pearl	MS - Mahogany/Grey	GA - Granite/Aluminium
	IS - Grey	VG - Red/Ice	CS - Crystal/Grey	QS - Nickel/Grey	NA - Walnut Tree/Aluminium	GS - Granite/Grey

Design ranges

BASE – Simplicity is the sign of beauty. Precise and convenient shapes, distinctive colours embodied in switches.

AQUARELLA – Spacetime without limits. Metallic design will draw you into the world of exclusive design.

Animato – Wide range of colors, modern design and nice price.

CRYSTAL – Endless elegance of glass. Switches underlining the dynamics of your interior.

METALLO – Be exceptional! Nobility of metal will inspire you with unforgettable moments.

ARBORE – The Nature at your fingertips. Warm tones of wood create an atmosphere of absolute bliss.

PETRA – Feel free to experiment. Stone is a symbol of stability, strength and power. Enjoy the switches you can lean on.

www.logus90.com

Catalogue content

Modular electronic devices

Modular electronic devices

Time relays

Single-function

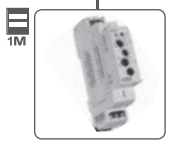
CRM-81J
3 functions and 6 time ranges, multivoltage or 230V supply, output 16A changeover/SPDT.

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.

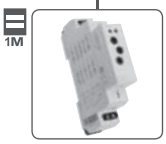
CRM-2HE
as CRM-2H , but time setting by external potentiometers (for frequent setting).

Multifunction

Analog

CRM-91H
10 functions, 10 time ranges, 1x output 16A changeover/ SPDT, multivoltage or 230V supply.

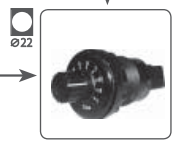
CRM-93H
as CRM-91 but output 3x8A chageover/SPDT.



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

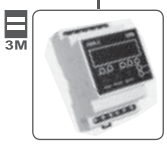
CRM-61
cost effective version of CRM-91H, 6 functions, 6 time ranges. Output 8A changeover/SPDT, supply AC 24-240 V, DC 24V .

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

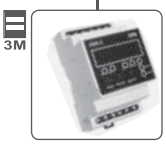


Potentiometer
potentiometer - external control unit for CRM-91HE and CRM-2HE, mounting into a switchboard, max connection length 10 m.

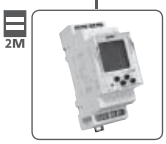
Digital



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



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



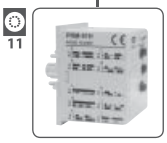
SHT-1, SHT-1/2
SHT-1: time switch with daily, weekly programming. 1-channel, output 16 A changeover/SPDT.
SHT-1/2: as SHT-1, but 2-channel.

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.

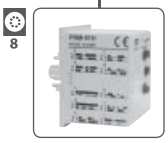
SHT-4
Timer with an astronomical program to control the lighting without using a light sensor.
2-channel.

SHT-6
Time switch with DCF managing. Daily, weekly and annual program, output 16 A.
1-channel.

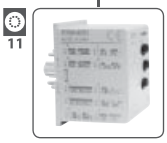
PLUG-IN



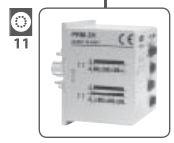
PRM-91H/11
as CRM-91H but into 11-pin socket, multivoltage supply, output contact 16 A.



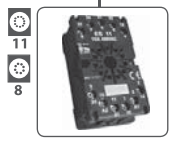
PRM-91H/8
as PRM-91H/11 but with 8-pin socket, output contact 16A.



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

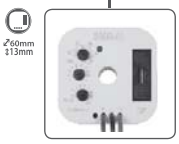


PRM-2H
as CRM-2H but with 11-pin socket, 2x changeover, 8A contact.

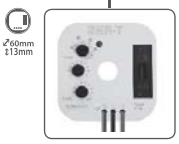


socket to DIN rail
ES-11 (11 pin)
ES-8 (8 pin).

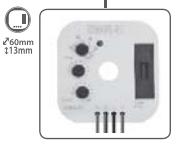
MINI



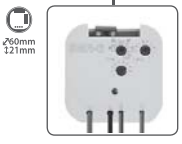
SMR-K
super multifunction relay for installation into a wiring box, 3 wire connection (without neutral).
Input: can be connected in parallel with LED energy saving light bulb or fluorescent lamp.



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



SMR-H
as SMR-T but 4 wire connection, output - triac 0-200 VA, 9 functions including function of memory relay.

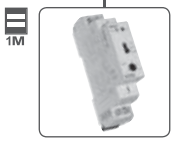


SMR-B
as SMR-H but output relay contact 16 A (possibility to switch also fluorescent lights).

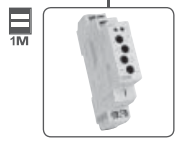
Staircase switch

CRM-4
basic version , time 0.5-10 min output contact 16 A , anti-blocking function.

CRM-42
programmable staircase switch with warning before switching off, time setting by number of button pressings.



CRM-42F
programmable staircase switch without warning before switching off, time setting by number of button pressings.



DIM-2
with dimming, setting: dim-up/shining/dim-down brightness only for el. bulbs output up to 500VA.

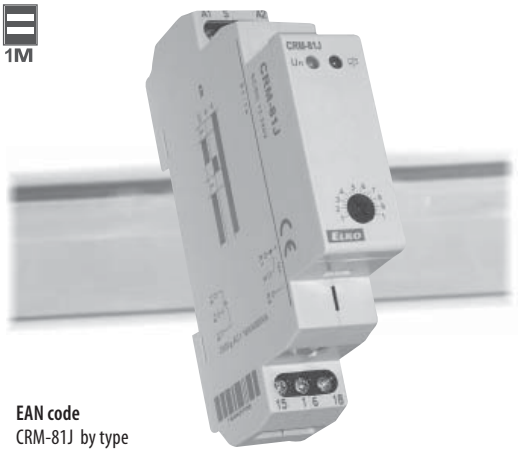
Chart 1. Version - DIN rail mounting

	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-2T/230	CRM-4	CRM-42(CRM-42F)	CRM-61	SJR-2	PDR-2/A	PDR-2/B	SHT-1 (SHT-1/2)	SHT-3 (3/2), SHT-6	SHT-4	SOU-2	PRM-91H	PRM-92H	PRM-2H
	1-MODULE	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●									
	2-MODULE																					●	●	●	●			
	3-MODULE																			●	●							
	PLUG-IN																									●	●	●
	Under the switch	See chart 2 Version - mounting into installation box (KU68)																										
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	230 V AC	●	●	●	●	●	●		●	●				●	●	●	●		●	●	●	●	●	●	●			
	12 - 240 V AC/DC	●	●	●	●	●	●	●	●	●	●	●		●					●	●	●	●	●		●	●	●	●
	12 - 240 V AC												●															
OUTPUT	1x changeover/ SPDT 8 A																	●							●			
	1x changeover/ SPDT 16 A	●	●	●					●		●	●		●		●						●	●	●		●		
	2x changeover 8 A							●																			●	●
	2x changeover 16 A														●				●	●	●	(●)	(●)					
	3x changeover/ 3PDT 8 A				●	●	●			●																		
	Static output (triac)												●															
	1x NO 16 A																●											

Chart 2. Version - mounting into installation box (KU68)

	Type	SMR-K, SMR-T, SMR-H	SMR-B
Functions	A -delay off on entering edge	●	●
	B - delay off on down-ward edge	●	●
	C - delay off on down-ward edge	●	●
	D - cycler - flasher by impuls	●	●
	E - puls shift	●	●
	F - delay on	●	●
	G - pulse relay	●	●
	H - impulse relay with delay	●	●
	I - cycler starting with gap	●	●
	j - delay on after switched off		●
	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 230 V	●	●
Number of contacts	1x triac 1x NO $AgSnO_2$	●	●

1M



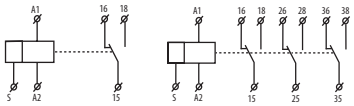
EAN code
CRM-81J by type
CRM-83J by type

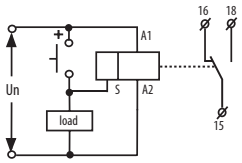
- Single-function and single-time relay with possibility of fine time setting by a potentiometer (within the frames of a particular time range)
- Suitable for applications where function and time requirements are known
- Time switch, possible to be used for pump decay time after switching heating off, 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
- Output contact: CRM-81J: 1x changeover/ SPDT 16 A
  CRM-83J: 3x changeover/ 3PDT 8 A
- 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:	UNI	AC/DC 12 - 240 V (AC 50 - 60 Hz)	
Burden:	UNI	AC 0.7 - 3 VA / DC 0.5 - 1.7 W	
Voltage range:	230	AC 230 V / 50 - 60 Hz	
Consumption (apparent/loss):	230	AC max. 12 VA / 1.3 W	AC max. 12 VA / 1.9 W
Supply voltage tolerance:		-15 %; +10 %	
Supply indication:		green LED	
Time ranges:		0.1 s - 10 h (in 6 alternate)	
Time setting:		potentiometer	
Time deviation:		5 % - mechanical setting	
Repeat accuracy:		0.2 % - set value stability	
Temperature coefficient:		0.01% / °C, at =20 °C	
Output			
Number of contacts:		1x changeover/ SPDT (AgNi / Silver Alloy)	3x changeover/ SPDT (AgNi / Silver Alloy)
Current rating:		16 A / AC1	8 A / AC1
Breaking capacity:		4000 VA / AC1, 384 W / DC	2000 VA / AC1, 192 W / DC
Inrush current:		30 A / <3 s	10 A / <3 s
Switching voltage:		250 V AC1 / 24 V DC	
Min. breaking capacity DC:		500 mW	
Output indication:		red LED	
Mechanical life:		$3x10^7$	
Electrical life (AC1):		$0.7x10^5$	
Control			
Consumption of input:		AC 0.025 - 0.2 VA / DC 0.1 - 0.7 W (UNI), AC 0.53 VA (AC 230 V)	
Load between S-A2:		Yes (UNI), Yes (AC 230 V)	
Control terminals:		A1-S	
Glow tubes connetions:		Yes	
Max. amount of glow lamps connected to controlling input:		UNI - glow lamps cannot connected/NO 230 V - max.10 pcs (Measured with glow lamp 0.68mA/230 AC)	
Impulse length:		min. 25 ms / max. unlimited	
Reset time:		max. 150 ms	
Other information			
Power of control input:		-20 °C to +55 °C (-4 °F to 131 °F)	
Storage temperature:		-30 °C to +70 °C (-22 °F to 158 °F)	
Electrical strength:		4 kV (supply-output)	
Mounting/DIN rail:		DIN rail EN 60715	
Protection degree:		IP 40 from front panel / IP20 terminals	
Operating position:		any	
Overvoltage cathegory:		III.	
Pollution degree:		2	
Max. cable size(mm^2):		solid wire max.1x2.5 or 2x1.5 / with sleeve max.1x2.5 (AWG 12)	
Dimensions:		90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)	
Weight:		(UNI) - 62 g, (230) - 60 g	(UNI) - 86 g, (230) - 82 g
Standards:		EN 61812-1, EN 61010-1	

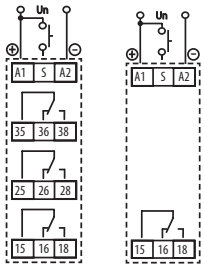
Symbol

CRM-81J





Connection



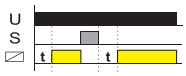
Example of an order

CRM-81J/230, ZR10s
1x changeover contact, voltage AC 230 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

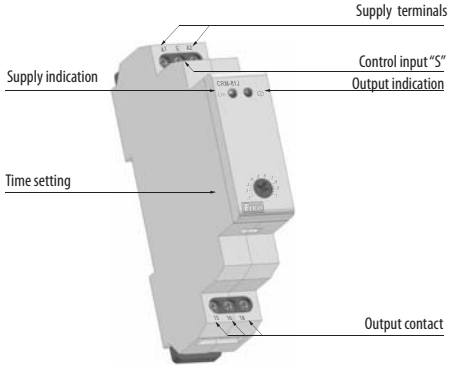
BL - Cycler 1:1

Note: the function ZR and ZN is controlled by supply voltage and control input ie. when it comes to failure and refreshing the supply voltage, the relay automatically makes one cycle.

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

Description



1M

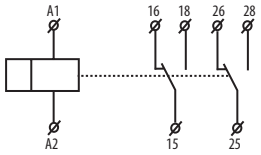
- „True OFF" relay - relay timing without supply voltage
- Sample of use: back-up source for Delay OFF in case of voltage failure (e.g. emergency lighting, emergency respirator, or protection of el. controlled doors - in case of fire)
- 2 time functions adjustable by rotary switch:
  a - Delayed return 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
- Output contact: 2x changeover/DPDT 8 A
- 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

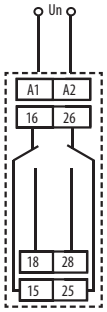
Technical parameters

	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:	0.01 % / °C, at = 20 °C (0.01 % / °F, at = 68 °F)
Output	
Number of contacts:	2x changeover/SPDT (AgNi/ Silver Alloy)
Current rating:	8 A / AC1
Breaking capacity:	2000 VA / AC1, 192 W / DC
Inrush current:	10 A / <3 s
Switching voltage:	250 V AC1 / 24 V DC
Min. breaking capacity DC:	500 mW
Output indication:	red LED
Mechanical life:	$3x10^7$
Electrical life (AC1):	$0.7x10^5$
Other information	
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
Electrical strength:	4 kV (supply-output)
Mounting/DIN rail:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 10 terminals
Operating position:	any
Overvoltage cathegory:	III.
Pollution degree:	2
Max. cable size (mm^2):	solid wire max. 2x2.5 or 1x4 (AWG 12) with sleeve max. 2x1.5 or 1x2.5 (AWG 12)
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)
Weight:	93 g (3.3 oz.)
Standards:	EN 61812-1, EN 61010-1

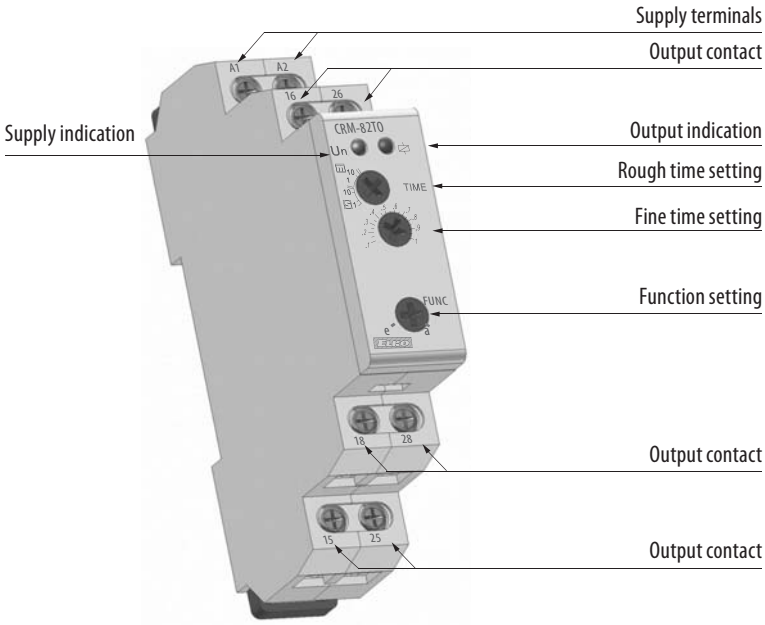
Symbol



Connection

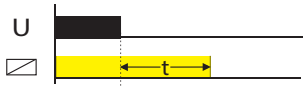


Description

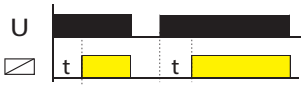


Function

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



e - Off Delay (S break)



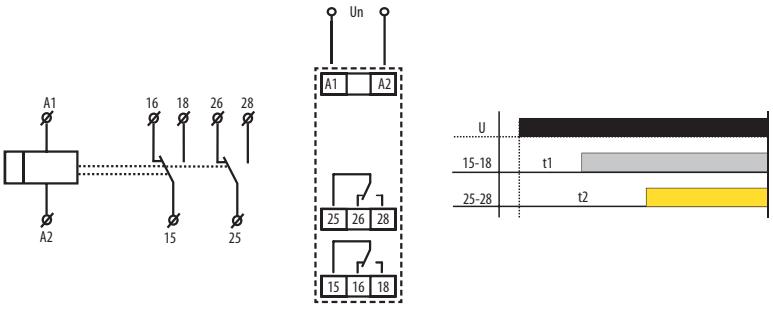
1M

- For gradual switching of heavy powers (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
- Rought time setting via rotary switch
- Voltage range: AC 230 V or AC/DC 12 - 240 V
- Output contact: 2 x changeover /DPDT 16 A
- Output indication: multifunction red LED, flashing at certain states
- 1-MODULE, DIN rail mounting

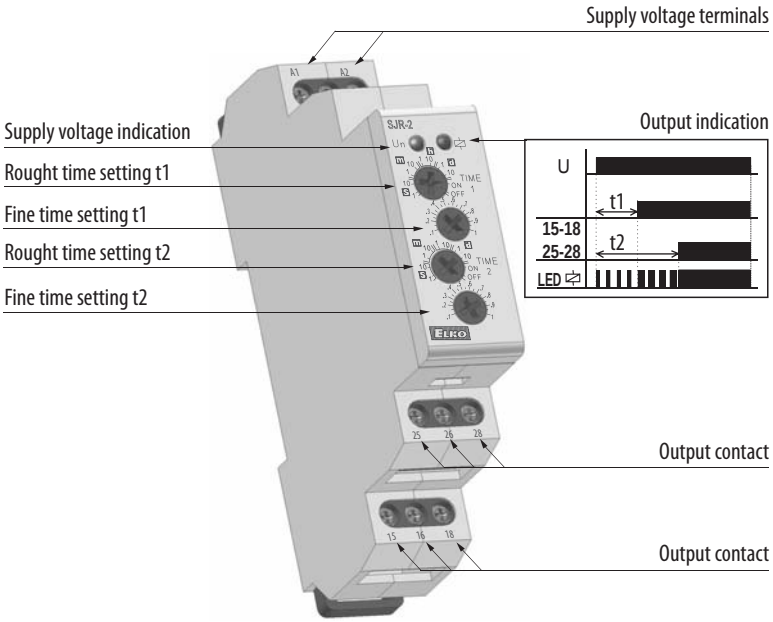
EAN code
SJR-2 /230V: 8595188116015
SJR-2 /UNI: 8595188117401

Technical parameters		SJR-2
Number of functions:		2x delay ON
Supply terminals:		A1 - A2
Voltage range:	UNI	AC/DC 12 - 240 V (AC 50 - 60 Hz)
Burden:	UNI	AC 0.7 - 3 VA / DC 0.5 - 1.7 W
Voltage range:	230	AC 230 V / 50 - 60 Hz
Power input (apparent/loss):	230	AC max. 12 VA / 1.3 W
Supplyvoltagetolerance:		-15 %; +10 %
Supplyindication:		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 % / °C, at = 20 °C (0.01 % / °F, at = 68 °F)
Output		
Number of contacts:		2x changeover/ DPDT (AgNi / Silver Alloy)
Current rating:		16 A / AC1
Breaking capacity:		4000 VA / AC1, 384 W / DC
Inrush current:		30 A / <3 s
Switching voltage:		250 V AC1 / 24 V DC
Min. breaking capacity DC:		500 mW
Output indication:		multifunction red LED
Mechanical life:		$3x10^7$
Electrical life (AC1):		$0.7x10^5$
Reset time:		max. 150 ms
Other information		
Operating temperature:		-20 °C to +55 °C (-4 °F to 131 °F)
Storage temperature:		-30 °C to +70 °C (-22 °F to 158 °F)
Electrical strength:		4 kV (supply-output)
Operating position:		any
Mounting/DIN rail:		DIN rail EN 60715
Protection degree:		IP 40 from front panel / IP 20 terminals
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)
Dimensions:		90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝) (3.5˝ x 0.7˝ x 2.5˝)
Weight:		UNI - 88 g (3.1 oz.), 230 - 83 g (2.9 oz.)
Standards:		EN 61812-1, EN 61010-1

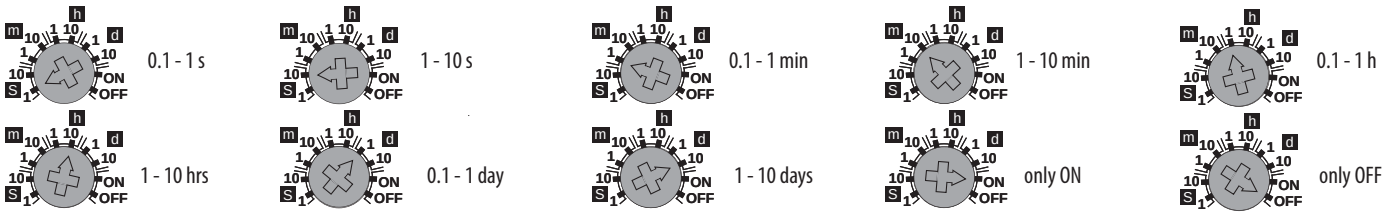
Symbol Connection Function



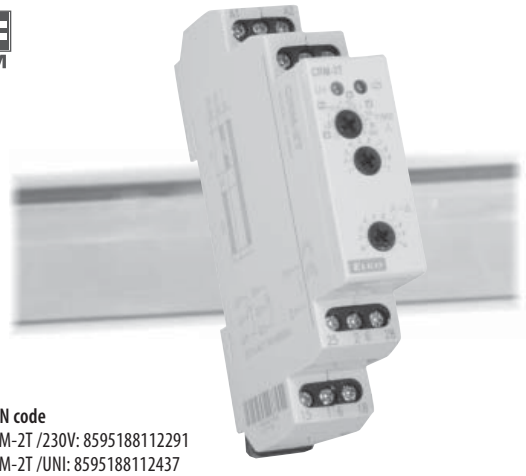
Description



Time ranges



1M



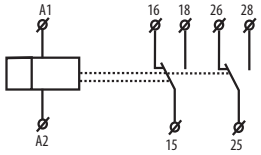
EAN code
CRM-2T /230V: 8595188112291
CRM-2T /UNI: 8595188112437

- 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 人/ △:
  - time scale 0.1 s - 1 s
  - fine time setting by potentiometer
- Voltage range: AC 230 V, AC/DC 12 - 240 V
- Output contact: 2x changeover/ DPDT 16A
- Output indication: multifunction red LED
- 1-MODULE, DIN rail mounting

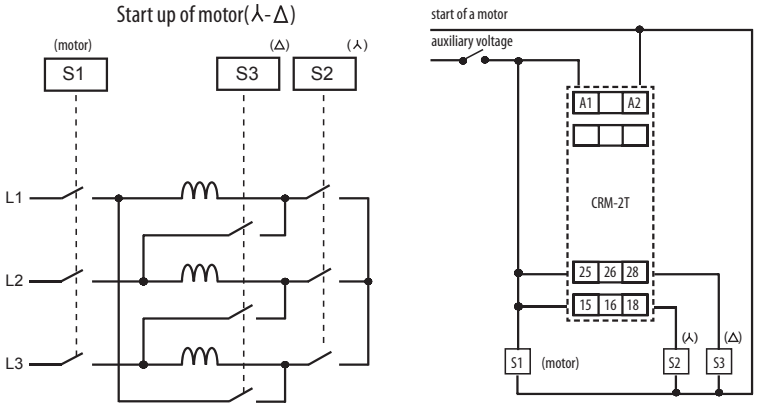
Technical parameters

		CRM-2T
Number of functions:		1
Supply terminals:		A1 - A2
Voltage range:	UNI	AC/DC 12 - 240 V/AC 50 - 60 Hz
Burden:	UNI	AC 0.7 - 3 VA / DC 0.5 - 1.7 W
Voltage range:	230	AC 230 V / 50 - 60 Hz
Burden:	230	AC max. 12 VA / 1.9 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 % / °C, at = 20 °C (0.01 % / °F, at = 68 °F)
Output		
Number of contacts:		2x changeover/ DPDT (AgNi / Silver Alloy)
Current rating:		16 A / AC1
Breaking capacity:		4000 VA / AC1, 384 W / DC
Inrush current:		30 A / <3 s
Switching voltage:		250 V AC1 / 24 V DC
Min. breaking capacity DC:		500 mW
Output indication:		multifunction red LED
Mechanical life:		$3x10^7$
Electrical life (resistive):		$0.7x10^5$
Reset time:		max. 150 ms
Other information		
Operating temperature:		-20 °C to +55 °C (-4 °F to 131 °F)
Storage temperature:		-30 °C to +70 °C (-22 °F to 158 °F)
Electrical strength:		4 kV (supply-output)
Operating position:		any
Mounting/DIN rail:		DIN rail EN 60715
Protection degree:		IP 40 from front panel / IP 20 terminals
Overvoltage cathegory:		III.
Pollution degree:		2
Terminal wire capacity:		max.1x 2.5, 2x1.5 (AWG 12) with sleeve max. 1x2.5 (AWG 12)
Dimensions:		90 x 17.6 x 64 mm (3.5″ x 0.7″ x 2.5″)
Weight:		84 g (3 oz.)
Standards:		EN 61812-1, EN 61010-1

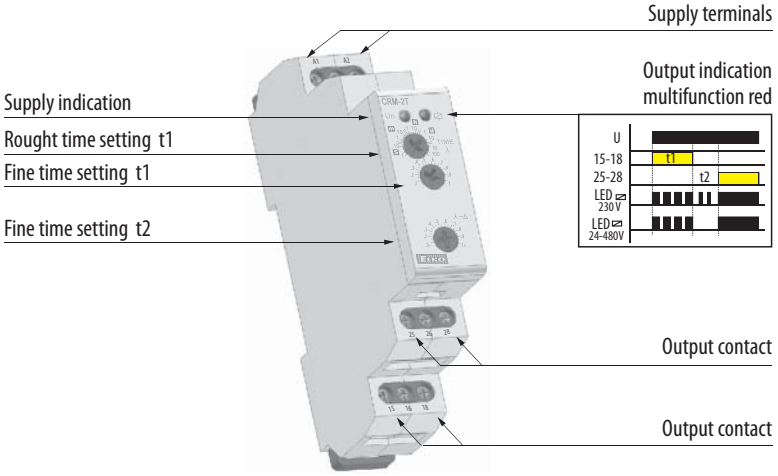
Symbol



Connection CRM-2T

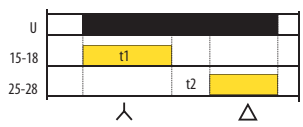


Description

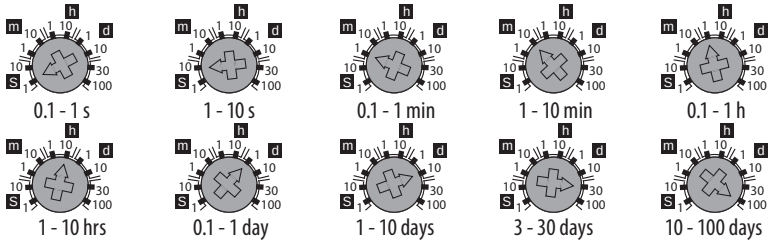


Function

Delay ON star / delta



Time ranges t1:



1M

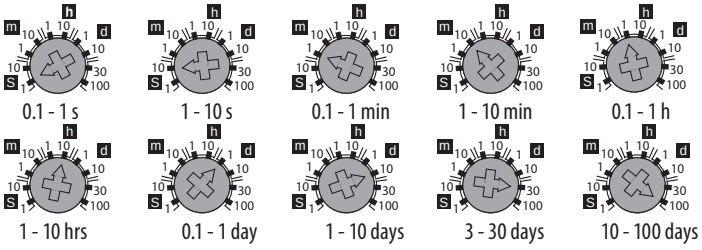
EAN code
CRM-2H /230V: 8595188124201
CRM-2H /UNI: 8595188113007

- Cycler with independent adjustable switch ON/OFF
- Used for regular room ventilation, cyclic dehumidification, light control, circulating pumps, noon signs, 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 230 V or AC/DC 12 - 240 V
- Output contact: 1x changeover/SPDT 16 A
- Output indication: multifunction red LED
- 1-MODULE, DIN rail mounting

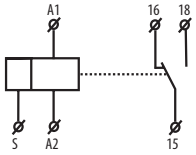
Technical parameters

		CRM-2H
Number of functions:		2 (function is chosen by connecting S-A1)
Supply terminals:		A1 - A2
Voltage range:	UNI	AC/DC 12 - 240 V (AC 50 - 60 Hz)
Burden:	UNI	AC 0.7 - 3 VA / DC 0.5 - 1.7 W
Voltage range:	230	AC 230 V / 50 - 60 Hz
Power input (apparent input/loss input):	230	AC max. 12 VA / 1.3 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 % / °C, at = 20 °C (0.01 % / °F, at = 68 °F)
Output		
Number of contacts:		1x changeover/ SPDT (AgNi / Silver Alloy)
Current rating:		16 A / AC1
Breaking capacity:		4000 VA / AC1, 384 W / DC
Inrush current:		30 A / <3 s
Switching voltage:		250 V AC1 / 24 V DC
Min. breaking capacity DC:		500 mW
Output indication:		multifunction red LED
Mechanical life:		$3x10^7$
Electrical life (resistive):		$0.7x10^5$
Reset time:		max. 150 ms
Other information		
Operating temperature:		-20 °C to +55 °C (-4 °F to 131 °F)
Storage temperature:		-30 °C to +70 °C (-22 °F to 158 °F)
Electrical strength:		4 kV (supply-output)
Operating position:		any
Mounting/DIN rail:		DIN rail EN 60715
Protection degree:		IP 40 from front panel / IP 20 terminals
Overvoltage cathegory:		III.
Pollution degree:		2
Terminal wire capacity:		solid wire max.1x 2.5 or 2x1.5/ with sleeve max. 1x2.5 (AWG 12)
Dimensions:		90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)
Weight		UNI - 65 g (2.3 oz.), 230 - 61 g (2.2 oz.)
Standards:		EN 61812-1, EN 61010-1

Time ranges



Symbol



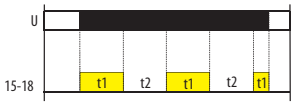
Connection

Cycler beginning with pulse

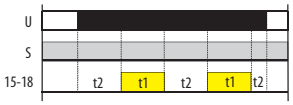
Cycler beginning with pause (jumper S-A1)

Function

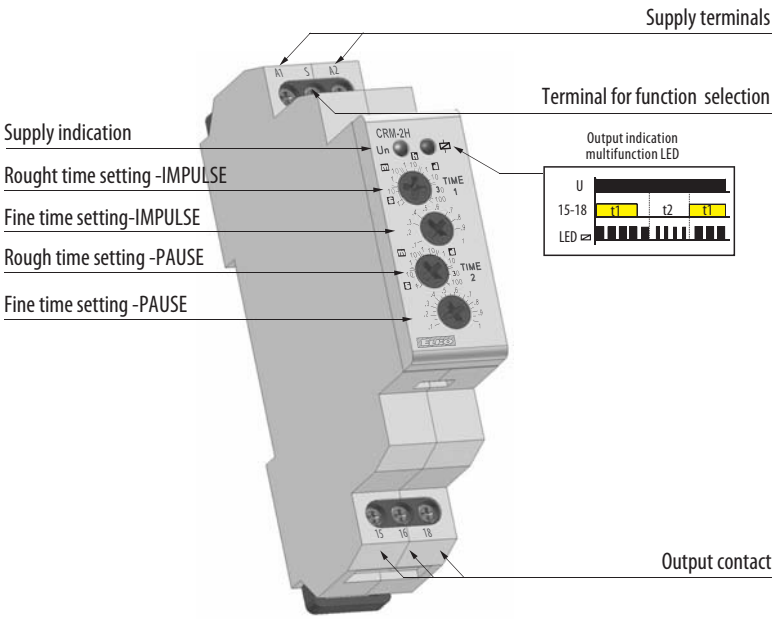
Cycler beginning with pulse



Cycler beginning with pause



Description



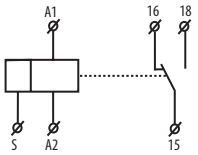
1M

- 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
- Output contact: 1x changeover 8 A/ SPDT
- Multifunction red LED output indicator flashes or shines depending of status
- 1-MODULE, DIN rail mounting

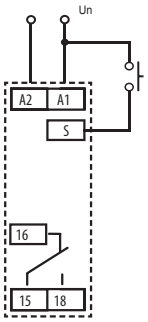
EAN code
CRM-61 /UNI: 8595188120210

Technical parameters	CRM-61
Number of functions:	6
Supply terminals:	A1 - A2
Supply voltage :	AC 24 - 240 V (AC 50 - 60 Hz) a 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 % /°C, at = 20°C
Output	
Number of contacts:	1x changeover/ SPDT (AgNi / Silver Alloy)
Current rating:	8 A/ AC1
Breaking capacity:	2500 VA / AC1, 240 W / DC
Output indication:	multifunction red LED 8 A / AC1
Mechanical life:	$1x10^7$
Electrical life (AC1):	$1x10^5$
Controlling	
Control. voltage:	UNI
Control power input:	AC 0.025 - 0.2 VA / DC 0.1 - 0.7 W
Load between S-A2:	Yes
Glow-tubes:	No
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:	-20 °C to +55 °C (-4 °F to 131 °F)
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
Electrical strength:	4 kV (supply-output)
Operating position	any
Mounting/DIN rail:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 10 terminals
Overvoltage cathegory:	III.
Pollution degree:	2
Max. cable size (mm^2):	max. 2x 2.5, max. 1x4 (AWG 12) with sleeve max. 1x2.5, 2x1.5 mm^2 (AWG 12)
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)
Weight:	69 g (2.4 oz.)
Standards:	EN 61812-1, EN 61010-1

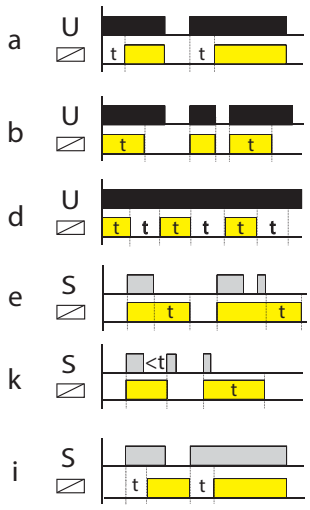
Symbol



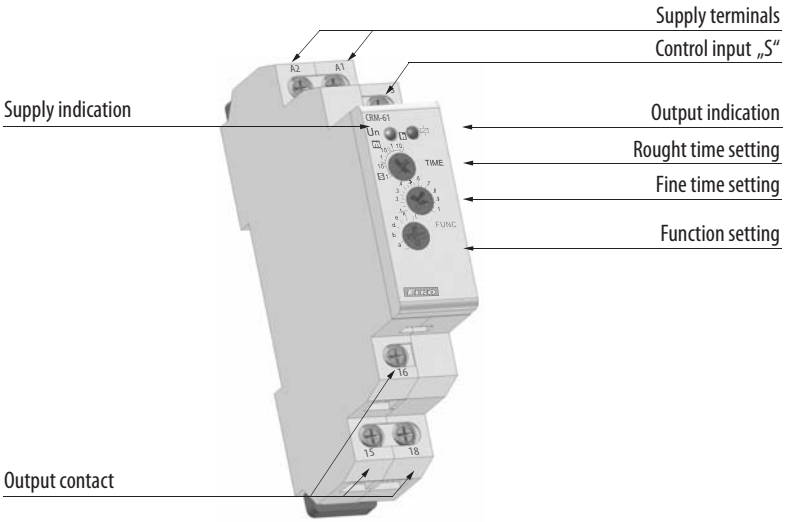
Connection



Function



Description



1M

EAN code

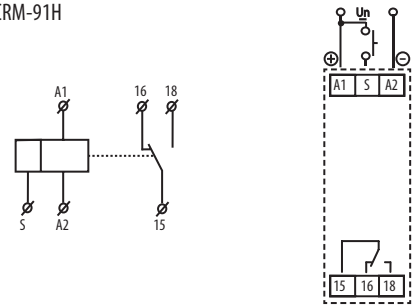
CRM-91 /230V:	8595188112444
CRM-91 /UNI:	8595188112420
CRM-93H /230V:	8595188112789
CRM-93H /UNI:	8595188112468
CRM-9S /UNI:	8595188116008

- Multifunction time relay can be used for electrical appliances, control of lights, heating, motors, pumps and fans (10 functions, 10 time ranges, multi-voltage, 16Amps or 3x8Amps 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 or AC 230 V,
  Output contact: CRM-91H: 1x changeover/SPDT 16 A; CRM-93H: 3 x changeover/SPDT 8 A
- CRM-9S: Universal supply voltage AC 12 - 240 V AC 12 - 240 V, absolutely noise-less switching
  1x static contactless output (triac) 01.7 A (60A/<10 ms), switches potential A1
- Multifunction red LED output indicator flashes or shines depending of status
- 1-MODULE, DIN rail mounting

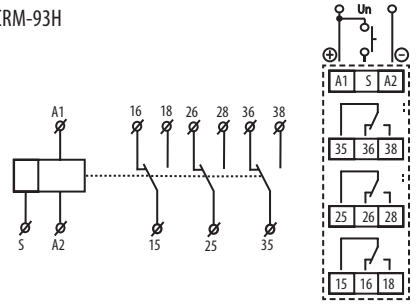
Technical parameters		CRM-91H	CRM-93H	CRM-9S
Number of functions:		10		
Supply terminals:		A1 - A2		
Voltage range:	UNI	AC/DC 12 - 240 V (AC 50 - 60 Hz)		AC 12-240V (50-60Hz)
Burden:		AC 0.7 - 3 VA / DC 0.5 - 1.7 W		AC max. 0.35VA
Voltage range:	230	AC 230 V / 50 - 60 Hz		x
Consumption (apparent/loss):		AC max. 12VA / 1.3W	AC max. 12VA / 1.9W	x
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 % / °C, at = 20 °C (0.01 % / °F, at = 68 °F)		
Output				
Number of contacts:		1x changeover/ SPDT (AgNi / Silver Alloy)	3x changeover/ SPDT (AgNi / Silver Alloy)	1x static contactless output (triac)
Current rating:		16A / AC1	8A / AC1	0.7A
Breaking capacity:		4000VA / AC1, 384W / DC	2000VA / AC1, 192W / DC	x
Inrush current:		30A / <3s	10A / <3s	60A / <10ms
Switching voltage:		250V AC1 / 24V DC		x
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 (AC1):		$0.7x10^5$		$>10^8$
Controlling				
Power on control input:		AC 0.025 - 0.2 VA / DC 0.1 - 0.7 W (UNI), AC 0.53 VA (AC 230 V), AC 0.025 - 0.2 VA (AC 12 - 240 V)		
Load between S-A2:		YES		
Control. terminals:		A1-S		
Glow tubes connections:		YES		NO
Max. amount of glow lamps connected to controlling input:		UNI - glow lamps cannot connected/NO 230 V - max.20 pcs (Measured with glow lamp 0.68mA/230V AC)		glow lamps cannot connected/NO
Impulse length:		min. 25 ms / max. unlimited		x
Reset time:		max. 150 ms		max. 250 ms
Other information				
Operating temperature:		-20 °C to +55 °C (-4 °F to 131 °F)		
Storage temperature:		-30 °C to +70 °C (-22 °F to 158 °F)		
Electrical strength:		4kV(supply-output)		x
Operating position:		any		
Mounting/DIN rail:		DIN rail EN 60715		
Protection degree:		IP 40 from front panel / IP 20 terminals		
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)		
Dimensions:		90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)		
Weight:		(UNI) - 64 g (2.26 oz.); (230) - 62 g (2.2 oz.)	(UNI) - 89 g (3.1 oz.); (230) - 87 g (3 oz.)	51 g (1.8 oz.)
Standards:		EN 61812-1, EN 61010-1		

Symbol **Connection**

CRM-91H

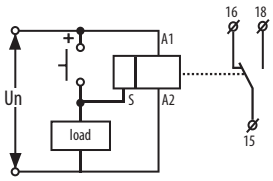


CRM-93H

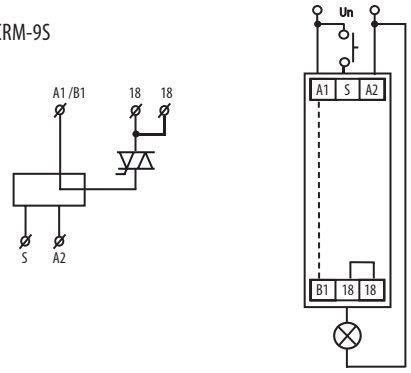


Possibility to connect load onto controlling input

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

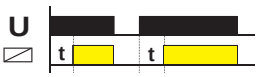


CRM-9S



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 

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

b 

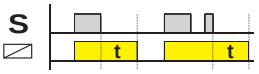
Repeat Cycle (Starting Off)
When input voltage U is applied, time delay t begins. When time delay t is complete, relay contacts R change state for time delay t. This cycle will repeat until input voltage U is removed. Trigger switch is not used in this function.

c 

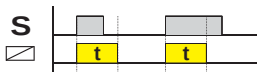
Repeat Cycle (Starting On)
When input voltage U is applied, relay contacts R change state immediately and time delay t begins. When time delay t is complete, contacts return to their shelf state for time delay t. This cycle will repeat until input voltage U is removed. Trigger switch is not used in this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

d 

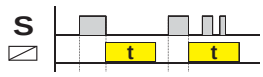
Off Delay (S Break)
Input voltage U must be applied continuously. When trigger switch S is closed, relay contacts R change state. When trigger switch S is opened, delay t begins. When delay t is complete, contacts R return to their shelf state. If trigger switch S is closed before time delay t is complete,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

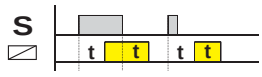
Single Shot
Upon application of input voltage U, the relay is ready to accept trigger signal S. Upon application of the trigger signal S, the relay contacts R transfer and the preset time t begins. During time-out, the trigger signal S is ignored. The relay resets by applying the trigger switch S when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

f 

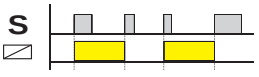
Single Shot Trailing Edge (Non-Retriggerable)
Upon application of input voltage U, the relay is ready to accept trigger signal S. Upon application of the trigger signal S, the relay contacts R transfer and the preset time t begins. At the end of the preset time t, the relay contacts R return to their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

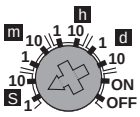
i 

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 re-applied to repeat pulse. Trigger switch is not used in this function.

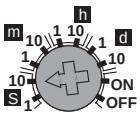
j 

PULSE=0.5 s

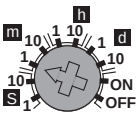
Time ranges



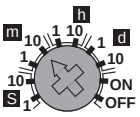
0.1 - 1s



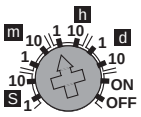
1 - 10 s



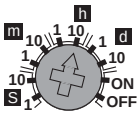
0.1 - 1 min



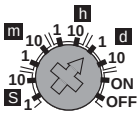
1 - 10 min



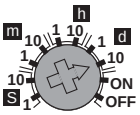
0.1 - 1 h



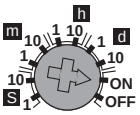
1 - 10 hrs



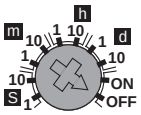
0.1 - 1 day



1 - 10 days

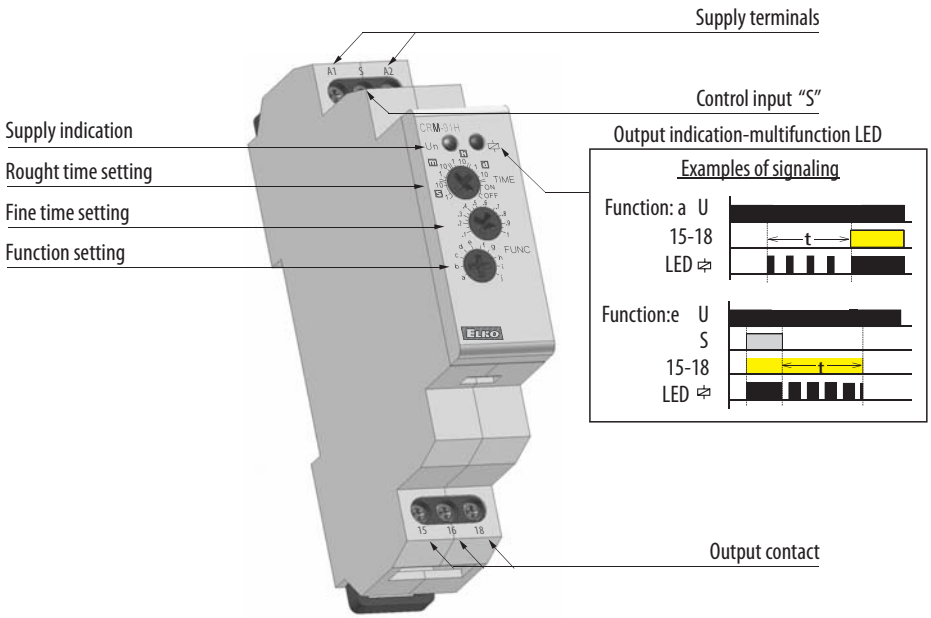


only ON



only OFF

Description



Notes

1) CRM-93H doesn't allow switching of different phases or 3-phase voltages.
2) When mounting into steal-plated switchboards, it is necessary keep safety distance of min. 3 mm from terminal's screws 35-36-38 and 25-26-28 towards the shutter of a switchboard.

1M

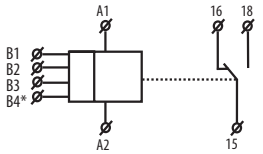
EAN code
CRM-91HE /UNI + potentiometr: 8595188142052
CRM-2HE /UNI + potetiometr: 8595188142069
Potentiometr for CRM-91HE, CRM-2HE : 8595188125215

- Control by external control unit - potentiometer (can be 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
- Output contact: 1x changeover 16 A/SPDT
- 1-MODULE, DIN rail mounting
- Possible to connect external potentiometer - max. distance 10m (32.8 ft.) 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 % /°C, at = 20°C	
Output		
Number of contacts:	1x changeover/ SPDT (AgNi / Silver Alloy)	
Current rating:	16 A / AC1	
Breaking capacity:	4000 VA / AC1, 384 W / DC	
Inrush current:	30 A / <3 s	
Switching voltage:	250 V AC1 / 24 V DC	
Min. breaking capacity DC:	500 mW	
Output indication:	multifunction red LED	
Mechanical life:	$3x10^7$	
Electrical life (AC1):	$0.7x10^5$	
Controlling		
Control. voltage:	UNI	
Consumption of input:	AC 0.025-0.2VA / DC 0.1-0.7W	
Load between S-A2:	Yes	
Glow-tubes:	No	
Control. terminals:	A1-S	
Impulse length:	min. 25 ms / max. unlimited	
Reset time:	max. 150 ms	
Other information		
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)	
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)	
Electrical strength:	4 kV (supply - output)	
Operating position:	any	
Mounting/DIN rail:	DIN rail EN 60715	
Protection degree:	IP 40 from front panel / IP 20 terminals	
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)	
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)	
Weight:	77 g (2.7 oz.)	78 g (2.8 oz.)
Standards:	EN 61812-1, EN 61010-1	

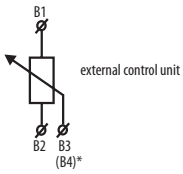
Symbol

CRM-91HE, CRM-2HE



*B4 only for CRM-2HE

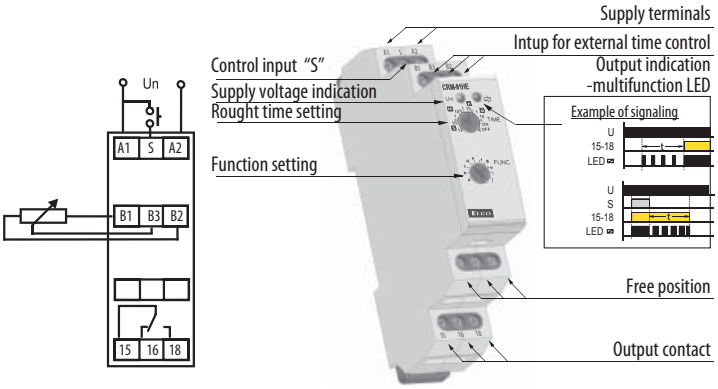
Potentiometer to CRM-91HE, CRM-2HE



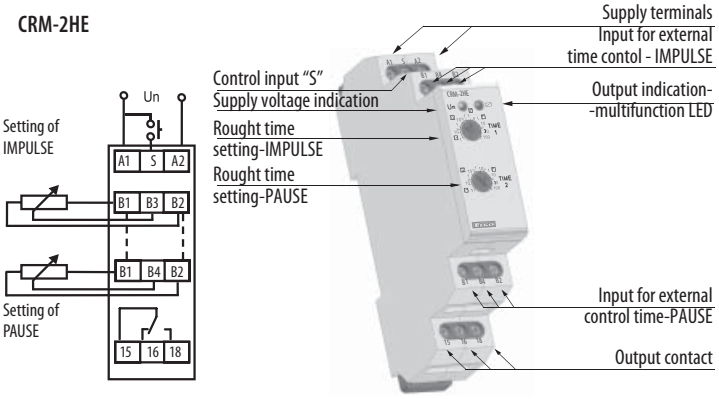
Connection

Description

CRM-91HE



CRM-2HE



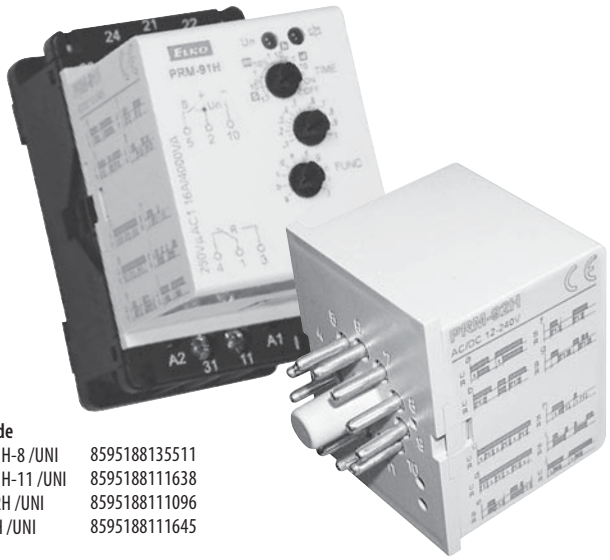
Function

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

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:	15 g (0.5 oz.)
Dimensions:	see page Accessories

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 8pin 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
  11 and 8 pin type
  10 time functions, time scale from 0.1 s to 10 days is divided into 10 ranges
  output contact 1x 16 A / 4000VA, 250V AC1

- 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
  output contact 2x 8 A / 2000VA, 250V AC1

- Asymmetric cycler PRM-2H
  11 pin type
  2 time functions, time scale from 0,1 s to 100 days is divided into 10 ranges
  output contact 2x 8 A / 2000VA, 250V AC1

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

Technical Parameters

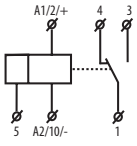
	PRM-91H/8	PRM-91H/11	PRM-92H	PRM-2H
Number of functions:	10			2
Supply:	pins 2 and 7	pins 2 and 10	pins 2 and 10	pins 2 and 10
Voltage range:	AC/DC 12 - 240 V (AC 50 - 60 Hz)			
Burden:	AC 0.7 - 3 VA / DC 0.5 - 1.7 W			
Supply voltage tolerance:	-15 %; +10 %			
Supply indication:	green LED			
Time ranges:	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 % / °C, at = 20 °C (0.01 % / °F, at = 68 °F)			
Output				
Number of contacts:	1x changeover/ SPDT (AgNi / Silver Alloy)		2x changeover/ DPDT (AgNi / Silver Alloy)	
Current rating:	16 A / AC1		8A / AC1	
Breaking capacity:	4000 VA / AC1, 384 W / DC		2000 VA / AC1, 192 W / DC	
Inrush current:	30 A / <3 s		10 A / <3 s	
Switching voltage:	250 V AC1 / 24 V DC			
Min. breaking capacity DC:	500 mW			
Output indication:	multifunction red LED			
Mechanical life:	$3x10^7$			
Electrical life (AC1):	$0.7x10^5$			
Control				
Control. voltage:	in the supply voltage range			
Control power input:	AC 0.025 - 0.2 VA / DC 0.1 - 0.7 W (UNI)			
Load between 5-10:	Yes			
Glow-tubes:	No			
Control terminals:	2 - 5			
Max. capacity of cable control:				
-without connected glow-lamps:	0.1µF			
Impulse length:	min. 25 ms / max. unlimited			
Reset time:	max. 150 ms			
Other information				
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)			
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)			
Electrical strength:	2.5 kV			
Operating position:	any			
Mounting/DIN rail:	DIN rail EN 60715			
Protection degree:	IP 40 from front panel			
Overvoltage cathegory:	III.			
Pollution degree:	2			
Dimensions:	50 x 38 x 53 mm (2˝ x 1.5˝ x 2.1˝)			
Weight:	57 g (2.01 oz.)	57 g (2.01 oz.)	58 g (2.05 oz.)	58 g (2.05 oz.)
Standards:	EN 61812-1, EN 61010-1			

Time ranges of PRM-91H, PRM-92H are identical with CRM-91H.
Time ranges of PRM-2H are identical with CRM-2H. See page 17.

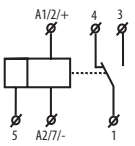
Symbol

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

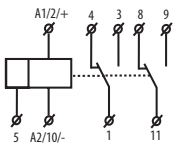
PRM-91H
11 pin



8 pin

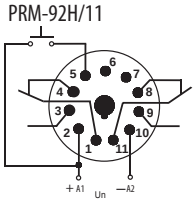


PRM-92H, PRM-2H

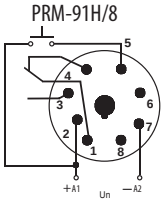


Connection

PRM-92H/11



PRM-91H/8



Recommended socket for DIN rail

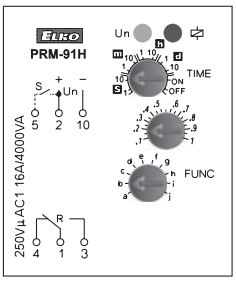
ES-11A

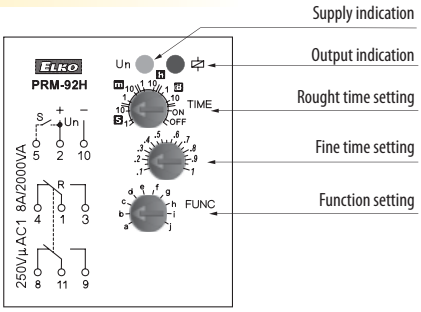
11 pin

ES-8

8 pin

Description / Connection

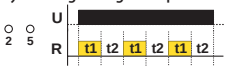




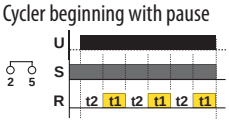
Functions PRM-2H

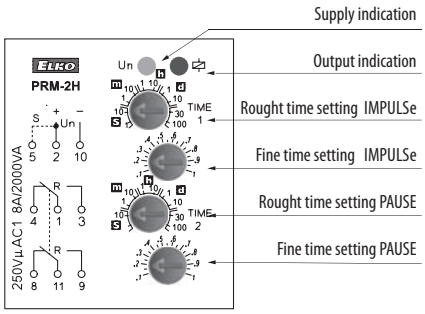
Choice Function in PRM-2H is done by connecting terminals 2 and 5

Cycler beginning with pulse



Cycler beginning with pause





Functions of PRM-91H, PRM-92H are identical with CRM-91H. See page 17.

3M

EAN code

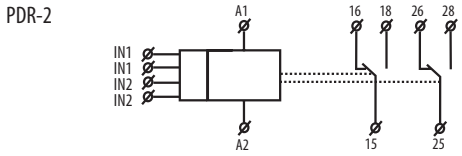
PDR-2A /230V:	8594030333037
PDR-2A /UNI:	8594030333044
PDR-2B /230V:	8594030333051
PDR-2B /UNI:	8594030333068

- Multifunction programmable digital relay with 4 digit red LED display
- Control and setting is 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 or AC 230 V
- 3-MODULE, DIN rail mounting

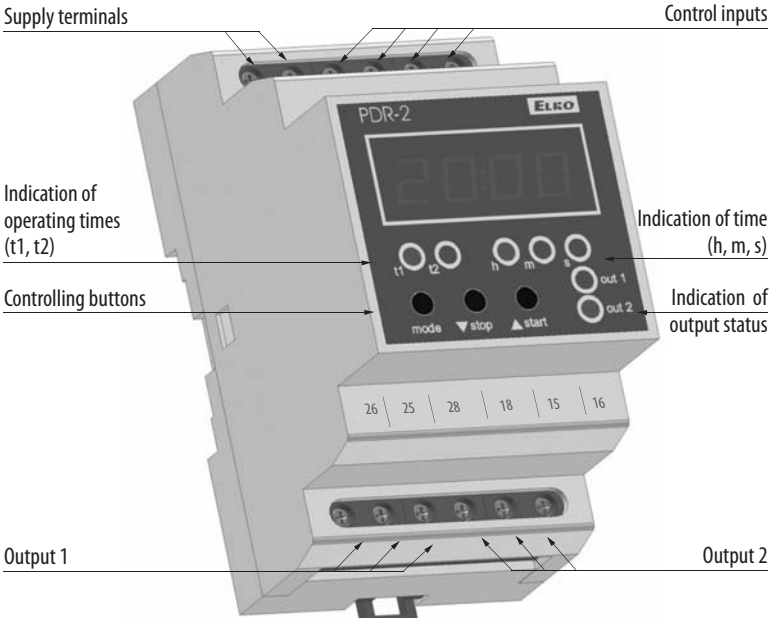
Technical parameters

		PDR-2/A	PDR-2/B
Function:		16	10
Supply terminals:		A1 - A2	
Voltage range:	UNI	AC/DC 12 - 240 V (AC 50 - 60 Hz)	
Burden:	UNI	AC 0.5 - 2.5 VA / DC 0.4 - 2.5 W	
Voltage range:	230	AC 230 V / 50 - 60 Hz	
Consumption (apparent/loss):	230	AC max. 16 VA / 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 % / °C, at = 20 °C (0.01 % / °F, at = 68 °F)	
Output			
Number of contacts:		2x changeover/ DPDT (AgNi / Silver Alloy)	
Current rating:		16 A / AC1	
Breaking capacity:		4000 VA / AC1, 384 W / DC	
Inrush current:		30 A / <3 s	
Switching voltage:		250 V AC1 / 24 V DC	
Min. breaking capacity DC:		500 mW	
Output indication:		red LED	
Mechanical life:		$3x10^7$	
Electrical strength (AC1):		$0.7x10^5$	
Control			
Control input Burden:		AC 0.01 - 0.25 VA (UNI), AC 0.25 VA (AC 230 V)	
Glow lamps:		No	
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 10 mm (0.39″)	
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:		-20 °C to +55 °C (-4 °F to 131 °F)	
Storage temperature:		-30 °C to +70 °C (-22 °F to 158 °F)	
Electrical strength:		4 kV (supply - output)	
Operating position:		any	
Mounting/DIN rail:		DIN rail EN 60715	
Protection degree:		IP 40 from front panel / IP 20 terminals	
Overvoltage cathegory:		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)	
Dimensions:		90 x 52 x 65 mm (3.5″ x 2″ x 2.6″)	
Weight:		(UNI) - 143 g(5 oz.), (230) - 134 g(4.7 oz.)	
Standards:		EN 61812-1, EN 61010-1	

Symbol



Description

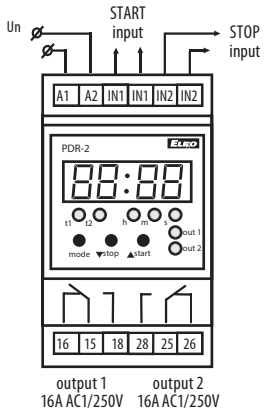


Time data

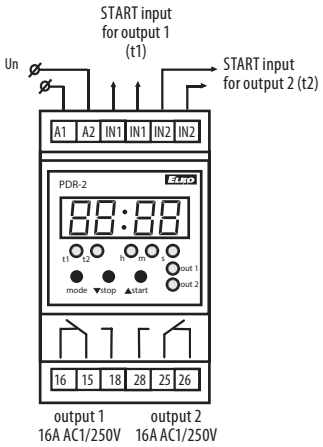
Time range:	0.01 s - 99 h 59 min 59 sec 99 ss
Minimal time step:	0.01 s
Time deviation:	0.01 % of set value
Setting error:	0 %
Setting, reset accuracy:	100 %
Digital places:	selected via program

Connection

PDR-2/A



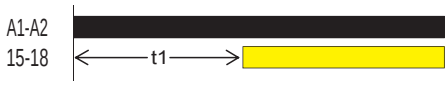
PDR-2/B



Function

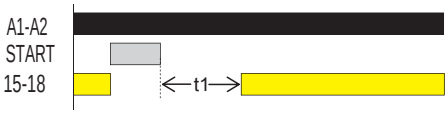
Functions for PDR-2/A and PDR-2/B

1. Delay ON

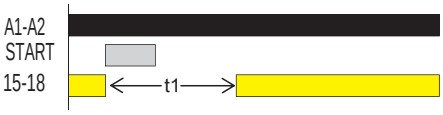


2. Delay OFF

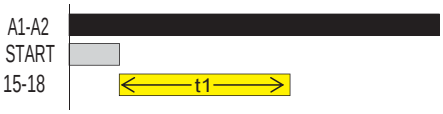
3. Delay ON after break of control. contact



4. Delay ON at make of control. contact

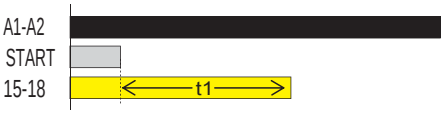


5. Delay OFF after break of output contact

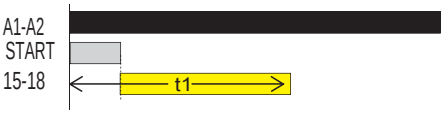


6. Delay OFF at make of output contact

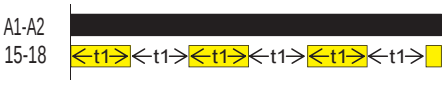
7. Delay OFF at break of control. contact with instant output



8. Delay OFF at make of control. contact with delayed output



9. Cycler beginning with impulse

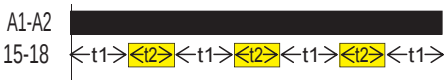


10. Cycler beginning with pause

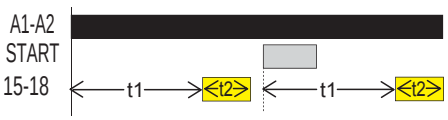
Functions for PDR-2/A

11. Cycler beginning with impulse with variable interval

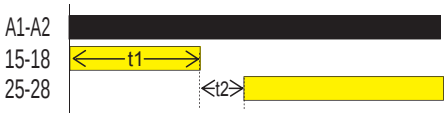
12. Cycler beginning with pause with variable interval



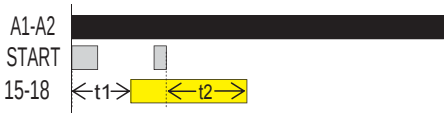
13. Generator of impulse



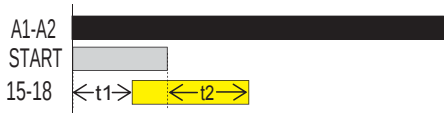
14. Changeover star/delta



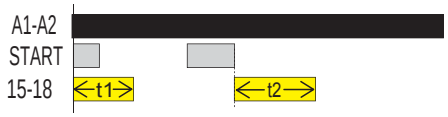
15A. Shift of pulse by 2 times



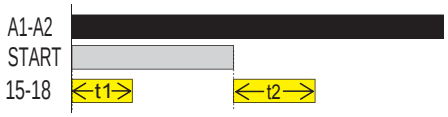
15B. Shift of impulse by 2 times



16A. Extended impulse by 2 times

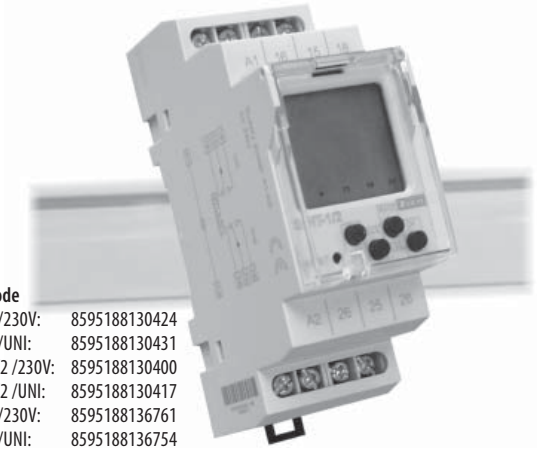


16B. Extended impulse by 2 times



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

2M



EAN code

SHT-1 /230V:	8595188130424
SHT-1 /UNI:	8595188130431
SHT-1/2 /230V:	8595188130400
SHT-1/2 /UNI:	8595188130417
SHT-3 /230V:	8595188136761
SHT-3 /UNI:	8595188136754
SHT-3/2 /230V:	8595188129015
SHT-3/2 /UNI:	8595188129046

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

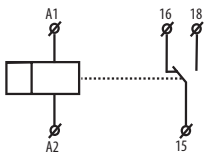
- This time switch clock SHT is used to control various appliances in real time; daily, weekly, monthly and annual mode
- Switching: according the program (AUTO)/constantly manually, manually to next program change/random (CUBE)
- „Holiday program" option to choose an interval when the device doesn´t 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 230 V or 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

Technical parameters

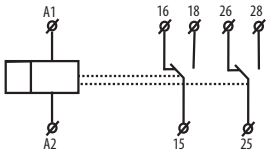
		SHT-1, SHT- 3	SHT-1/2, SHT-3/2
Supply terminals:		A1 - A2	
Voltage range:	UNI	AC/DC 12 - 240 V (AC 50 - 60 Hz)	
Burden:	UNI	AC 0.5 - 2 VA / DC 0.4 - 2 W	
Voltage range:	230	AC 230 V / 50 - 60 Hz	
Burden:	230	AC max. 14 VA / 2 W	
Supply voltage tolerance:		-15 %; +10 %	
Back-up supply:		yes	
Summer/winter time:		automatic	
Output			
Number of contacts:		1x changeover/SPDT (AgSnO$_2$)	2x changeover/DPDT (AgSnO$_2$)
Current rating:		16 A / AC1	
Breaking capacity:		4000 VA / AC1, 384 W / DC	
Inrush current:		30 A / <3 s	
Switching voltage:		250 V AC1 / 24 V DC	
Min. breaking capacity DC:		500 mW	
Mechanical life:		3x10^7	
Electrical life (AC1):		0.7x10^5	
Time circuit			
Power back-up:		up to 3 years	
Accuracy:		max. ±1s/ day at 23 °C (73.4 °F)	
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:		-20 °C to +55 °C (-4 °F to 131 °F)	
Storage temperature:		-30 °C to +70 °C (-22 °F to 158 °F)	
Electrical strength:		4 kV (supply - output)	
Operating position:		any	
Mounting:		DIN rail EN 60715	
Protection degree:		IP 10 clips, IP 40 from front panel	
Overvoltage cathegory:		III.	
Polution degree:		2	
Max. cable size (mm^2):		solid wire max. 2x2.5 or 1x4 (AWG 12) with sleeve max. 1x2.5 or 2x1.5 (AWG 12)	
Dimensions:		90 x 35.6 x 64 mm (3.5˝ x1.4˝ x 2.5˝)	
Weight:		(UNI) - 130 g (4.6 oz.), (230) - 110 g (3.9 oz.)	(UNI)- 143 g 143 g (5 oz.), (230) - 125 g (4.4 oz.)
Standards:		EN 61812-1, EN 61010-1	

Symbol

SHT-1
SHT-3

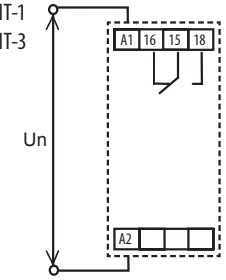


SHT-1/2
SHT-3/2

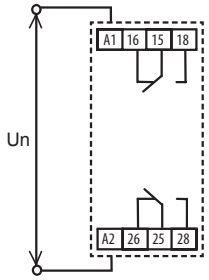


Connection

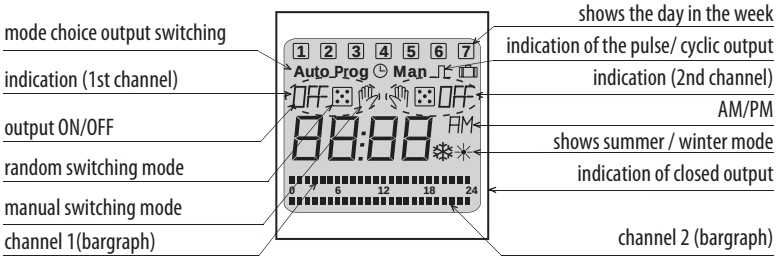
SHT-1
SHT-3



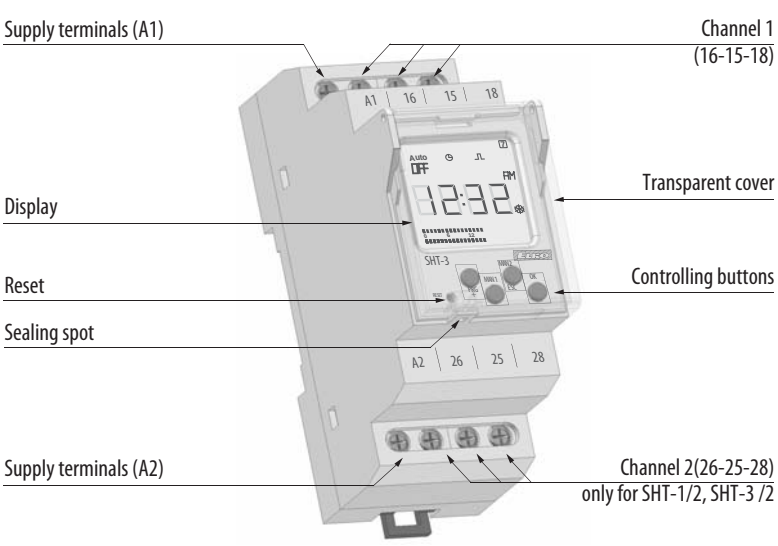
SHT-1/2
SHT-3/2



Description of displayed elements on the screen



Description



2M

EAN code
SHT-4 8595188144759

- Used for controlling the lighting (billboards, advertisements, shop windows, etc.) with no light sensor required
- Function:
  - by entering the geographic coordinates, the lighting can be switched on/off by sunrise and sunset
    - the preset coordinates for European cities, with optional manual adjustment of the geographical coordinates
    - during programming, 120 minutes may be added to the time of sunrise and sunset
    - selection of ON/OFF functions at sunrise or sunset
  - astro-clock with adjustable interruption
  - operating hours counter for each channel
  - timer - switching on the basis of real-time
- Two-channel design, where each channel is programmable independently of the other
- Automatic switching between winter and summer time
- Sealable transparent cover on the front panel
- Data and time backup using the battery
- Battery life - up to 3 years
- Easy replacement of the backup battery through the plug-in module, no disassembling is required
- Supply voltage: AC 230 V
- 2-MODULE, DIN rail mounting

Technical parameters

	SHT-4
Power supply terminals:	A1 - A2
Supply voltage:	AC 230 V / 50 - 60 Hz
Input power:	AC max. 14 VA / 2 W
Supply voltage tolerance:	-15 %; +10 %
Real time back-up:	yes
Transition to summer / winter time:	automatic
Output	
Number of contacts:	2 x changeover ($AgSnO_2$)
Rated current:	16 A / AC1
Switching power:	4000 VA / AC1, 384 W / DC
Peak current:	30 A / <3 s
Switching voltage:	250 V AC1 / 24 V DC
Min. DC switching power:	500 mW
Mechanical service life:	$> 3x10^7$
Electrical service life (AC1):	$> 0.7x10^5$
Timing circuit	
Real time reserve:	up to 3 years
Accuracy of operation:	max. ±1 s per day, at 23°C
Minimum triggering interval:	1 minute
Program data storage period:	10 years at minimum
Programming circuit	
Number of memory locations:	100
Program:	daily, yearly (until 2099)
Data display:	LCD display, backlight
Other information	
Operating temperature:	-20.. +55°C
Storage temperature:	-30.. +70 °C
Electrical strength:	4 kV (power supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 10 terminals, IP 40 from front panel
Overvoltage category:	III.
Polution degree:	2
Max. cable size (mm^2):	max. 2x2.5, max. 1x4 with sleeve max. 1x2.5, max. 2x1.5 mm^2
Dimensions:	90 x 35.6 x 64 mm
Weight:	133 g
Standards:	EN 61812-1, EN 61010-1

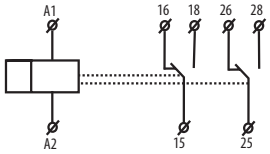
Plug-in module

With battery

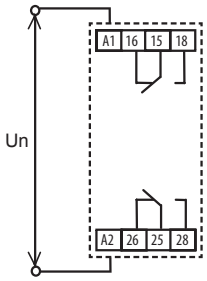
Without battery

Type of backup battery:	CR 2032 (3V)

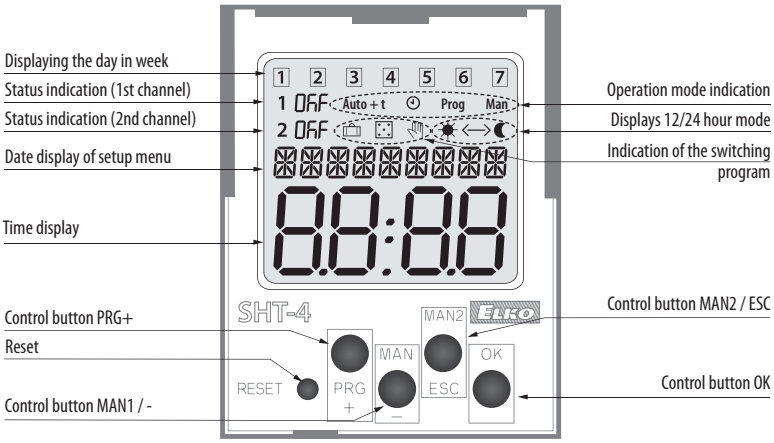
Symbol



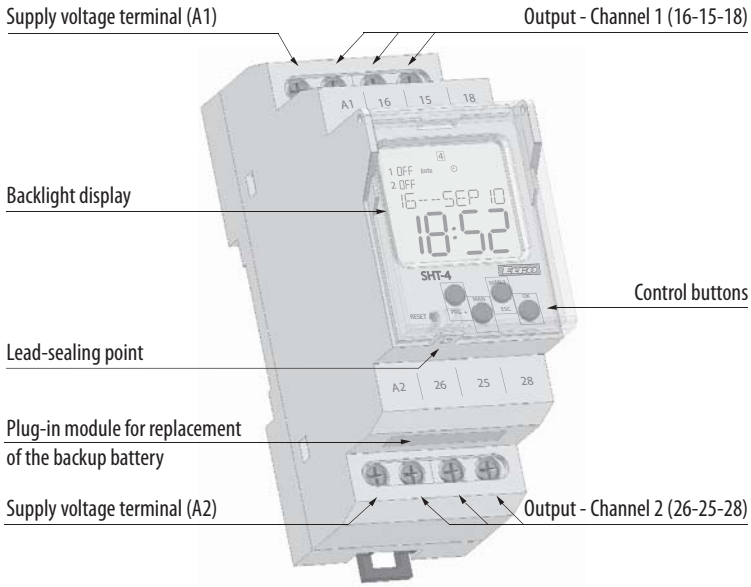
Wiring



Description of items displayed on the screen



Device description

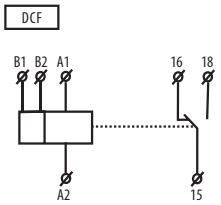


2M

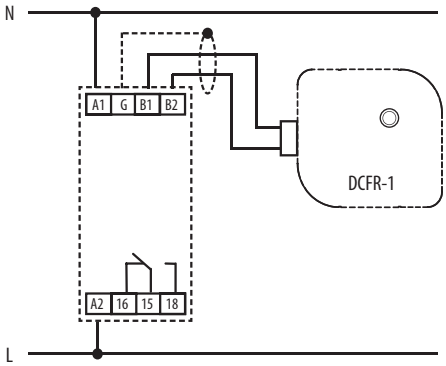
- Used for controlling appliances depending on real time, that is synchronized by a DCF 77 signal, thanks to the automatic time settings (with DCF 77 signal) it eliminates inaccuracies and errors by time running
- 1 channel design with external DCF receiver
- Automatic switching between winter/summer time
- Sealable cover of the front panel
- 100 memory locations
- Backlit LCD display
- Switching according to the program: auto / manual / random / holiday program
- Backing up data and time using the battery
- Reserve battery for up to 3 years
- Easy replacement for the backup battery with plugging module without detaching the device
- Power supply: AC 230V
- 2-MODULE, mounting on DIN rail

EAN code
SHT-6 8595188148382
DCFR-1 8595188148412

Symbol



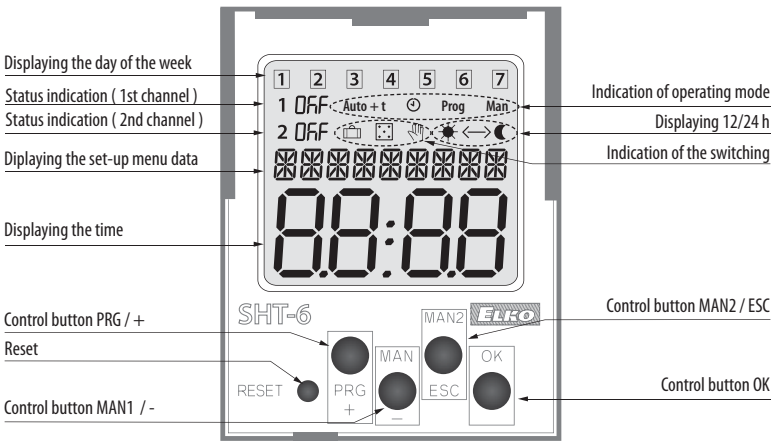
Connection



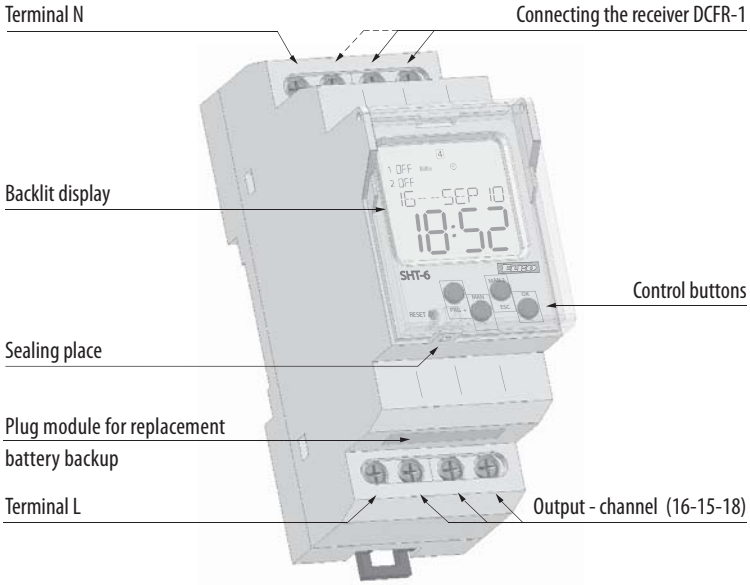
Technical parameters

	SHT-6
Terminals Supply	A1 - A2
Voltage Supply:	AC 230 V / 50 - 60 Hz
Tolerance of voltage supply:	-15 %; +10 %
Output	
Number of contacts:	1 x changeover ($AgSnO_2$)
Rated current:	16 A / AC1
Switching capacity:	4000 VA / AC1, 384 W / DC
Peak current:	30 A / <3 s
Max. switching voltage:	250 V AC1 / 24 V DC
Minimum switching capacity DC:	500 mW
Mechanical life:	> $3x10^7$
Electrical life (AC1):	> $0.7x10^5$
Time circuit	
Backup real. time:	up to 3 years
Running accuracy:	
Without DCF receiver	max. ±1 s a day with 23°C
Minimum switching interval:	1 min
Data retention programs:	min. 10 years
Program circuit	
Number of memory locations:	100
Program:	daily, yearly (till year 2099)
Displayed data:	LCD display with backlight
Other information	
Working temperature:	-10.. +55°C
Storage temperature:	-30.. +70 °C
Dielectric strength:	4 kV (output supply)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection:	IP10 terminals, IP40 from the front panel
Over voltage category:	III.
Degree of pollution:	2
Cable size (mm^2)	max. 2x2.5, max. 1x4
Dimension:	with max. ferrule 1x2.5, max. 2x1.5 mm^2
Weight:	90 x 35.6 x 64 mm
	140 g
Related standards	EN 61812-1, EN 61010-1

Description of the displayed elements on the screen



Description



Plug-in module

With battery — Without battery

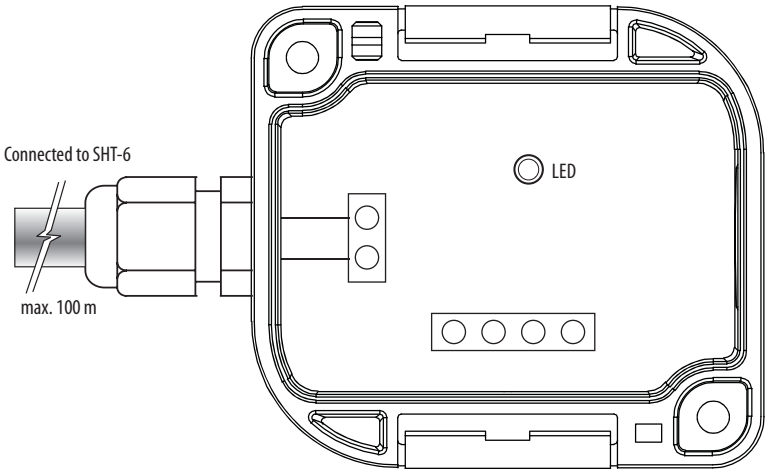
Type of backup battery:	CR 2032 (3V)

2M

- Universal DCF module, which is designed for controlling the SHT-6 timer, and other devices.
- Outdoor applications (IP65)
- Two-wire connection - not polarity sensitive!
- Length of connecting cable is up to 100 m
- Visual indication of proper function module

Technical parameters	DCFR-1
Connection:	2 conductors
Max. cross-connection conductors:	2.5 mm^2
Max voltage on the wires:	10 V
Indication Function:	red LED
Other information	
Storage temperature:	-30.. +70 °C
Protection:	IP65
Dimension:	98 x 62 x 34 mm
Weight:	110 g
Operating position:	perpendicular to the direction of reception
The reception area:	about 1500 km from Frankfurt / Main

Working position - options



SMR-B
60mm
21mm

SMR-K
SMR-T
SMR-H
60mm
13mm

- 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
- More information about type and size of load for these products can be found on page 111

- SMR-K
  - 3-conductor connection, works without the connection of a neutral conductor.
  - power output: 10-160 VA
  - for flawless function of the product is necessary the presence of a load R, L or C between input S and neutral wire

- SMR-T
  - 3-wire connection, works without the connection of a neutral conductor
  - power output: 10 - 160 VA
  - between input S and neutral wire is possible connect any load R, L, or C – that is not necessary (unlike SMR-K)

- SMR-H
  - 4-wire connection
  - power output: 0 - 200 VA
  - it can not be used for fluorescent lamp and energy saving bulb (capacitive load)

- SMR-B
  - 4-wire connection
  - 10 functions
  - output contact 1x16A / 4000 VA, 250V AC1
  - enables switching of fluorescent lights and also energy saving lights
  - suitable for switching loads greater than SMR-K, SMR-T, SMR-H, for example pulse relay, stair automatic switch, switching of ladder radiators in bathrooms
  - independent galvanically separated input AC/DC 5-250 V, for example for control from a security system

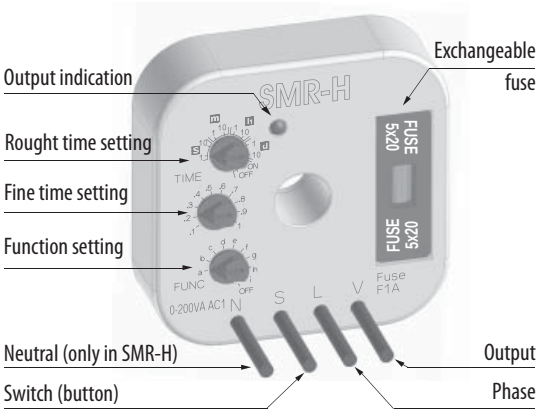
EAN code

SMR-K /230V	8595188145176
SMR-T /230V	8595188129107
SMR-H /230V	8595188129114
SMR-B /230V	8595188135566

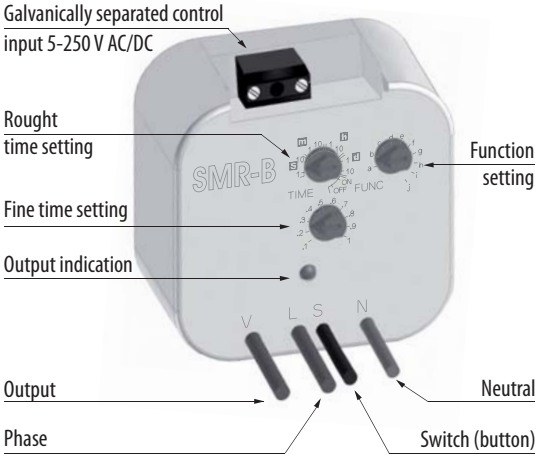
Technical parameters	SMR-K	SMR-T	SMR-H	SMR-B
Number of functions:	9			10
Connection:	3-wire, without neutral		4-wire, with neutral	
Voltage range:	AC 230V / 50-60Hz			
Power input (no operation/make):	0.8 / 3VA			max 1 / 1VA
Supply voltage tolerance:	-15%; +10%			
Time ranges:	0.1 s - 10 days			
Time setting:	via rotaty switch			
Time deviation:	10 % - mechanical setting			
Repeat accuracy:	2 % - set value stability			
Temperature coefficient:	0.1 % / °C, at = 20 °C			
Output				
Number of contacts:	1 x triac			1x NO($AgSnO_2$)
Resistive load:	10 - 160 VA		0 - 200 VA	16A 125/250 V AC1
Inductive load:	10 - 100 VA		0 - 100 VA	8A 250 V AC ($\cos\varphi > 0.4$)
Control				
Control voltage:	AC 230 V			AC230V, UNI-5-250VAC/DC
Control current:	25µA	3 mA		
Impulse length:	min. 50ms / max. unlimited			
Glow tubes connetions:	x	Yes		
Max. amount of glow lamps connected to controlling input:	230V - max. amount 50 pcs (Measured with glow lamp 0.68mA/230V AC)			
Other information				
Operating temperature:	0..+50°C			
Operating position:	any			
Mounting:	free at connecting wires			
Protection degree:	IP30 in standard conditions			
Overvoltage cathegory:	III.			
Pollution degree:	2			
Fuse:	F 1A / 250V			x
Connection:	3x CY, Ø 0.75 mm² (AWG 18) lenght 90mm (3.5˝)	4x sol. wir., Ø 0.75 mm² (AWG 18) lenght 90mm (3.5˝)		2 x CY, Ø 0.75mm² (AWG 18) 2 x CY, Ø 2.5 mm² (AWG 10)
Glow-lamps in control button:	x	max.10		max.20
Dimensions:	49 x 49 x 13 mm (1.9˝x 1.9˝x 0.8˝)			49 x 49 x 21 mm (1.9˝x 1.9˝x 0.8˝)
Weight:	26 g (0.92 oz.)	26 g (0.92 oz.)	27 g (0.95 oz.)	53 g (1.9 oz.)
Standards:	EN 61812-1, EN 61010-1			

Description

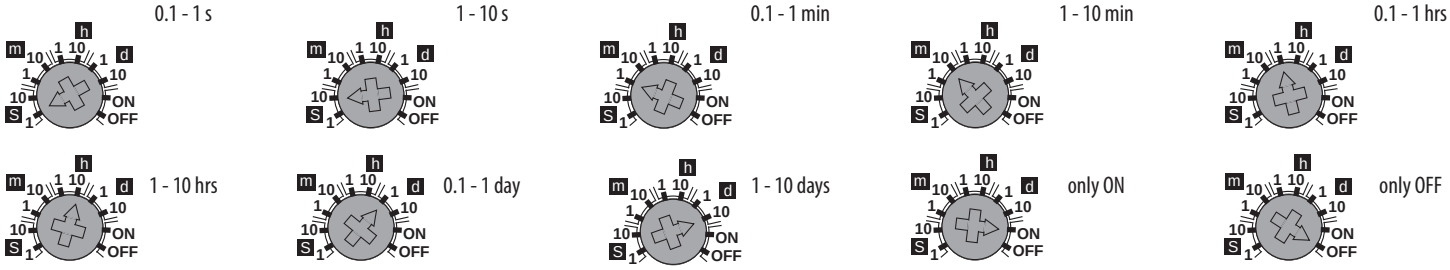
SMR-H



SMR-B



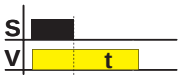
Time ranges



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



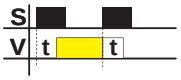
Function c - delay OFF on downward edge
after switching off output switches on and times.

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

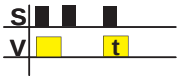
Function e - puls shift
delay on after the switch is switched on and delay on after it is switched off

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



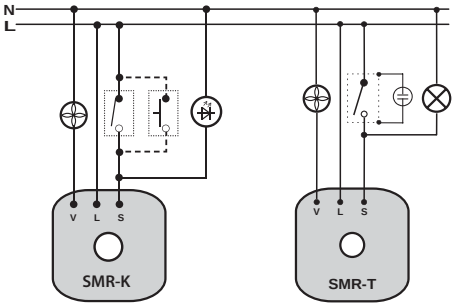
Function h - impulse relay with delay
one press switches on, another one switches the output off in case it is done before the end of timing



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

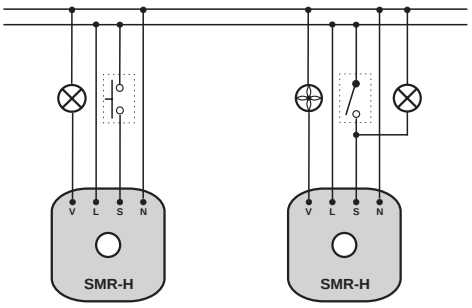
Function j* - cycler starting with gap
delay ON until switched off until it is de-energized or a switch is pressed again.
Note.: *- Function j is valid only for SMR-B

Connection SMR-K, SMR-T, SMR-H, SMR-B



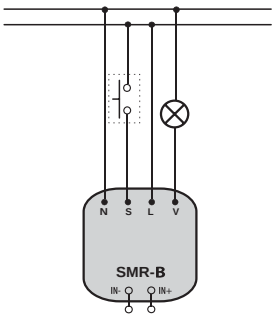
Typical wiring of SMR-K, SMR-T - timer for lamp unit

Fan control depending on the SMR-K , SMR-T lighting



Typical wiring of SMR-H - timer for lamp unit

Fan control depending on the lighting

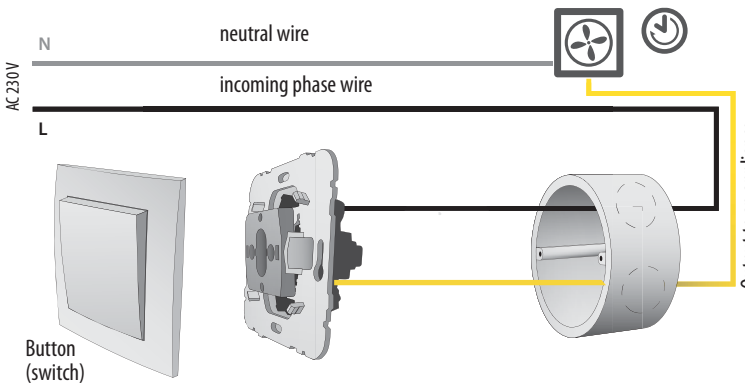


Input for external control voltage AC/ DC 5-250 V

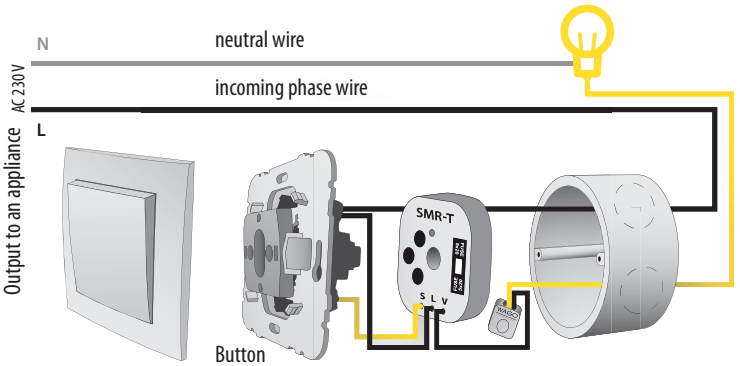
Note: The products of the SMR-K, SMR-T, SMR-H are not intended for switching capacity load (energy saving light bulbs and LED lights with capacity power etc.), these products are only intended for switching resistive and inductive loads (incandescent bulbs, fans, etc.). For other types of traffic is determined by the SMR-B with relays output. This output is possible to switch the load character 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 (unlike the SMR-K) condition.

Example of connection SMR-T

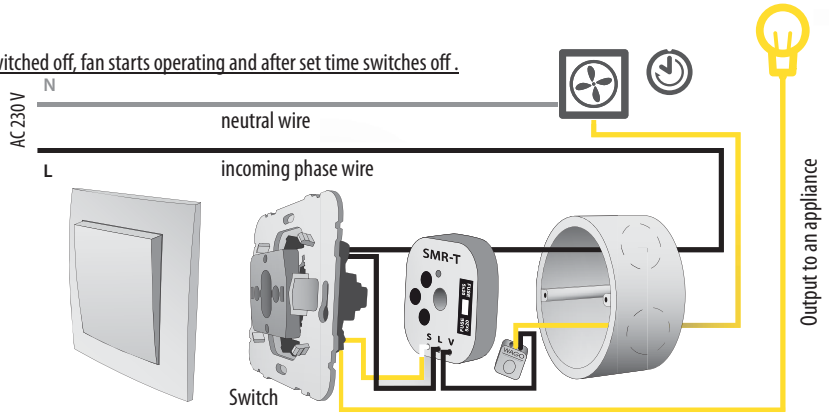
Original connection



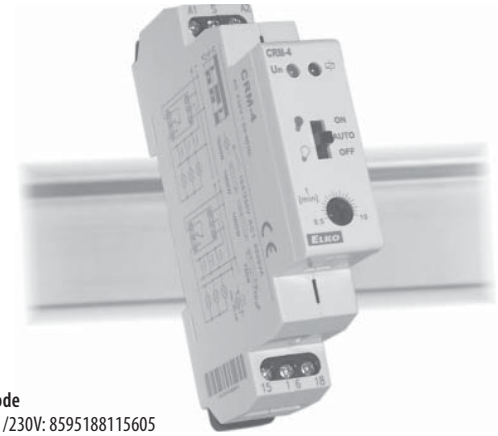
Control of an appliance by button



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



1M



EAN code
CRM-4 /230V: 8595188115605

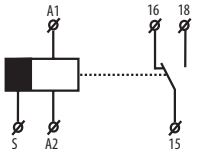
- Used for delayed switching of lights in the corridors, entrances, stairways, halls or for delayed finish of fans (WC, bathroom, etc.)
- It is controlled by a button or by several buttons from more places (connected in parallel) buttons can be equipped by glow lamps (max. 20 pcs of glow lamps)
- Output relay contact 16 A/AC1 with surge current up to 80 A enables switching of el. bulbs and fluorescent lamps
- 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 230 V
- Protection against button blocking (e.g. a match inserted in a button)
- 1- MODULE, DIN rail mounting

Technical parameters

	CRM-4
Function:	delay off reacting to control contact switching
Supply terminals:	A1 - A2
Voltage range:	AC 230 V / 50 - 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 % / °C, at = 20 °C (0.05 % / °F, at = 68 °F)
Output	
Number of contacts:	1x changeover/SPDT ($AgSnO_2$)
Current rating:	16 A / AC1
Breaking capacity:	4000 VA / AC1, 384 W / DC
Inrush current:	30 A / <3 s
Switching voltage:	250 V AC1 / 24 V DC
Min. breaking capacity DC:	500 mW
Output indication:	red LED
Mechanical life:	$3x10^7$
Electrical life (AC1):	$0.7x10^5$
Control	
Control voltage:	AC 230 V
Power on input:	AC 0.53 VA
Load between S-A2:	Yes
Control terminals:	A1-S
Glow tubes connetions:	Yes
Max. amount of glow lamps connected to controlling input:	AC 230V - max. amount 35 pcs (Measured with glow lamp 0.68mA/230V AC)
Impulse length:	min. 25 ms / max. unlimited
Reset time:	max. 150 ms
Other information	
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
Electrical strength:	4 kV (supply - output)
Operating position:	any
Mounting/DIN rail:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 20 terminals
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)
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)
Weight:	62 g (2.2 oz.)
Standards:	EN 60669-2-3, EN 61010-1

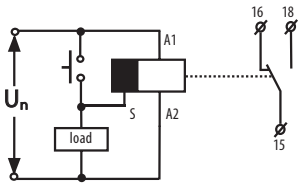
Function

Symbol



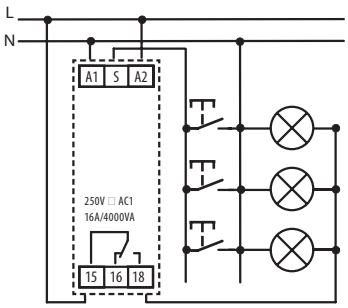
Connection

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).

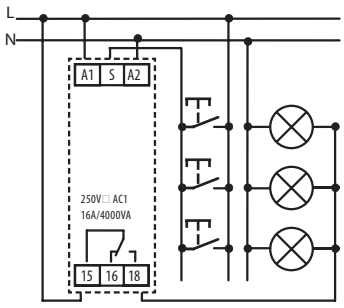


Circuit connection

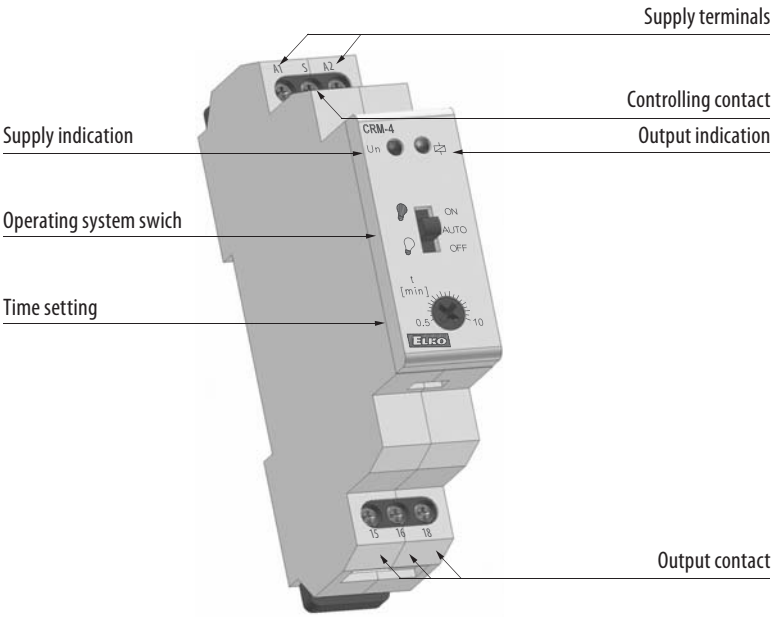
3-wire connection



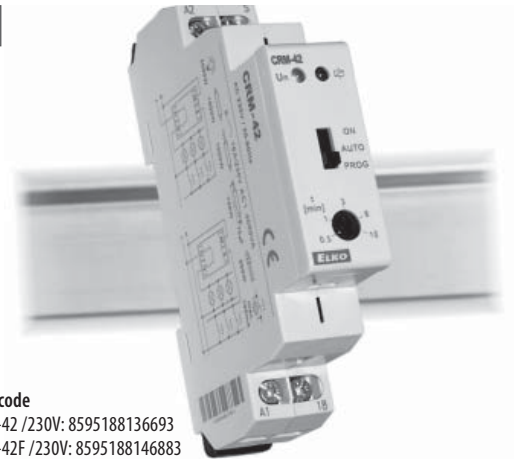
4- wire connection



Description



1M



EAN code
CRM-42 /230V: 8595188136693
CRM-42F /230V: 8595188146883

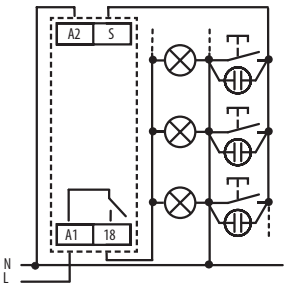
- Intelligent staircase switch, the same use as CRM-4, but with enlarged possibility of control in mode „PROG", it is possible to select time of delayed OFF by number of button pressing. Each pressing multiplies time set by potentiometer, it means that in case you set time to 5 min and press the button 3 times, then the output is automatically prolonged to 15 min. Output can be also switched off before time (reset) by long pressing of button (longer than 2 sec)
- Output relay contact 16A/AC1 with inrush current up to 80 A enables switching of el. bulbs and also fluorescent lights
- Operating system switch:
  ON - output is constantly ON (service mode)
  AUTO - timing according to adjusting by potentiometer in range 30 s - 10 min
  PROG - timing with time prolongation option by number button pressing
- Timing (in mode AUTO and PROG) is possible to be stopped by long pressing of the button (> 2 s)
- Voltage range: AC 230 V, clamp terminals
- Output indication: multif. red LED, flashing at certain states
- Possibility to connect up to 100 buttons equipped with glow lamps (in total 100mA)
- 3-wire or 4-wire connection (it is possible to control input S by potential A1 or A2)
- Warning before switch OFF- output doubleflash 40 and 30 sec before switch OFF
- CRM-42F: Staircase switch without warning flashes especially suited for use with energy-saving lamps, where frequent flashing may cause damage to the light source
- 1- MODULE, DIN rail mounting

Technical parameters

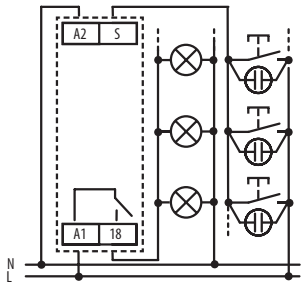
	CRM-42 / CRM-42F
Function:	delay OFF responsive to control contact switch on
Supply terminals:	A1 - A2
Voltage range:	AC 230 V / 50 - 60 Hz
Burden:	AC max. 12 VA / 1.8 W
Supply voltage tolerance:	-15 %; +10 %
Supply indication:	green LED
Time ranges:	Mode AUTO: 0.5 - 10 min, Mode PROG
Time setting:	potentiometer
Time deviation:	5 % - mechanical setting
Repeat accuracy:	5 % - set value stability
Temperature coefficient:	0.05 % / °C, at = 20 °C (0.05 % / °F, at = 68 °F)
Output	
Number of contacts:	1x NO - SPST($AgSnO_2$), switches potencial A1
Current rating:	16 A / AC1
Breaking capacity:	4000 VA / AC1, 384 W / DC
Inrush current:	30 A / <3 s
Switching voltage:	250 V AC1 / 24 V DC
Min. breaking capacity DC:	500 mW
Output indication:	red LED
Mechanical life:	$3x10^7$
Electrical life (AC1):	$0.7x10^5$
Electrical life (AC5b):	$8x10^4$ (bulbs 1000 W) *
Control	
Control voltage:	AC 230 V
Input Burden:	AC 0.53 VA
Glow tubes connetions:	Yes
Max. amount of glow lamps connected to controlling input:	230V - max. amount 50 pcs (Measured with glow lamp 0.68mA/230V AC)
Control. terminals:	A1-S or A2-S
Impulse length:	min. 50 ms / max. unlimited
Reset time:	max. 150 ms
Other information	
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
Operating position:	any
Mounting/DIN rail:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 10 terminals
Overvoltage cathegory:	III.
Pollution degree:	2
Max. cable size (mm^2):	solid wire max. 2x2.5 or 1x4, (AWG 12) with sleeve max. 1x2.5 or 2x1.5, (AWG 12)
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)
Weight:	65 g (2.3 oz.)
Standards:	EN 60669-2-3, EN 61010-1

Connection

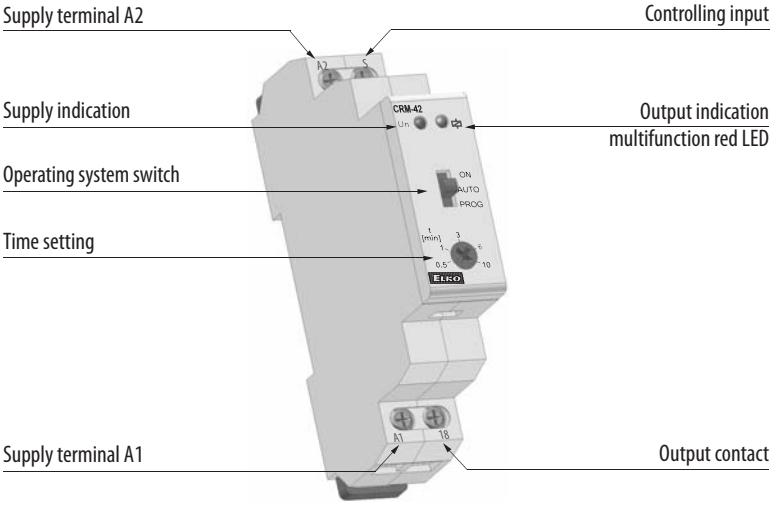
3- wire connection



4- wire connection

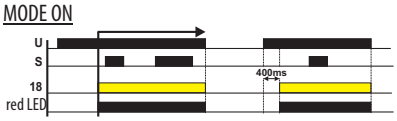


Description

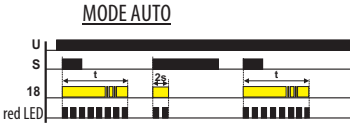


Function

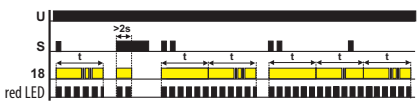
MODE ON



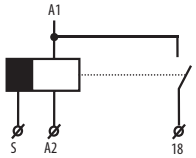
MODE AUTO



MODE PROG (the illumination time is defined by number of button pressing)



Symbol

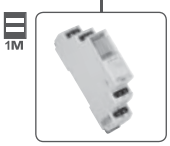


* For bigger bulb loads and frequent switching is recommended to intensify the contact relay with power contactor e.g. VSXXX

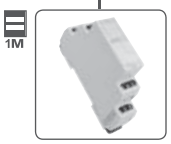
Auxiliary and Power relays

VS(B,K)

VS116B/230
Supply voltage :
AC 230 V
Output contact:
1x changeover/ SPDT 16 A.

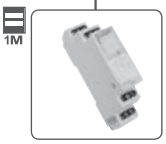


VS116K
Supply voltage :
AC 230 V and AC/DC 24 V
Output contact:
1x changeover/ SPDT 16 A.



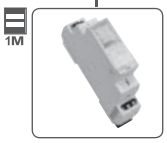
VS308K
Supply voltage :
AC 230 V and AC/DC 24 V
Output contacts:
3x changeover/ SPDT 8A.

VS316/24
Supply voltage :
AC/DC 24 V
Output contacts:
3x changeover/SPDT 16 A,
possibility to be connected
into 3-phase circuit.

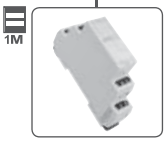


VS316/230
Supply voltage :
AC 230 V
Output contacts:
3x changeover/ SPDT 16 A,
possibility to be connected
into 3-phase circuit.

VS(U)

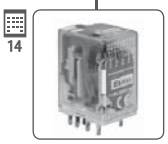


VS116U
Supply voltage :
AC/DC 12-240 V
Output contact:
1x changeover/SPDT 16 A.



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

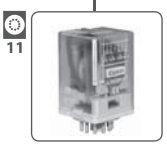
782L



782L
Power relays plug-in
Output contacts: 4 x
changeover contact/
SPDT 6 A
Plug-in type.

ES-15/4NA - socket
Max. voltage: 12 A
Weight: 59 g
Mounting to DIN rail
Designated for 4-contact relay.

750L



750L
Power relays plug-in
Output contacts:
3 x changeover contact /
SPDT 10 A
Plug-in type.

ES-11A- socket
Max. current: 10 A
Weight: 60 g
Monting to DIN rail
Designated for 3-contact relay.

Type	Design	Coil voltage	Output contact	Other features			Designation	page of catalogue
				LED signal light	RC unit	Paralel diode		
VS116B/230	MINI	AC 230 V/50-60 Hz	1x16 A changeover/ SPDT	●			VS116/B230 MINI, with installation into junction box or ceiling that allows control of lights, shades or awnings drives	32-33
VS116K	1M-DIN	AC 230 and AC/DC 24 V	1x16 A changeover/ SPDT	●	●	●	as a separation relay (4kV), direct switching of appliances up to 4000VA (e.g. heaters), well visible signalization, noiseless	32-33
VS116U	1M-DIN	AC/DC 12..240 V	1x16 A changeover/ SPDT	●	●	●	as VS116K, but multivoltage supply coil	32-33
VS308K	1M-DIN	AC 230 and AC/DC 24 V	3x8 A changeover/ 3PDT	●	●	●	a "multiplication" of contacts, 3x changeover contact/ 3PDT only in 1-MODULE, well visible signalization, noiseless	32-33
VS308U	1M-DIN	AC/DC 12..240 V	3x8 A changeover/ 3PDT	●	●	●	as VS308K, but multivoltage supply coil	32-33
VS316/24	1M-DIN	AC/DC 24 V	3x16 A changeover/ 3PDT	●	●	●	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	32-33
VS316/230	1M-DIN	AC 230 V	3x16 A changeover/ 3PDT	●	●	●	as VS316/24, but AC 230V	32-33
782L	PLUG-IN	AC 6-230 V, DC 6-110 V	4x8 A changeover/ 4PDT	●			compact small relay for installation into plug relay, basic version equipped by LED indication, detent and testing lever	34-35
750L	PLUG-IN	AC 6-230 V, DC 6-110V	3x16 A changeover/ 3PDT	●			as 782, but into 11-pin round socket, 3x changeover contact / 3PDT 16A/250V	34-35

More about contact loadability on page 111

1M

60mm
21mm

EAN code
see page 33

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

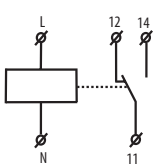
Type	Current rating	Number of contacts	Design	Supply terminals
VS116K	16 A	1	DIN (1M)	A1 - A2 230V AC/ A1 - A3 24V AC/DC
VS116U	16 A	1	DIN (1M)	A1 - A2 12- 240V AC
VS116/B230	16 A	1	BOX (MINI)	L-N 230V AC
VS308K	8 A	3	DIN (1M)	A1 - A2 230V AC/ A1 - A3 24 V AC/DC
VS308U	8 A	3	DIN (1M)	A1 - A2 12-240V AC/DC
VS316/24	16 A	3	DIN (1M)	A1 - A2 24V AC/DC
VS316/230	16 A	3	DIN (1M)	A1 - A2 230V AC

- Relays VS316/24, VS316/230 enable connection to a 3-phase circuit
- In the design 1-MODULE , DIN rail mounting, output status indicated by high intensity LED with choice of LED color (red, green, yellow, blue or white LED*)
- VS116/B230 MINI, mounting in installation box or ceilings, enabling switching of lights, motors for blinds or awnings
- For VS116/B230 status of output indicated by LED on front panel of device

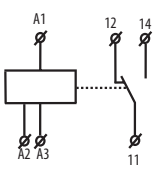
Technical parameters	VS116B/230	VS116K	VS116U	VS308K	VS308U	VS316/24	VS316/230
Supply terminals:	L-N	A1 - A2					
Voltage range:	AC 230 V/50-60 Hz	AC 230 V/50-60 Hz	AC/DC 12-240 V/ 50-60 Hz	AC 230 V/ 50-60 Hz	AC/DC 12-240 V/ 50-60 Hz	AC/DC 24 V/ 50-60 Hz	AC 230 V/ 50-60 Hz
Burden:	AC max. 7.5 VA/ 1W	AC max. 7.5 VA/ 1W	AC 0.7 - 3 VA/ DC 0.5 - 1.7 W	AC max. 10.3 VA/ 1.1 W	AC 0.7 - 3 VA/ DC 0.5 - 1.7 W	1.6 VA/ 1.2 W	2.5 VA
Supply terminals:	x	A1-A3	x	A1-A3		x	
Voltage range:	x	AC/DC 24 V (50-60 Hz)	x	AC/DC 24 V (50-60 Hz)		x	
Burden:	x	AC 1 VA/ DC 1W	x	AC 1 VA/ DC 1W		x	
Supply voltage tolerance:	-15%; +10%						
Output							
Number of contacts:	1 x changeover/ SPDT ($AgSnO_2$)			3 x changeover/3PDT (AgNI / Silver Alloy)		3 x changeover/ 3PDT ($AgSnO_2$)	
Current rating:	16 A/ AC1			8 A/ AC1		16A/ AC1	
Breaking capacity:	4000VA/ AC1, 384W/ DC			2000VA/ AC1, 192W/ DC		4000VA/ AC1, 384W/ DC	
Inrush current:	30 A/ <3s			10 A/ <3s		30 A/ <3s	
Switching voltage:	250 V AC1/ 24 V DC						
Min. breaking capacity DC:	500 mW						
Output indication:	red LED	high intensity of LED					
Mechanical life:	$3x10^7$						$1x10^7$
Electrical life (AC1):	$0.7x10^5$						$1x10^5$
Time between switching:	min. 2s	min. 2s				20 ms	50 ms
Other information							
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)						
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)						
Electrical strength:	4 kV (supply-output)						
Operating position:	any						
Mounting/DIN rail:	free at connecting wire	DIN rail EN 60715					
Protection degree:	IP 30	IP 40 from front panel					
Overvoltage cathegory:	III.						
Pollution degree:	2						
Max. cable size (mm^2):	2x 0.75 mm^2, 3x 2.5 mm^2	max.1x 2.5 or 2x1.5 max. 1x2.5					
Dimensions:	49 x 49 x 21 mm	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)					
Weight:	48 g	54 g (1.9 oz.)	58 g (2.05 oz.)	52 g (1.83 oz.)	83g (2.9 oz.)	90 g (3.17 oz.)	92 g (3.25 oz.)
Standards:	EN 61810-1, EN 61010-1	EN 61810-1, EN 61010-1					

Symbol

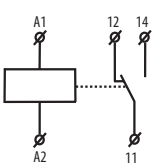
VS116B/230



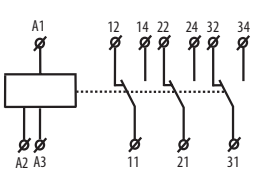
VS116K



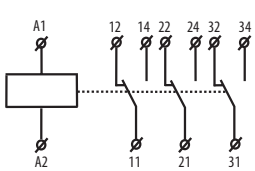
VS116U



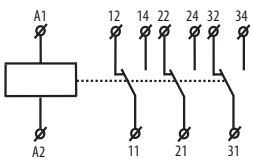
VS308K



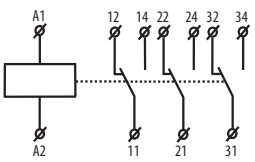
VS308U



VS316/24



VS316/230

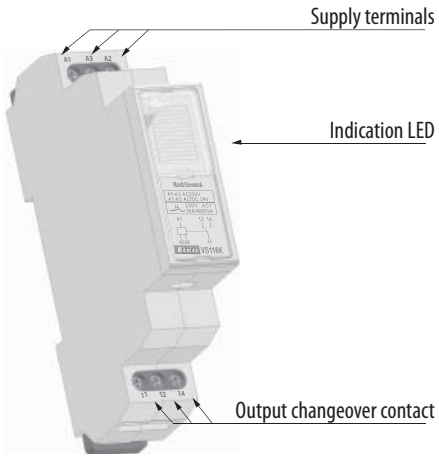


Notes:

Max. time of changeover of contact is 10ms.
VS316/24 or VS316/230 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.

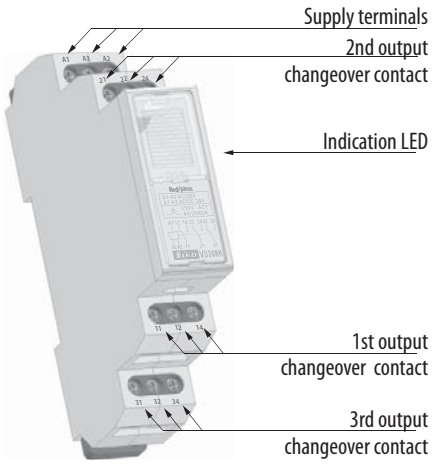
Description

VS116K, VS116U



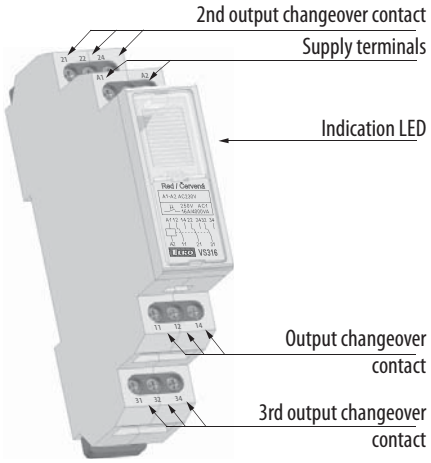
terminal A3 only for VS116K

VS308K, VS308U

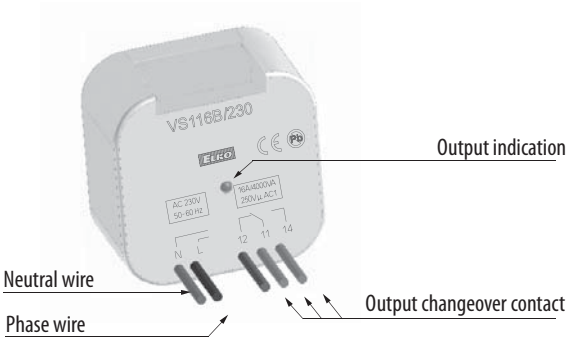


terminal A3 only for VS308K

VS316/24, VS316/230



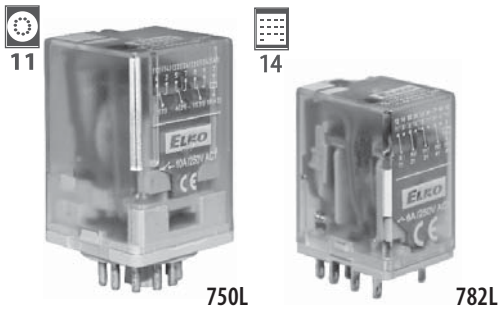
VS116B/230



EAN codes

VS116U /red	8595188124607	VS308U /red	8595188130103	VS316 /230 red	8595188135559
VS116U /green	8595188136433	VS308U /green	8595188136440	VS316 /230 green	8595188136075
VS116U /yellow	8595188138499	VS308U /yellow	8595188138529	VS316 /230 yellow	8595188136082
VS116U /white	8595188138482	VS308U /white	8595188138512	VS316 /230 white	8595188136051
VS116U /blue	8595188138475	VS308U / blue	8595188138505	VS316 /230 blue	8595188136068
VS116K /red	8595188122597	VS308K /red	8595188122696	VS316 /24 red	8595188135771
VS116K /green	8595188122610	VS308K /green	8595188122719	VS316 /24 green	8595188136105
VS116K /yellow	8595188122580	VS308K /yellow	8595188122689	VS316 /24 yellow	8595188136129
VS116K /white	8595188122573	VS308K /white	8595188122672	VS316 /24 white	8595188136099
VS116K /blue	8595188122603	VS308K /blue	8595188122702	VS316 /24 blue	8595188136112

VS116B/230	8595188147543



- Used for switching a higher power (load) than that of the switched element amplifier
- For auxiliary lighting control, signalization, the relay interlockings, boilers, HDO, heaters
- 3x changeover contacts of 10A(AgNi) **for 750L**
- 4x changeover contacts of 6A(AgNi) **for 782L**
- Recommended bases - ES-11A base for 750L, ES-15/4NA base for 782L

Technical parameters	750L	782L
Contacts		
Number of switching contacts	3	4
Contact material:	AgNi	AgNi
Rated voltage:	AC 250 V/440 V (50 - 60 Hz)	AC 250 V/250 V (50 - 60 Hz)
Rated current:	10 A	6 A
peak current	20 A	12 A
Switching capacity	10A/250A	6A/250A
Switching capacity	3A/120V/1.5A/240V	1.5A/120V/0.75A/240V
Switching capacity	10 A / 24 V DC	6 A / 24 V DC
Switching capacity	0.22 A / 120V 0.1 A/250 V	0.22 A / 120V 0.1 A/250 V
Minimum switching voltage / current:	5mA/5V	5mA/5V
Coil	1.5W/DC	1.5W/DC
Rated Voltage (DC):	6, 12, 24, 48, 110 V	6, 12, 24, 48, 110 V
Rated voltage (AC, 50-60Hz):	6, 12, 24, 120, 230 V	6, 12, 24, 120, 230 V
Rated power (AC / DC)	AC 2.8 VA (50Hz) /2.5 VA (60Hz)/ DC 1.5 W	AC 1.6 VA/ DC 0.9 W
Tolerance of supply voltage:	-20 / +10 %	-20 / +10 %
Isolating data		
Rated insulation voltage (AC):	2500 V	2500 V
Dielectric strength (AC)		
coil - contact:	2500 V	2500 V
contact - contact:	1500 V	1500 V
Isolating resistance at 500 V DC:	10^7 Ω	10^7 Ω
Distance contact - coil		
air:	≥ 3 mm	≥ 1.6 mm
surface:	≥ 4.2 mm	≥ 3.2 mm
General information		
Mechanical life:	≥ $2x10^7$	$1x10^7$
Electrical life (AC1):	≥ $2x10^5$ 10A/250V AC	≥ 10^5 6A/250V AC
Max. switching frequency		
at rated load:	1200 cycles / hrs	1200 cycles / hrs
Without load:	12000 cycles / hrs	18000 cycles / hrs
Pick-up time / returning contact:	max. 12/10 ms	max. 10/8 ms
Working temperature:	-40.. +55 °C (AC)	-40.. +55 °C
Storage temperature:	-40 .. +85 °C	-40.. +85 °C
Protection:	IP40 from the front panel	IP40 from the front panel
Dimensions:	35 x 35 x 54.4 mm	27.5 x 21.2 x 35.6 mm
Weight:	83 g	35 g
Standards:	EN 60947-4-1, EN 60947-5-1	EN 61810-1,
		EN 60255-1-00, EN 61810-7

Coil data for 750L

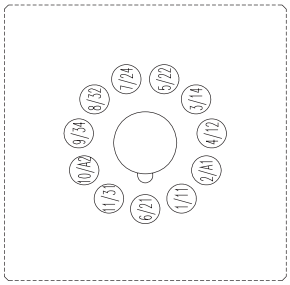
Product Type	Voltage[V]	Resistance [Ω]
AC voltage		
5006	AC 6	4.3
5012	AC 12	18.5
5024	AC 24	75
5048	AC 48	305
5060	AC 60	475
5115	AC 115	1 840
5120	AC 120	1 910
5220	AC 220	6 980
5230	AC 230	7 080
5240	AC 240	7 760
DC voltage		
1006	DC 6	28
1048	DC 48	1 750
1060	DC 60	2 700
1110	DC 110	9 200
1120	DC 120	11 000
1012	DC 12	110
1024	DC 24	430
1220	DC 220	37 000

Coil data for 782L

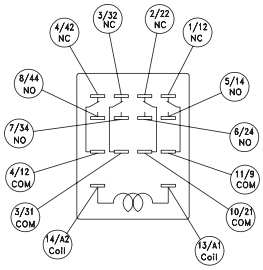
Product Type	Voltage [V]	Resistance[Ω]
AC voltage		
5006	AC 6	9.8
5012	AC 12	39.5
5024	AC 24	158
5042	AC 42	470
5048	AC 48	740
5060	AC 60	930
5080	AC 80	1 720
5110	AC 110	3 450
5115	AC 115	3 610
5120	AC 120	3 770
5127	AC 127	4 000
5220	AC 220	15 400
5230	AC 230	16 100
5240	AC 240	16 800
DC voltage		
1005	DC 5	28
1006	DC 6	40
1012	DC 12	160
1024	DC 24	640
1048	DC 48	2 600
1060	DC 60	4 000
1080	DC 80	7 100
1110	DC 110	13 600
1125	DC 125	16 000
1220	DC 220	15 400

Connection

The 750L connection



The 782L connection



Socket ES-11A - for 750L

Max. Current: 10A
Weight: 60 g
Mounting on DIN rail
Designed for 3- relay contacts

ES-11A

Socket ES-15/4N - for 782L

Max. Current: 12A
Weight: 59 g
Mounting on DIN rail
Designed for 4- relay contacts

ES-15/4NA

Accessories to ES-11A - for 750L

Clip to relay 750L: 16-1351

Accessories to ES-15/4NA - for 782L

swivel label - TR1

The LED module, the protective diode and R/C member can be assigned into the slot.

EAN code

750L/110V DC	8595188129992	ES-15/4NA	8595188119245
750L/120V AC	8595188130028	ES-11A	8595188129879
750L/12V AC	8595188130011	ES8	8595188136167
750L/12V DC	8595188129978	Clip to relay 750L	8595188119283
750L/230V AC	8595188119221	Clip to relay 782L	8595188119276
750L/24V AC	8595188119207		
750L/24V DC	8595188125147		
750L/48V DC	8595188129985		
750L/6V AC	8595188130004		
750L/6V DC	8595188129961		
782L/110V DC	8595188129923		
782L/120V AC	8595188129947		
782L/12V AC	8595188119085		
782L/12V DC	8595188119030		
782L/230V AC	8595188119115		
782L/24V AC	8595188119092		
782L/24V DC	8595188119047		
782L/48V AC	8595188129954		
782L/48V DC	8595188129916		
782L/6V AC	8595188129930		
782L/6V DC	8595188129909		

Dimmers

R, L

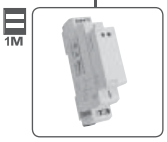
R, L, C

R, L, C

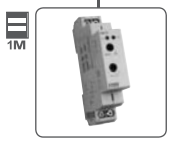
MODULAR

DIM-2
staircase switch with gradual dimming up/ down, level and time of illumination, all values are adjustable.
R = 10 -500 VA
L = 10 -250 VA

DIM-5
control by a button/ buttons (connected in parallel), short pressing ON/OFF, long pressing regulates brightness, memory storing.
R = 10 -500 VA
L = 10 -250 VA



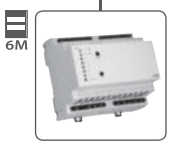
DIM-14
as DIM-5 but dims all types of loads, in-built protection against temperature and current overload, electronic fuse.
R = 500 VA
L = 500 VA
C = 500 VA



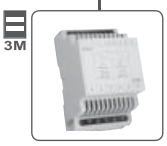
DIM-15
designated for dimming of
1) LED lamps and LED lighting sources
2) dimmable energy saving fluorescent lamps

LIC-1
intensity controller for maintaining the constant illumination level.
Dimmable energy saving fluorescent lamps, LED lamps.
R,L,C, - resistive, inductive and capacitive loads

MODULAR



DIM-6
power dimming to 2kW.
Can be controlled by button, external potentiometer, 0-10 V (1-10 V) system iNELS.
R = 2000VA
L = 2000 VA
C = 2000VA

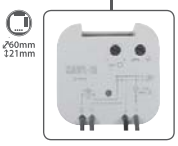


DIM6-3M-P
DIM6-3M-P is a power module expansion unit for DIM-6. It cannot be operated independently.
R = 1000VA
L = 1000 VA
C = 1000VA

MINI

SMR-S
as DIM-5, but for mounting under a wall-switch into an installation box KU-68 (or the similar),
3 wire connection (without neutral).
R = 10-300VA
L = 10-150 VA

SMR-U
as DIM-14, but for mounting under a wall-switch into an installation box KU-68 (or the similar).
R = 1000VA
L = 1000 VA
C = 1000VA



SMR-M
for mounting under a wall-switch into an installation box KU-68 (or similar).
Dimmable energy saving fluorescent lamps, LED lamps.

Recommendation for mounting:

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

Type	Design	Supply voltage	Type of dimmed load					Output				Dimming principal		Designation	Catalogue page
			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		
DIM-2	1M-DIN	AC 230V	●	●		x	x	triac	10-500VA*	10-250VA	-	●	x	staircase switch with gradual dim-up/dim-down, level and length of illumination, all values are adjustable	37
DIM-5	1M-DIN	AC 230V	●	●		x	x	triac	10-500VA*	10-250VA	-	●	x	control by button/buttons (connected in parallel), short pressing ON/OFF, long pressing regulated brightness, memory recording	38
DIM-14	1M-DIN	AC 230V	●	●	●	x	x	2x MOSFET	500 VA*	500 VA*	500 VA*	●	●	as DIM-5, but dims all types of load, inbuilt protections against thermo and current overload, electronic fuse	39
DIM-15	1M-DIN	AC 230V	-	-	-	●	●	2x MOSFET	●	-	●	x	x	designated for dimming of: 1) LED bulbs and LED lighting sources 2) dimmable saving fluorescent lamps	42
DIM-6	6M-DIN	AC 230V	●	●	●	x	x	4x MOSFET	2 000 VA*	2 000 VA*	2 000 VA*	●	●	for controlled dimming of lights up to 2kW, with a possibility of module extention up to 20kW (el.bulbs and hallogen lights, also with ballast type C or L)	40
DIM-6-3MP	3M-DIN	AC 230V	●	●	●	x	x	2x MOSFET	1 000 VA*	1 000 VA*	1 000 VA*	x	x	is expanding power modul for controlled dimmer DIM-6	41
SMR-S	BOX	AC 230V	●	●		x	x	triac	10-300VA*	10-150VA	-	●	x	as DIM-5, but for mounting under a wall-switch, into a wiring box, 3 wire connection (without neutral) is expanding power modul for controlled dimmer DIM-6	44
SMR-U	BOX	AC 230V	●	●	●	x	x	2x MOSFET	500VA*	500VA*	500VA*	●	●	as DIM-14, but for mounting under a wall-switch, into an installation box	44
SMR-M	BOX	AC 230V	-	-	-	●	●	2x MOSFET	●	-	●	●	●	designated for dimming of: 1) LED bulbs and LED lighting sources 2) dimmable saving fluorescent lamps	42
LIC-1	1M-DIN	AC 230V	●	●	●	●	●	2x MOSFET	300 VA*	300 VA*	300 VA*	●	●	for maintaining the constant illumination level. ESL dimmable compact fluorescent lamps, LED lamps, R,L,C, - resistive, inductive and capacitive loads	45

Note: * - with load over 300 VA is necessary to ensure sufficient cooling

Expandatory:

R, L, C

Dimmer with designatedload:
R - RESISTIVE
L - INDUCTIVE
C - CAPACITIVE

ESL - energy saving fluorescent lamps
LED - LED lamps

type of load (symbols)	bulbs, halogen lamps	low-voltage el.bulbs 12/24V With wound transformers	low-voltage el.bulbs 12/24V With electronic transformers	ESL dimmable compact fluorescent lamps	LED lamps
	HAL. 230 V				
	R	L	C	ESL	LED

Demonstrated symbols are informative

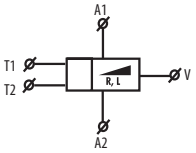
1M

EAN code
DIM-2 /230V: 8595188112475
DIM-2-1h /230V: 8595188135740

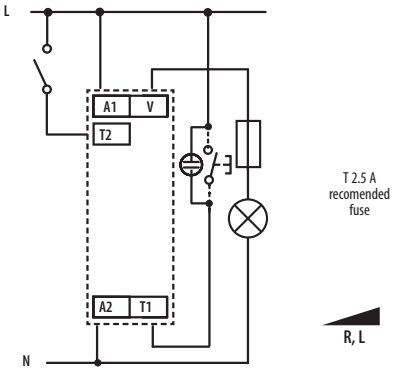
- Designated for dimming el. bulbs, halogen lights and halogen lights with winding transformers
- Intelligent control of halogen lights, function of gradual switching on and dimming
- Controlling inputs for push button and switch
- Values are set by potentiometers on front panel of the product, adjustable:
  - maximum dim-up
  - speed (fluency) of dim-up
  - speed (fluency) of dim-down
  - time for which a light is on with maximum dim-up
- All time intervals can be adapted according to a request
- Output without contact: 1x triac
- Load AC 5b (el. bulbs) 500 W
- Clamp terminals
- Parallel connection of controlling pushbuttons is possible
- Protection against over-temperature inside the product - switches output off + signalizes overheating by LED flashing
- Note: possibility of start and finish adjustment up on 1 hour, device has description DIM-2 1h
- 1-MODULE, DIN rail mounting

Technical parameters:	DIM-2
Supply terminals:	A1 - A2
Voltage range:	AC 230 V / 50 Hz
Burden:	max. 5 VA
Supply voltage tolerance:	-15 %; +10 %
Supply indication:	green LED
Time setting by:	potentiometers
Time deviation:	10 % - mechanical setting
Repeat accuracy:	5 % - set value stability
Temperature coefficient:	0.01 % /°C, at = 20°C
Recovery time:	max.80ms
Controlling T1 (button)	
Terminals:	T1 - A1
Voltage:	AC 230 V
Power on control input:	max. 1.5 VA
Impulse length:	min.100 ms /max. unlimited
Glow-lamps:	Yes
Max. amount of glow lamps	230V - max. amount 50 pcs
connected to controlling input:	(Measured with glow lamp 0.68mA/230V AC)
Controlling T2 (switch)	
Terminals:	T2 - A1
Voltage:	AC 230 V
Power on control input:	0.1 VA
Impulse length:	min.100 ms /max. unlimited
Output	
Current rating:	2 A
Resistance load:	10 - 500 VA
Inductive load:	10 - 250 VA
Other information	
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
Operating position:	any
Mounting/DIN rail:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 10 terminals
Overvoltage cathegory:	III.
Pollution degree:	2
Max. cable size (mm^2):	solid wire max.2x 2.5 or 1x4/ with sleeve max. 1x2.5 or 2x1.5 (AWG 12)
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)
Weight:	65 g (2.3 oz.)
Standards:	EN 60669-2-1, EN 61010-1

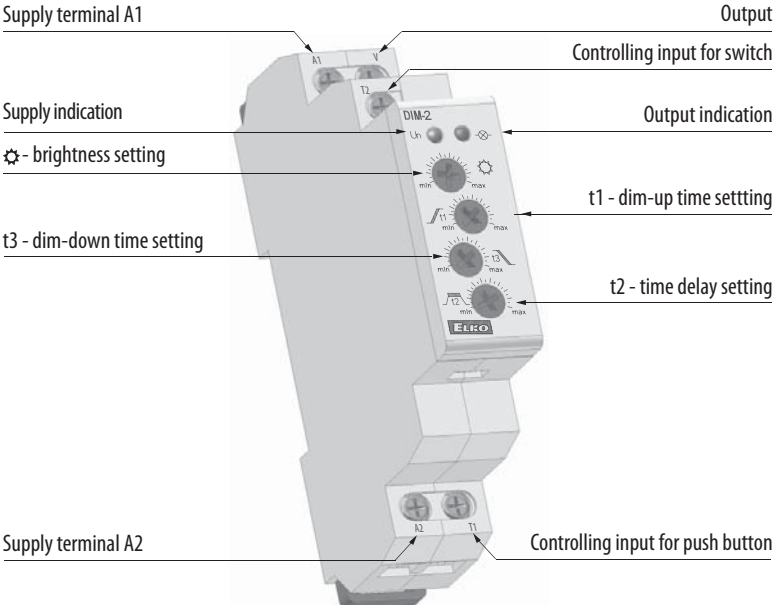
Symbol



Connection



Description



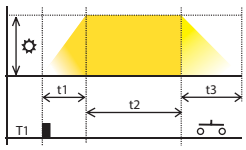
Recommendation for mounting: leave a gap of min. 0.5 module (approx. 9 mm) on side of the device to ensure better cooling of the device.

Function

Legend:

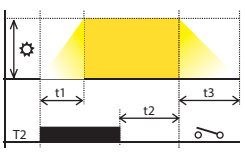
☼ Brightness: 10-100%
t1 Dim-up time: 1-40 s
t2 Time delay: 0s-20min
t3 Dim-down time: 1-40s

Controlled via input T1(button)



Dim-up delay-down is started by a button. Cycle extensiona-nother button pressing (du-ring cycle).

Controlled via input T2 (switch)



The switch starts the cycle and it stops on max.set brightness. After the switch is off, the cycle will continue until completed.

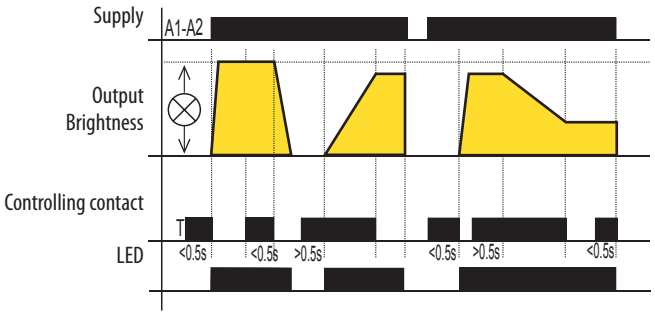
1M

- Designated for dimming el. bulbs, halogen lights and halogen lights with winding transformers
- For switching and dimming lights in corridors, stairways... control input for push-buttons (parallel connection possible)
- Short press turns light on/off, longer press (> 0.5 s) provides dim up / dim down
- When switched off , brightness level is stored in a memory and when On again it restores last brightness level
- Voltage range: AC 230 V
- Contactless output, triac 2A/ 500 VA
- LED output indication (with any level of brightness)
- Possibility to connect control buttons in parallel
- 1-MODULE, DIN rail mounting
- Clamp terminals
- Protection against over-heating inside the product - switches output off + signalizes overheating by LED flashing

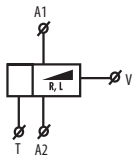
EAN code
DIM-5 /230V: 8595188115612

Technical parameters	DIM-5
Supply terminals:	A1 - A2
Voltage range:	AC 230 V / 50 Hz
Burden:	max. 5 VA
Supply voltage tolerance:	-15 %; +10 %
Supply indication:	green LED
Controlling	
Control terminals:	T - A1
Control voltage:	AC 230 V
Power control input:	max. 1.5 VA
Impulse length:	min. 80 ms / max. unlimited
Glow-lamps:	Yes
Max. amount of glow lamps	230V - max. amount 50 pcs
connected to controlling input:	(Measured with glow lamp 0.68mA/230V AC)
Output	
Current rating:	2 A
Resistance load:	10 - 500 VA
Inductive load:	10 - 250 VA
Output indication:	red LED
Other information	
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
Operating position	any
Mounting/DIN rail:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 10 terminals
Overvoltage cathegory:	III.
Pollution degree:	2
Max. cable size (mm^2):	solid wire max. 2x2.5 or 1x4 (AWG 12)
	with sleeve max. 1x2.5 or 2x1.5 (AWG 12)
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)
Weight:	58 g (2 oz.)
Standards:	EN 60669-2-1, EN 61010-1

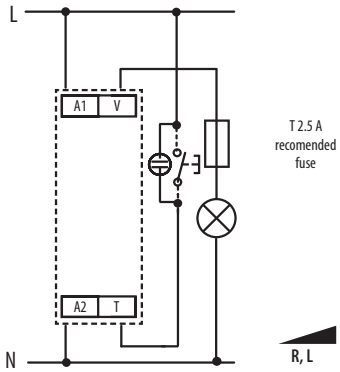
Function



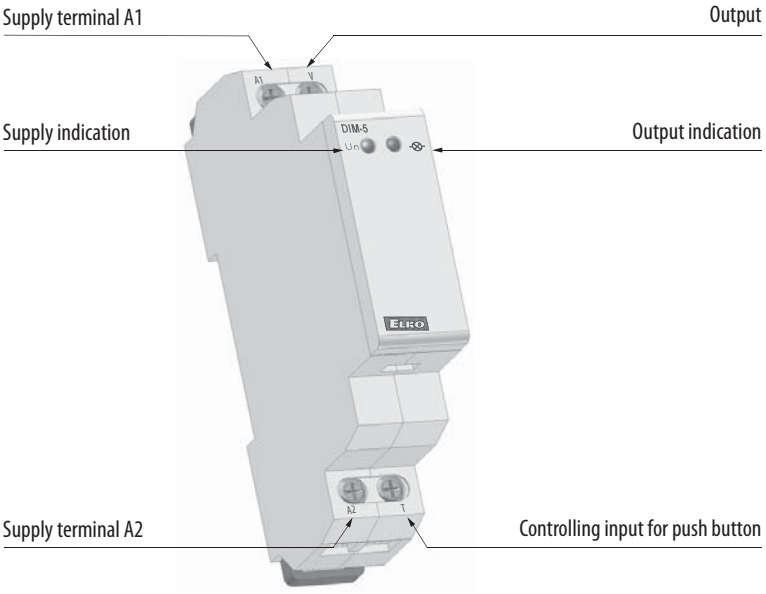
Symbol



Connection



Description



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

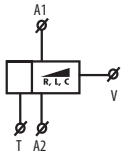
1M

- Designed for dimming of incandescent bulbs and halogen lights with wound or electronic transformer
- For switching and dimming of lights, control inputs for a button
- Short impulse switches ON/OFF, longer impulse (>0.5s) enables gradual light intensity setting
- Last intensity level is stored in memory when switched off
- Voltage range: AC 230 V
- Output without contacts: 2x MOSFET
- LED output indicator with any level of brightness possibility of parallel connection of control buttons
- Resistive, inductive or capacitive load, up to 300 W, for a short term up to 500 W
- 1-MODULE, DIN rail mounting
- Electronic overvoltage protection
- Protection against over-heating inside the device - output off

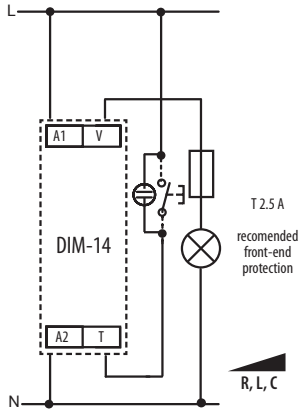
EAN code
DIM-14 /230V: 8595188135955

Technical parameters	DIM-14
Supply terminals:	A1-A2
Voltage range:	AC 230 V / 50 Hz
Burden:	1.3 W
Supply voltage tolerance:	-15 %; +10 %
Dissipated power:	6 VA
Indication output:	green LED
Controlling	
Control terminals:	A1- T
Control voltage:	AC 230 V
Power control input:	AC 0.3-0.6 VA
Impulse length:	min. 80 ms / max. unlimited
Glow-lamps:	Yes
Max. amount of glow lamps connected to controlling input:	230V - max. amount 20 pcs (Measured with glow lamp 0.68mA/230V AC)
Output	
Contactless:	2 x MOSFET
Current rating:	2 A
Resistance load:	500 VA*
Inductive load:	500 VA*
Capacitive load:	500 VA*
Output state indication:	red LED
Other information	
Operating temperature:	-20 °C to +35 °C (-4 °F to 95 °F)
Storage temperature:	-20 °C to +60 °C (-4 °F to 140 °F)
Operating position:	any
Mounting/DIN rail:	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 (AWG 12) with sleeve max. 1x2.5 or 2x1.5 (AWG 12)
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)
Weight:	58 g (2 oz.)
Standards:	EN 60669-2-1, EN 61010-1

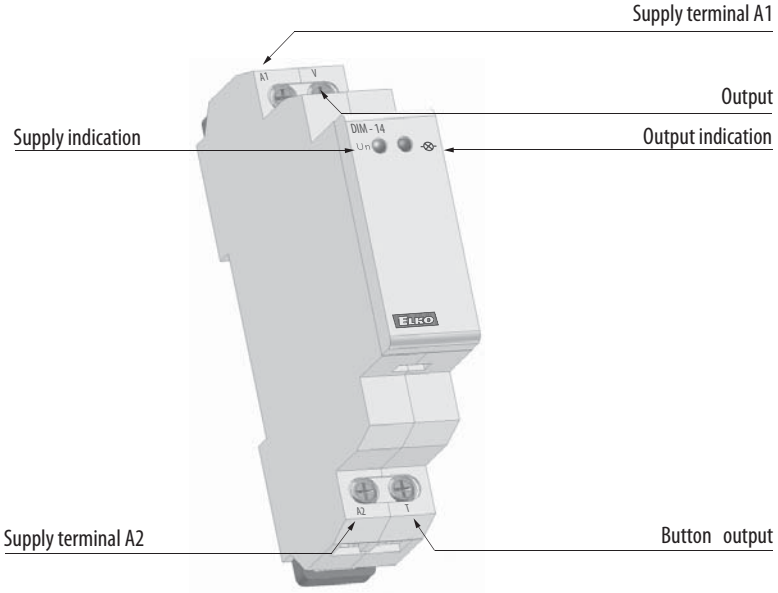
Symbol



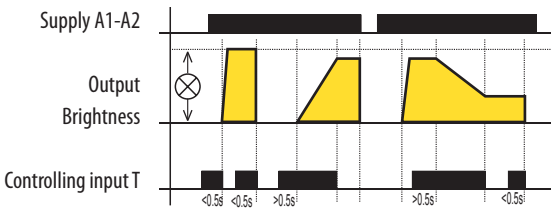
Connection



Description



Function

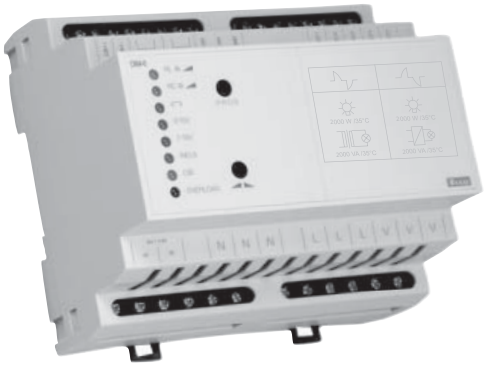


* When load is above 300 VA it is necessary to ensure sufficient cooling.

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

Warning for DIM-14: it is not allowed to connect together loads of inductive and capacitive type in the same time.

6M

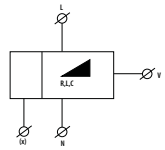


- Designed for RLC dimming lights, also available for appliance switching
- DIM-6 can be controlled by: button (parallel button connection), external potentiometer, analog signal 0-10 V (1-10 V), iNELS system bus
- Actuator manages output 230 V AC, controlled by 1 semi-conductor. Maximum output power is 2000 VA
- Power range can be increased up to 10 000 VA by module DIM6-3M-P
- Electronic overcurrent protection, overvoltage and short-circuit protection
- Protection against over-heating inside device - switch off output+signalize overheat by flashing red LED
- 6-MODULE version, DIN rail mounting

EAN code
DIM-6 /230V: 8595188136914

Technical parameters	DIM-6
Supply terminals:	L, N
Supply voltageí:	AC 230 V / 50 Hz
Input:	10 VA
Tolerance of Voltage range:	-15 %; +10 %
Max. output power:	max. 2 000 VA
Dissipated power:	2.5 % from load
Module extendable:	to 10 000 VA
Galvanic separation of bus and power output:	yes
Isul. volt. between outputs and inner circuits:	3.75kV, SELV according to EN 60950
Control - button type	
Control voltage:	AC 12-240V
Control terminals:	S - S, galvanically separated
Power of control input:	AC 0.53VA (AC 230V), AC 0.025-0.2VA (AC 12-240V)
Length of control impulse:	min. 25ms / max. unlimited
Recovery time:	max. 150ms
Connection of glow lamps:	NO (AC 230V); NO (AC 12-240V)
Control 0(1)-10V:	
Control terminals:	0(1)-10V, GND
Control voltage:	0-10V or 1-10V
Min. current of control input:	1mA
CIB control:	
Control terminals:	CIB+, CIB-
Bus voltage:	27V DC
Current of control input:	5mA
Indication of data transmission:	yellow LED
Output	
Contactless:	4 x MOSFET
Current rating:	10 A
Resistive load:	2 000 VA*
Inductive load:	2 000 VA*
Capacitive load:	2 000 VA*
Indication of output state:	yellow LED, according to load type
Other information	
Operating temperature:	-20 °C to +35 °C (-4 °F to 95 °F)
Storing temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
Operating position:	vertical
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel
Purpose of control device:	operative control device
Construction of control device:	individual control device
Char. of automatic operation:	1.B.E
Heat and fire resistance cat.:	FR-0
Anti-stroke category (immunity):	class 2
Rated impulse voltage:	2.5 kV
Overvoltage category:	III.
Pollution level:	2
Profile of connecting wires :	
- output part:	max.1x2.5, max2x1.5/ with sleeve max. 1x1.5 (AWG 12)
- control part:	max.1x2.5, max2x1.5/ with sleeve max. 1x2.5 (AWG 12)
Dimensions:	90 x 105 x 65 mm (3.5˝ x 4.1˝ x 2.6˝)
Weight:	410 g (14.5 oz.)
Standards:	EN 60669-2-1, EN 61010. EN 55014

Symbol

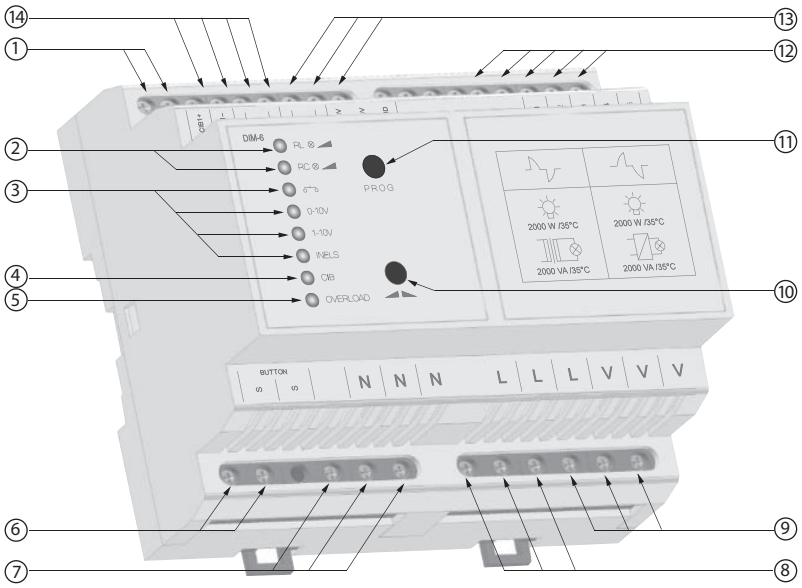


(x) - according to control type setting

Types of indication LED

RL ⊗ ◢ - Yellow-indicates configuration of load RL
RC ⊗ ◢ - Yellow-indicates configuration of load RC
⊶ - Green-button control mode selected
0-10V - Green - 0-10 V signal control mode selected
1-10V - Green – 1-10 V signal control mode selected
INELS - Green – CIB conductor bar-INELS control mode selected
CIB - Yellow – indicates CIB conductor bar data transfer comunication
OVERLOAD - Red – indicates overload, flashing LED signalizes over-heating inside the device, shinnig LED signalizes current overload

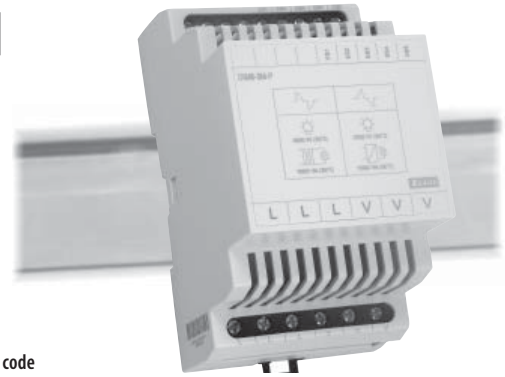
Device description



① Terminals for CIB bus connection
② Load type indication
③ Control type indication
④ CIB data transfer indication
⑤ Overload indication
⑥ Terminals for connecting control button
⑦ Terminals of neutral wire
⑧ Terminal for phase conductor connection
⑨ Output terminals
⑩ Button for output control
⑪ Button for output control
⑫ Terminal for additional modul conductor bar
⑬ Terminals for control by signal 0(1)-10V, or by potentiometer
⑭ Terminal for regulation load of wire jumper

* Warning : it is not allowed to connect inductive and capacitive loads at the same time.

3M



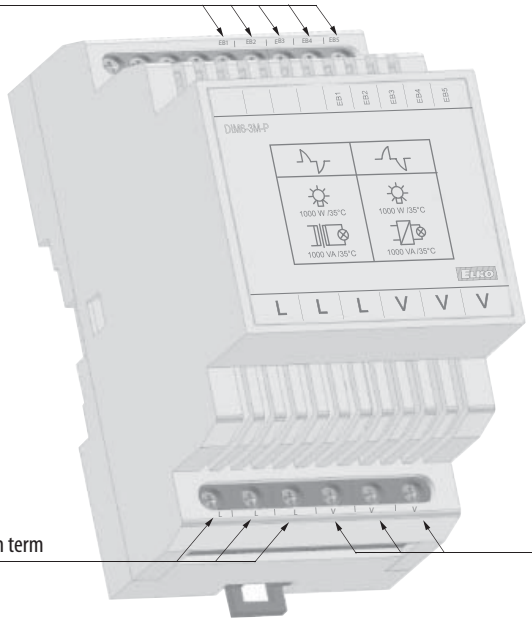
EAN code
DIM-6-3M-P: 8595188139106

- Expanding power module only for use in combination with DIM-6
- DIM6-3M-P provides power increasement (of about 1000VA) of load connected to DIM-6 (it means: 2 000VA (DIM-6) + 1 000VA (DIM6-3M-P) = 3 000VA)
- DIM-6 can be connected with up to 8 DIM6-3M-P to expand power up to 10 000 VA
- Attention-device has to be protected by circuit breaker accordant to the load connected to device
- DIM-6 in installation is cooled by natural air flow. If the natural air flow access is reduced, cooling has to be provided by ventilator. Rated operating temperature is 35°C/ 95 °F
- If there are several DIM6-3M-P connected to DIM-6, the distance between them has to be min. 2 cm/ 0.8"
- Max. lenght of bus EB is 1 m/ 39.4" and the connection has to be realized by schielded cable

Technical parameters	DIM6-3M-P
Load	max. 1 000VA
Dissipated power:	2.5 % from load
Output	
Contactless:	2 x MOSFET
Current rating:	5 A
Resistive load:	1 000 VA*
Inductive load:	1 000 VA*
Load capacity:	1 000 VA*
Other information	
Operating temperature:	-20 °C to +35 °C (-4 °F to 95 °F)
Storing temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
Operating position:	vertical
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel
Controlling device purpose:	operating control device
Controlling device construction:	additional control device
Automatic operating char.:	1.B.E
Heat and fire resistance category:	FR-0
Imunity category:	class 2
Rated impuls voltage:	2.5 kV
Overvoltage category:	III.
Pollution level:	2
Profile of connecting wires (mm^2)	
- output part:	max.1x2.5, max2x1.5 / with sleeve max. 1x1.5 (AWG 12)
- control part:	max.1x2.5, max2x1.5 /with sleeve max. 1x2.5 (AWG 12)
Size:	90 x 52 x 65 mm (3.5˝ x 2˝ x 2.6˝)
Weight:	134 g (4.7 oz.)
Standards:	EN 60669-2-1, EN 61010. EN 55014

Device description

Terminal for additional modul conductor bar

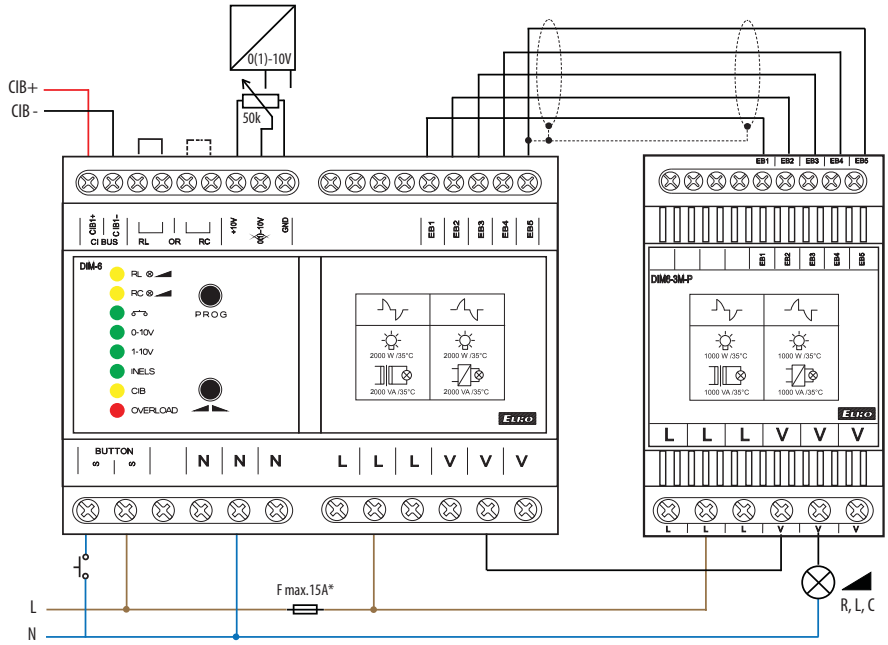


Phase connection term

Output terminals

*Warning: it is not allowed to connect loads of inductive and capacitive character at the same time

Connection

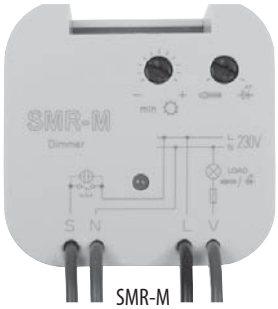


*Potencial L on device terminal, has to be protected by circuit breaker accordant to the load connected to device.

1M

60mm
21mm

DIM-15



SMR-M

EAN code
DIM-15/230V: 8595188140690
SMR-M: 8595188143776

- Designated for dimming of: a) LED bulbs and LED light sources
  b) dimmable saving fluorescent 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 (LED or saving fluorescent lamp) is set by switch-over on the front panel of device
- Minimal luminance, set by potentiometer on the front panel, eliminates flashing of some types of saving fluorescent lamps

DIM-15

- Supply voltage 230V AC
- 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

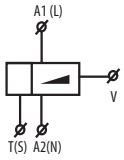
SMR-M

- button-controlled dimmer intended to be installed in an installation box (e.g. KU-68) 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 230 V / 50 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 230 V	
Control input power:	AC 0.3-0.6 VA	
Control impulse lenght:	min. 80 ms / unlimited	
Glow tubes connection:	Yes	
Max. amount of glow lamps connected to controlling input:	230V - max. amount 15 pcs (Measured with glow lamp 0.68mA/230V AC)	230V - max. amount 10 pcs (Measured with glow lamp 0.68mA/230V AC)
Output		
Contactless:	2 x MOSFET	
Load:*	300 W (at cos φ =1)	160 W (at cos φ =1)
Output status indication:	red LED	x
Other information		
Operating temperature:	-20 °C to +35 °C (-4 °F to 95 °F)	
Storing temperature:	-20 °C to +60 °C (-4 °F to 140 °F)	
Operating position:	any	
Mounting:	DIN rail EN 60715	free at connecting wires
Protection degree:	IP 40 from front panel / IP 10 clips	IP30 in standard conditions
Overvoltage category:	III.	
Pollution level:	2	
Terminal wire capacity:	max. 2x2.5, with sleeve max. 1x2.5, max. 2x1.5 (AWG 12)	x
Connection:	x	solid w. CY, Ø 0.75 mm²(AWG 18), lenght 90mm (3.5˝)
Dimensions:	90x17.6x64mm (3.5˝x0.7˝x2.5˝)	49 x 49 x 21 mm (1.9˝x 1.9˝x 0.8˝)
Weight:	57 g (1.98 oz.)	38 g (1.3 oz.)
Standards:	EN 60669-2-1, EN 61010-1	

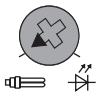
Symbol

DIM-15
(SMR-M)

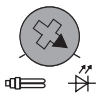


Light source type setting

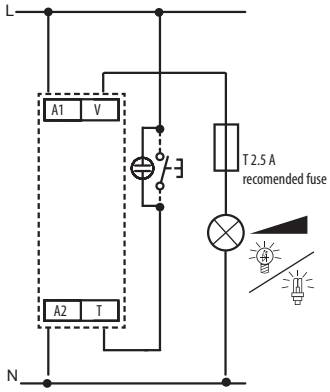
dimmable saving fluorescent lamps



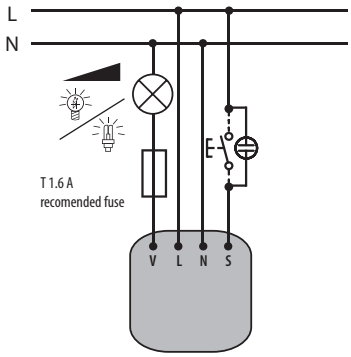
LED bulbs



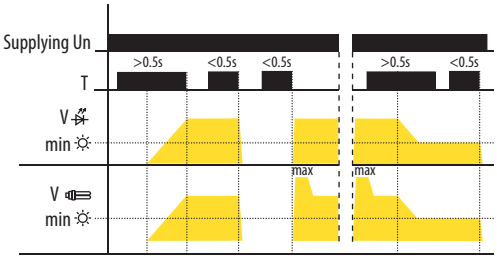
DIM-15



SMR-M



Functions and controlling



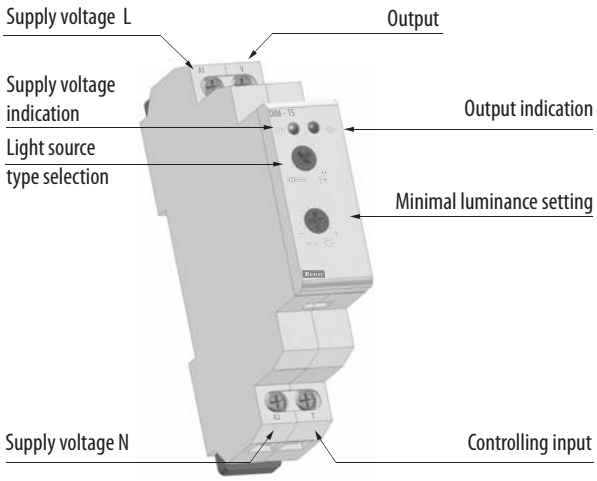
Controlling:
- short button press (<0.5s) turns the light off or on
- long press (>0.5s) enables slight regulation of light intensity
- setting of minimal luminance is possible only during decreasing of luminance by long button press

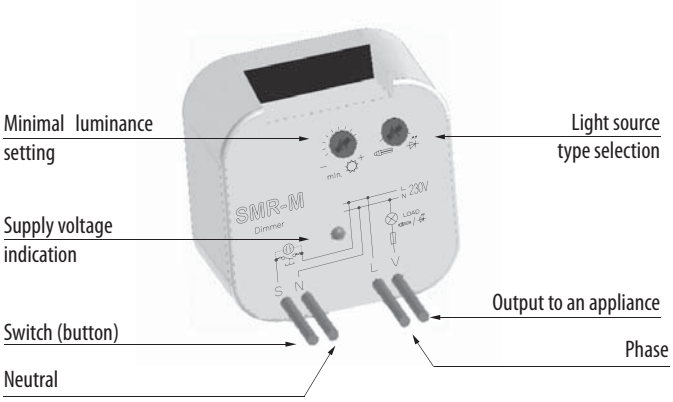
Minimal luminance setting:
„LED bulb“:
- if the light is turned off, short press (<0.5s) switches the light onto last set luminance level

„Energy saving lamp“:
- when light is off, short impulse turns lamp on and then luminance is decreased to set level
- setting of minimal luminance by saving fluorescent lamps serves for harmonizing of lowest light intensity prior its unprompted switching off

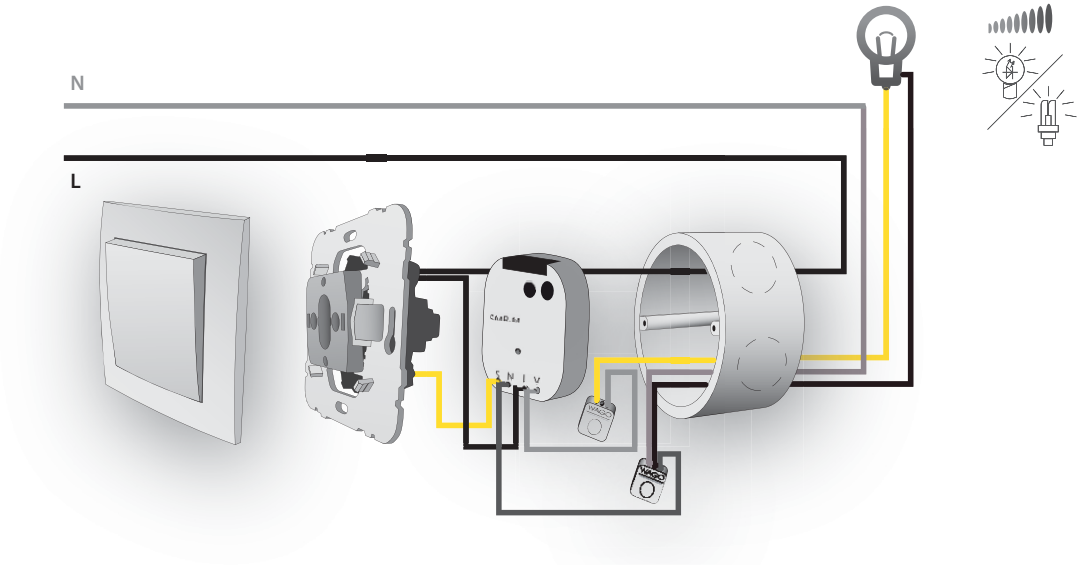
* Due to a large number of light source types, the maximum load depends on the internal construction of dimmable LEDs and ESL bulbs and their power factor cos φ.
The power factor of dimmable LEDs and ESL bulbs ranges from cos φ = 0.95 to 0.4.
An approximate value of maximum load may be obtained by multiplying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

Device describtion





Connection example



Additional information

- it is possible to dim only LED bulbs equipped with capacitator supplying
- it is not possible to dim saving fluorescent lamps without marking: dimmable
- an incorrect setting of light source has effect only on dimming range, it means neither dimmer or load get demaged
- maximal load is counting with usage of LC filter
- actual list of tested light sources is constantly refreshing, further information on www.elkoep.com/products/

EAN code
SMR-S /230V: 8595188123518
SMR-U /230V: 8595188130738

- Button-controlled dimmers designated for flush mounting into a wiring box, into an existing electroinstallation (SMR-S doesn´t need neutral for correct function)
- Used to control lamp brightness, dimming, possible to control from more places (parallel connections)
- Protection against temperature overrun inside the device – output off
- By changing wall-switch for a switch with SMR-S/SMR-U installed below you can reach effective brightness control
- SMR-S enables dimming of electric bulbs 12 V, halogen lights with wound transformers (inductive load)
- SMR-U enables also dimming 12 V halogen lights with electronic transformers (capacitive load)
- It can not be used for dimming of fluorescent lamps and energy saving lamps

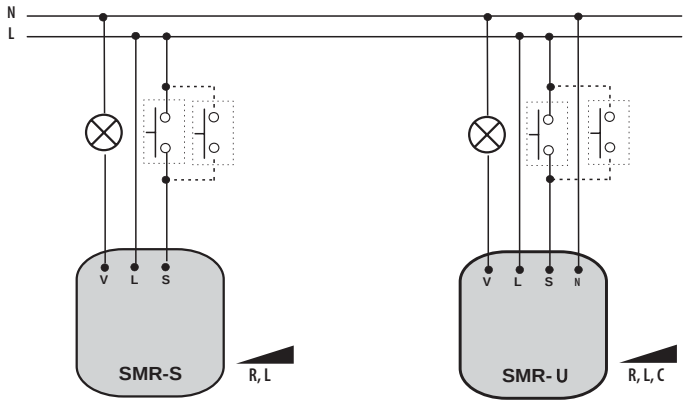
- SMR-S - 3-wire connection, functional without neutral
  - max. load: 300 VA (el. bulbs or halogen lights with wound transformer)
  - contactless output -1x triac
  - with exchangeable fuse
- SMR-U - 4-wire connection
  - max. load: 500 VA (el. bulbs or halogen lights with electronic or wound transformer)
  - contactless output - 2 xMOSFET
  - electronic over-heating protection - output off in case of short-circuit or overload

Technical parameters

Technical parameters	SMR-S	SMR-U
Connection:	3-wire con., without neutral	4-wire con., with neutral
Voltage range:	230 V AC / 50Hz	
Power input (no operation/make):	max. 3 VA	
Supply voltage tolerance:	-15 %; +10 %	
Output		
Resistive load:	10 - 300 VA	500 VA*
Inductive load:	10 - 150 VA	500 VA*
Capacitive load:	x	500 VA*
Control		
Control voltage:	AC 230 V	
Current:	max. 3 mA	
Impulse lenght:	min. 50 ms / max. unlimited	
Glow tubes connection:	Yes	
Max. amount of glow lamps connected to controlling input:	230V - max. amount 50 pcs (Measured with glow lamp 0.68mA/230V AC)	230V - max. amount 10 pcs (Measured with glow lamp 0.68mA/230V AC)
Other information		
Operating temperature:	0 °C to +50 °C (32 °F to 122 °F)	
Operating position:	any	
Mounting:	free at connecting wires	
Protection degree:	IP 30 in standard conditions	
Overvoltage cathegory:	III.	
Pollution degree:	2	
Fuse:	F 1.6A / 250V	x
Connection:	solid wires 0.75 mm² (AWG 18), lenght: 90 mm (3.5")	
Glow lamps in a button:	max. number 10	
Dimensions:	49 x 49 x 13 mm (1.9" x 1.9" x 0.5")	
Weight:	32 g (1.1 oz.)	32 g (1.1 oz.)
Standards:	EN 61010-1, EN 60669-2-1	

Note:
* - with load over 300 VA is necessary to ensure sufficient cooling.

Connection SMR-S, SMR-U



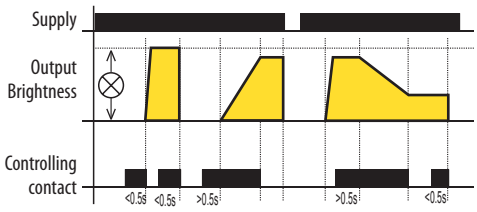
Typical connection of SMR-S - dimmer of lights

Typical connection of SMR-U - dimmer of lights

Warning: it cannot be used for fluorescent lights and energy saving lights!

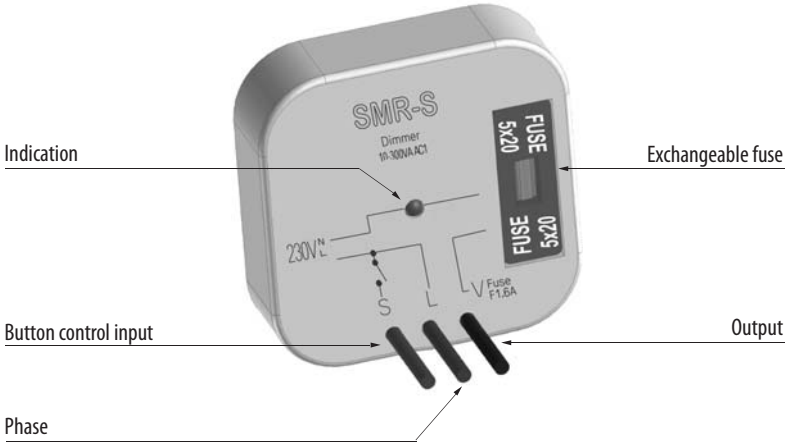
SMR-U: It is not allowed to connect together loads of inductive and capacitive type in the same time.

Function SMR-S, SMR-U

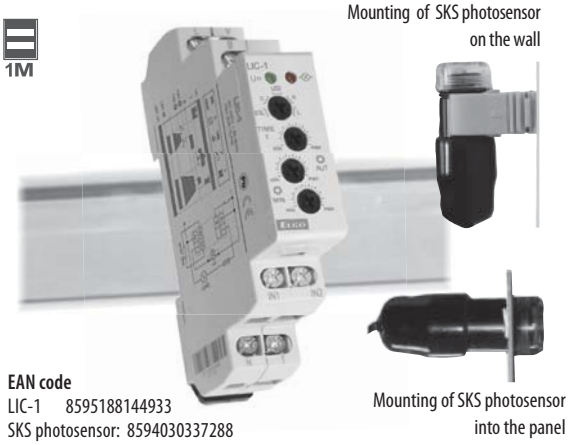


Short press (<0.5s) turns a light on, another short press turns it off. A longer press (>0.5s) causes a gradual regulation of light intensity min-max-min round until the button is released. After releasing a set intensity is kept in memory, further short presses turn the light on/off keeping the set intensity. The intensity can be changed by further long press. After de-energising the relay remembers the set value.

Description of SMR-S



1M



Mounting of SKS photosensor on the wall

Mounting of SKS photosensor into the panel

EAN code
LIC-1 8595188144933
SKS photosensor: 8594030337288

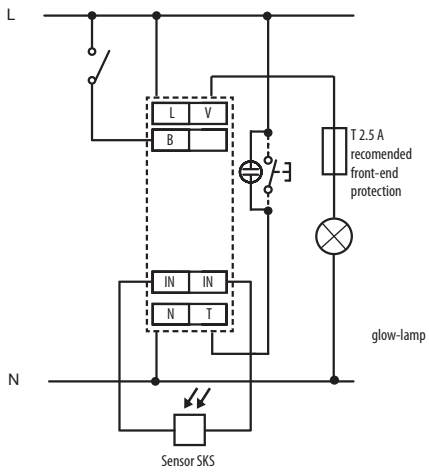
- Automatically regulates the intensity of light in a room
- External sensor scans the intensity and based on the preset value it decreases or increases the brightness of light
- Designed for dimming the LED lights, ESL - dimmable energy saving lamps, R - inductive, L - resistive and C - capacitive load
- Operating status:
  1 - Off
  2 - Automatic regulation
  3 - Cleaning (maximum level of illumination)
  4 - Setting the minimum lighting brightness
  5 -Setting the desired level of illumination
- Optional connection of buttons with 50 neon lamps
- Blocking the automatic control via external signal, power supply 230V AC
- 1-MODULE, DIN rail mounting, clamping terminals

Technical parameters

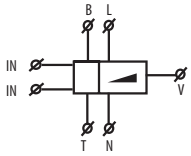
Technical parameters	LIC-1
Supply voltage tolerance:	L-N
Supply voltage:	AC 230 V / 50-60 Hz
Supply voltage tolerance:	±15 %
Apparent/loss power input:	max. 1.6VA / 0.8W
Power supply indication:	green LED
Control	
Button - control terminals:	L - T
Control voltage:	AC 230 V
Control input power:	max. 0.6 VA
Duration of control pulse:	min. 80 ms / max. unlimited
Glow tubes connection (terminals L-T):	Yes
Max. amount of glow lamps connected to controlling input:	230V - max. amount 50 pcs (Measured with glow lamp 0.68mA/230V AC)
Blocking input - terminals:	L - B
Control voltage:	AC 230V
Input power:	max. 0.1VA
Glow tubes connection (terminals L-B):	No
Duration of control pulse:	min. 80 ms / max. unlimited
Output:	2x MOSFET
Output status indication:	red LED
Load capacity:*	300 W (at cos φ =1)
Other information	
Operating temperature:	-20 °C to +35 °C (-4 °F to 95 °F)
Storage temperature:	-20 °C to +60 °C (-4 °F to 140 °F)
Operating position:	any
Mounting:	DIN rail EN 60715
Ingress protection:	IP 40 from front panel / IP 10 terminals
Overvoltage category:	III.
Contamination degree:	2
Connecting conductor cross-section (mm²):	solid wire max. 2x2.5 or 1x4 (AWG 12) with sleeve max. 1x2.5 or 2x1.5 (AWG 12)
Dimensions:	90 x 17.6 x 64 mm (3.5″ x 0.7″ x 2.5″)
Weight:	57 g (1.98 oz.)
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 LEDs and ESL bulbs 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.

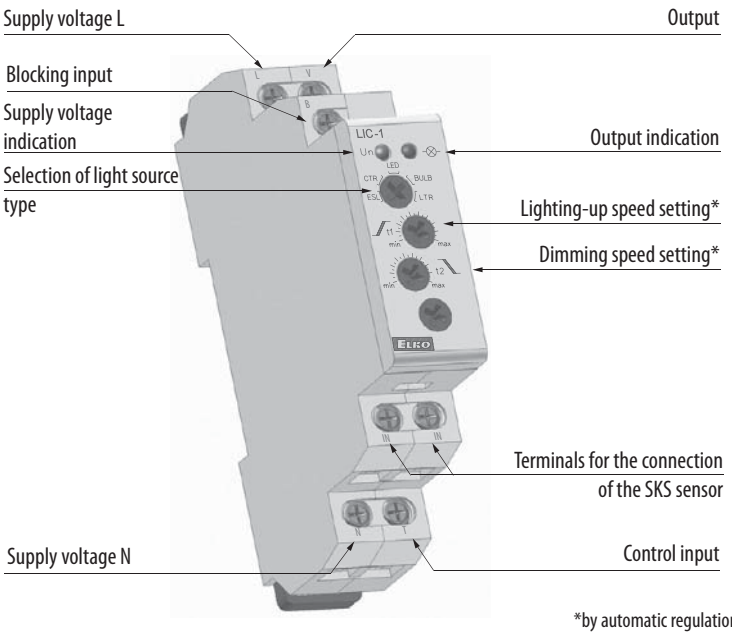
Connection



Symbol



Description



*by automatic regulation

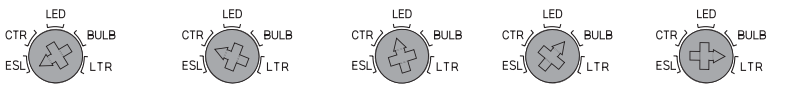
Function

Control (external button):

- Pressing the button shortly (<0.5 s) - always switches the light off
- Medium-long press (0.5 - 3s) - automatic control
- Long press (> 3s) - cleaning
- 3 x short presses from "off" - setting the desired level of illumination
- 5 x short presses from „off“ - setting the minimum brightness

In mode 4 and 5, the lamp brightness changes periodically from minimum to maximum. At a required level of brightness, the value is stored into memory by pressing the button shortly.

Selection of light source type



energy saving lights | halogen lamp with electronic transformer | LED lamp, 230 V | 230 V bulb | halogen lamp with ferromagnetic transformer

Power supplies

Voltage

Stabilized DC- switching

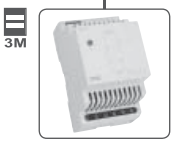
Stabilized DC- linear

Nonstabilized AC+DC

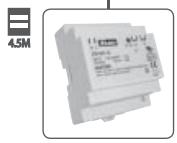
12V

PSB-10-12
IN: AC 100-250 V
OUT: DC 12V stabil
LOAD: 0.84 A / 10 W
- galvanically separated
- electronic fuse
- thermo protection
-MINI, into an installation box (such as KU-68).

PS-10-12
IN: AC 230 V
OUT: DC 12 V stabil
LOAD: 0.84 A / 10 W
- galvanically separated
- fusion safety
- electronic fuse
- thermo protection
- 1 MODULE.



PS-30-12
IN: AC 230 V
OUT: DC 12 V stabil
LOAD: 2.5A / 30 W
- galvanically separated
- electronic fuse
- thermo protection
- 3 MODULE.



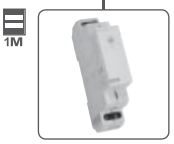
DR-60-12
IN: AC 100-240 V
OUT: DC 12 V stabil
LOAD: 4.5A / 54 W
- galvanically separated
- electronic fuse
- range of incoming voltage
- 4.5 MODULE .

PS-100-12
IN: AC 230 V
OUT: DC 12 V stabil
LOAD: 8,4A / 100 W
- galvanically separated
- fusion safety
- electronic fuse
- thermo protection
- 6 MODULE.

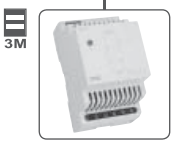
ZNP-10-12V
IN: AC 230V
OUT: AC/DC 12V nostabil
LOAD: 0.4A / 10VA
- galvanically separated
- fuse
- 3 MODULE.

24V

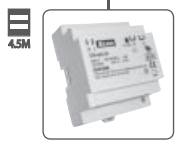
PSB-10-24
IN: AC 100-250 V
OUT: DC 24 V stabil
LOAD: 0.42A / 10W
- galvanically separated
- electronic fuse
- thermo protection
-MINI, into an installation box (such as KU-68).



PS-10-24
IN: AC 230 V
OUT: DC 24 V stabil
LOAD: 0.42A / 10W
- electronic fuse
- thermo protection
- 1 MODULE.



PS-30-24
IN: AC 230 V
OUT: DC 24 V stabil
LOAD: 1.25A / 30W
- galvanically separated
- electronic fuse
- thermo protection
- 3 MODULE.

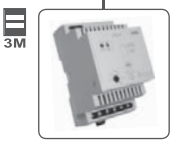


DR-60-24
IN: AC 100-240 V
OUT: DC 24 V stabil
LOAD: 2.5A / 60W
- galvanically separated
- electronic fuse
- 4.5 MODULE .

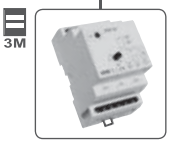
PS-100-24
IN: AC 230 V
OUT: DC 12 V stabil
LOAD: 4,2A / 100 W
- fusion safety
- electronic fuse
- thermo protection
- 6 MODULE.

ZNP-10-24V
IN: AC 230V
OUT: AC/DC 24V nostabil
LOAD: 0.4A / 10VA
- galvanically separated
- fuse
- 3 MODULE.

Regulated



PS-30-R
IN: AC 230 V
OUT: DC 12-24 V regul., stab.
LOAD: 2.5-1.25A / 30W
- galvanically separated
- electronic fuse
- thermo protection
- 3 MODULE.



ZSR-30
IN: AC 230V
OUT: DC 5-24 V reg., stab.
OUT: AC 24V, DC24V
LOAD: 1.6-0.3A/10VA
- range of incoming voltage
-current restrictor
- electronic fuse
- 3 MODULE.

Nonstabilized AC

Bell transformer

ZTR-8-8
output voltage 8 V.
Power: 8W.

ZTR-8-12
output voltage12 V.
Power: 8W.

ZTR-15-12
output voltage 4-8-12 V.
Power: 4V5V - 8V 10V- 12V 15V.

Type	Design	Input voltage	Output						Protection against overload			Designation	Page in catalogue
			AC	DC	Stabilized	Output voltage	Output current	Switching (S) / Linear (L)	Safety fuse	Electronic fuse	Short-circuit-proof		
ZNP-10-12	3M-DIN	AC 230 V, -15/+10%	●	●		AC 12V DC 12 V	0.8 A	-	●			DC and AC nonstabilized, output voltage 12 V – where it is not required or where there is stabilized differently/later	51
ZNP-10-24	3M-DIN	AC 230 V, -15/+10%	●	●		AC 24V DC 24V	0.4 A	-	●			DC and AC nonstabilized output voltage 24 V – where it is not required or is stabilized later	51
ZSR-30	3M-DIN	AC 230 V, -15/+10%	●	●	●	DC 5-24V AC 24 V	1.6 A- 0.3 A	S	●	●		regulated output voltage in a wide range DC 5-24 V: possibility to adjust output voltage with load according to request	51
PSB-10-12	MINI-BOX	AC 100-250V		●	●	DC 12 V	0.84 A	S		●	●	stabilized switching power supply with fixed output voltage 12 V / 10 W, box	48-49
PSB-10-24	MINI-BOX	AC 100-250V		●	●	DC 24V	0.42 A	S		●	●	stabilized switching power supply with fixed output voltage 24 V / 10 W, box	48-49
PS-10-12	1M-DIN	AC 230 V, -20/+10%		●	●	DC 12 V	0.84 A	S	●	●	●	stabilized switching power supply with fixed output voltage 12 V / 10 W, 1 module	48-49
PS-10-24	1M-DIN	AC 230 V, -20/+10%		●	●	DC 24V	0.42 A	S	●	●	●	stabilized switching power supply with fixed output voltage 24 V / 10 W, 1 module	48-49
PS-30-12	3M-DIN	AC 230 V, -20/+10%		●	●	DC 12 V	2.5 A	S	●	●	●	stabilized switching power supply with fixed output voltage 12 V / 30 W, 3 module	48-49
PS-30-24	3M-DIN	AC 230 V, -20/+10%		●	●	DC 24V	1.25 A	S	●	●	●	stabilized switching power supply with fixed output voltage 24 V / 30 W, 3 module	48-49
PS-30-R	3M-DIN	AC 230 V, -15/+10%		●	●	DC12-24V	2.5 A-1.25 A	S	●	●	●	stabilized switching power supply with fixed output voltage 12-24 V / 30 W, 3 module	48-49
PS-100-12	6M-DIN	AC 230 V, -20/+10%		●	●	DC 12 V	8.4A	S	●	●	●	stabilized switching power supply with fixed output voltage 12 V / 100 W, 6 module	48-49
PS-100-24	6M-DIN	AC 230 V, -20/+10%		●	●	DC 24V	4.2 A	S	●	●	●	stabilized switching power supply with fixed output voltage 24V / 100W, 6 module	48-49
DR-60-12	4.5M-DIN	AC 100-240V DC 124-370 V		●		DC 12 V	4.5 A	S				efficient switching power supply of DC voltage 12V / 54 W, wide range of input voltage (AC 100-240 and DC 124-370V)	50
DR-60-24	4.5M-DIN	AC 100-240V DC 124-370 V		●		DC 24V	2.5 A	S				efficient switching power supply of DC voltage 24V / 60 W, wide range of input voltage (AC 100-240 and DC 124-370V)	50
ZTR-8-8	2M-DIN	AC 230 V, -15/+10%	●			8 V	1A	-			●	bell transformer (short-circuit-proof) for supplying of bells, door openers, home call-boxes	52
ZTR-8-12	2M-DIN	AC 230 V, -15/+10%	●			12 V	0.66A	-			●		52
ZTR-15-12	3M-DIN	AC 230 V, +/- 10%	●			4-8-12 V	2-1.5-1A	-			●		52

PS-10-24

PSB-10-24

- PSB-10: switching stabilized power supplies with fixed output voltage, for mounting into an installation box (such as KU-68)
  - PSB-10-12 - stabilized power supply 12V/10W
  - PSB-10-24 - stabilized power supply 24V/10W
- PS-10: switching stabilized power supplies with fixed output voltage, version 1-module
  - PS-10-12 - stabilized power supply 12 V/10 W
  - PS-10-24 - stabilized power supply 24 V/10 W
- 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

ø60mm ↕21mm
PSB-10-12 8595188145022
PSB-10-24 8595188143783

1M
PS-10-12V 8595188139052
PS-10-24V 8595188139069

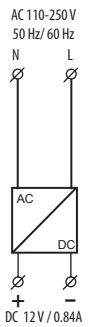
3M
PS-30-12V 8595188137966
PS-30-24V 8595188139045
PS-30-R 8595188136655

6M
PS-100-12V 8595188137195
PS-100-24V 8595188139021

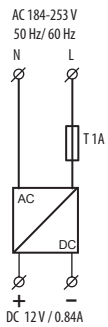
Technical parameters:	PSB-10-12	PSB-10-24	PS-10-12	PS-10-24	PS-30-12	PS-30-24	PS-30-R	PS-100-12	PS-100-24
Input									
Voltage range:	AC 110 - 250V / 50-60Hz		AC 184 - 253V/50-60Hz		AC 100-250V / 50 - 60Hz			AC 184-253V/50-60Hz	
Burden without load (max):	3VA / 0.5W		5VA / 2W		9VA / 1W	10VA/1,5W	4VA / 1,7W	6VA / 2W	
Burden with full load (max):	26VA / 13W		25VA / 13W		70VA / 37W		70VA / 37W	195VA / 118W	
Protection:	x		fuse T1A		fuse T2A			fuse T 3.15A	
Output									
Output voltage DC / max. current:	12V/0.84A	24V/0.42A	12.2V/0.84A	24.2V/0.42A	12.2V/2.5A	24.2V/1.25A	12.2V/2.5A 24.2V/1.25A	12.2V/8.4A	24.2V/4.2A
Tolerance of output voltage:	± 2%								
Output indication:	green LED								
Wave of off-load output voltage:	40mV		80mV		30mV		40mV	55mV	
Wave of output voltage with max load:	380mV		20mV		80mV		500mV	5mV	
Time delay after connection:	max. 1s								
Time delay after over-load	max. 1s								
Overload capacity:	max. 120% of rated output								
Efficiency:	> 75%		> 75%		>82%		>81%	>82%	
Electronic fuse:	electronic protections short-circuit, over load, over voltage								
Other information									
Working humidity:	20 .. 90% RH								
Operating temperature:	-20 °C to +40 °C (-4 °F to 104°F)								
Storage temperature:	-40 °C to +85 °C (-40 °F to 185 °F)								
Electrical strength input- output:	4kV								
Protection degree:	IP30		IP40 device/ IP20 in-built in distribution board						
Overvoltage category:	II.								
Polutioon degree:	1								
Max. cable size (mm²):	x		solid wire max.1x2.5 or 2x1.5/ with sleeve max.1x1.5						
Outlets:	solid wire CY, Ø 4x0.75mm², 90mm		x						
Dimensions:	48 x 48 x 21 mm		90 x 17.6 x 64 mm		90 x 52 x 65 mm		90 x 52 x 65 mm	90 x 105 x 65 mm	
Weight:	70 g	70 g	62 g	62 g	158 g	158 g	158 g	375 g	363 g
Standards:	EN 61558-1, EN 61010-1, EN 61558-2-17								

Connection

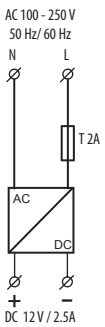
PSB-10-12 (PSB-10-24)



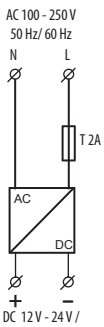
PS-10-12 (PS-10-24)



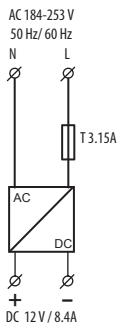
PS-30-12 (PS-30-24)



PS-30-R



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

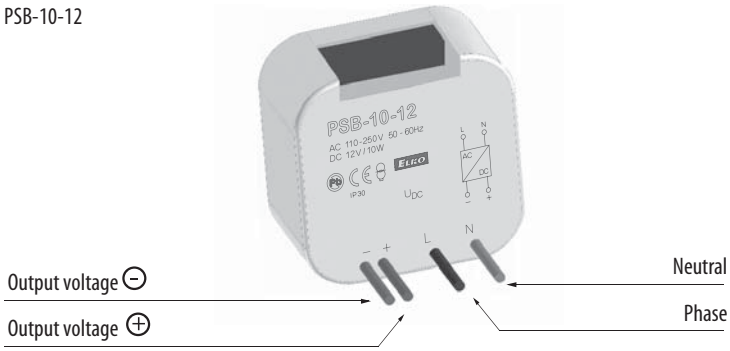


Connection

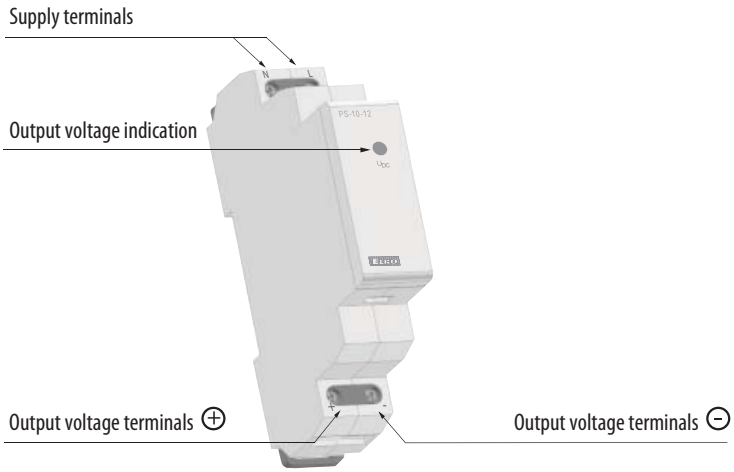
NOVINKA

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

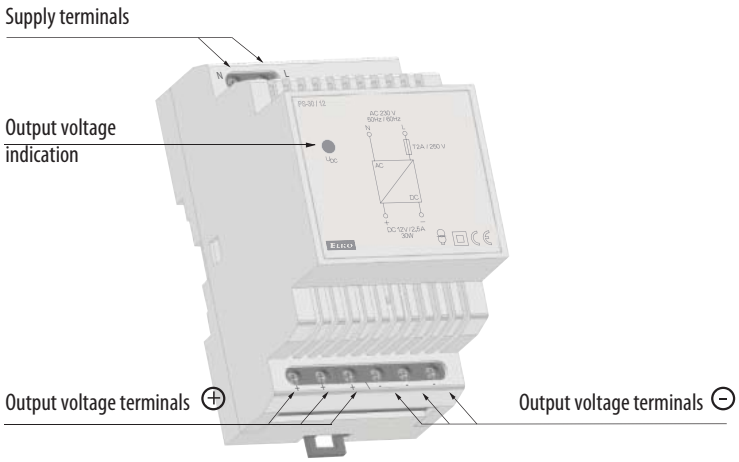
PSB-10-12



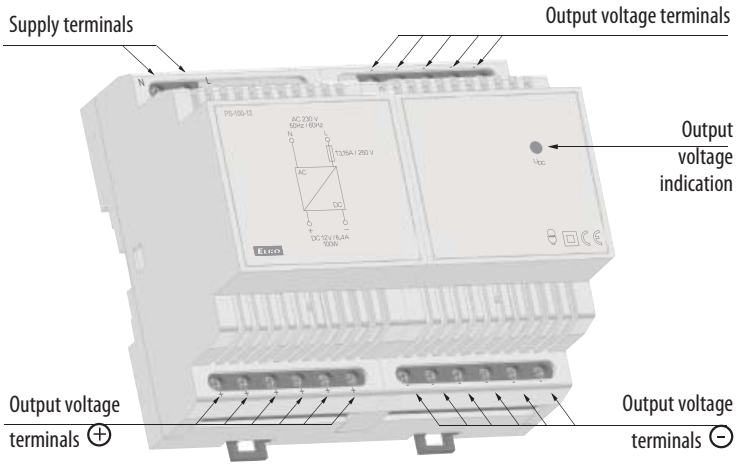
PS-10-12



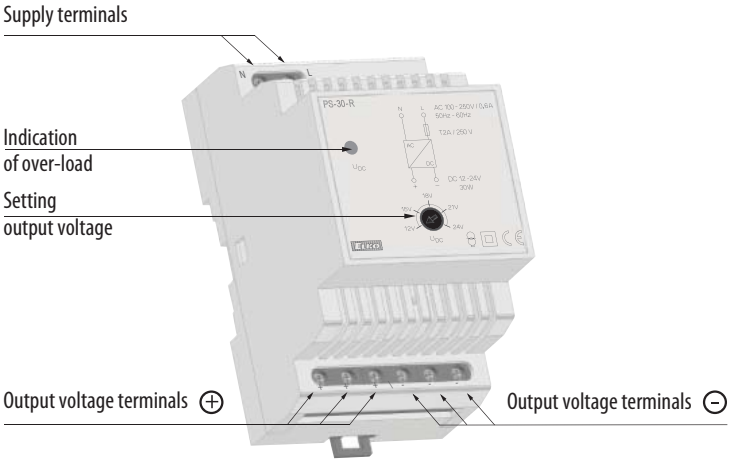
PS-30-12



PS-100-12



PS-30-R



4.5M

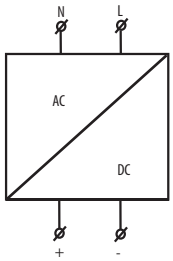
- Stabilized switching power supply
- Input voltage (Uprim) in a wide range 100 - 240 V AC
- DR-60-12: power supply with fixed output voltage DC 12 V, stabilized 54 W
- DR-60-24: power supply with fixed output voltage DC 24 V, stabilized 60 W
- Max. load 12 V-4.5 A, 24 V-2.5 A
- Electronic protection of short-circuit, over-loading, over-voltage, fine setting of output voltage by trimmer in a range ±10%
- LED power indicator light, viewable from the front panel
- Ambient air cooled through the perforated housing
- 4.5-MODULE, DIN rail mounting, isulation class II

EAN code
DR-60-12V: 8595188125048
DR-60-24V: 8595188125055

Technical parameters:

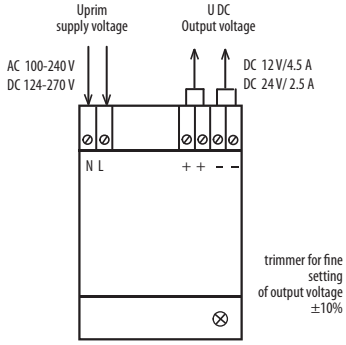
Input (U prim)		
Voltage range:	88-264 V AC/ 47-63 Hz nebo 124-370 V DC	
Supply voltage tolerance:	in the range of supply voltage	
Consumption without load (max):	3VA	
Consumption with full load (max):	AC 65 VA	AC 70 VA
Output (Usec)		
Output voltage:	12V ±10%	24V ±10%
Max.load:	4.5A / 54W	2.5A / 60W
Output voltage-no load DC:	12V ±10%	24V ±10%
Wave of output voltage:	0.12V	0.15V
Efficiency:	83.5%	86%
Tolerance of output voltage:	±1 %	
Electronic fuse:	electronic protections short-circuit, over load, over voltage	
Fine adjustment of output voltage:	±10 % - trimrem	
Overloud protection:	to 105-160 % of rated output	
Time delay after connection:	100 ms for 100% loading and AC 230 V	
Other information		
Working humidity:	20 - 90 % RH	
Thermal coeficient:	0.03 % /°C (0 to 50 °C)/ 0.03 % /°F (32 °F to 122 °F)	
Operating temperature:	-20 °C to +60 °C (-4 °F to 140 °F)	
Storage temperature:	-40 °C to +85 °C (-40 °F to 185 °F) / (10 - 95% RH)	
Electrical strength (prim/sec):	3 kV	
Protection degree:	IP20 device/ IP40 in-built in distribution board	
Max. cable size (mm²):	solid wire max.1x2.5 or 2x1.5/ with sleeve max.1x1.5 (AWG 10)	
Dimensions:	78 x 93x 56 mm (3.1˝ x 3.7˝ x 2.2˝)	
Weight:	300 g (10.6 oz.)	
Standards:	EN 61010-1, EN 61558-1, EN 61558-2-17	

Symbol

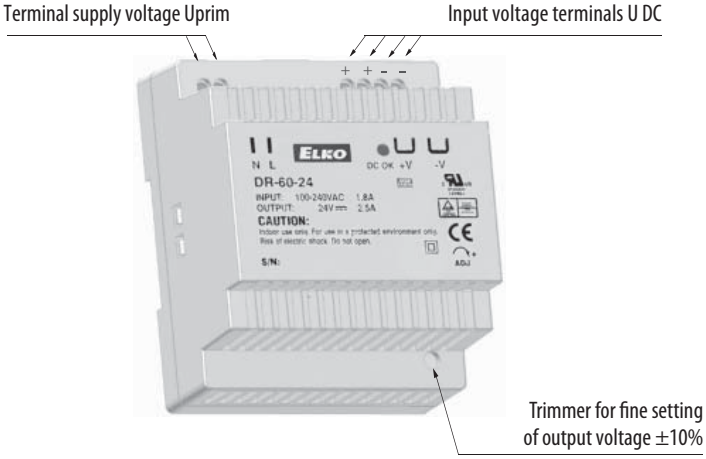


Connection

DR-60-12
DR-60-24



Description



3M

EAN code
ZNP-10-12V: 8594030332733
ZNP-10- 24V: 8594030334089
ZSR-30: 8594030331750

Regulated stabilized power supply ZSR-30

- Supply of various devices and appliances by safe voltage with fully galvanic separation from the main.
- Input voltage: AC 230 V
- Output voltage: DC 5-24 V stab., DC 24 V unstab. and AC 24 V
- Exceeded current limit values is indicated by LED flashing
- When there is full short-circuit, output is disconnected, output current is limited by an electronic fuse
- 3-MODULE, DIN rail mounting

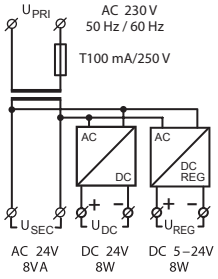
Nonstabilized power supply ZNP-10-12V, ZNP-10-24V

- AC and DC output voltage: 12 V or 24 V, nonstabilized
- Power supply with fixed output voltage
- Protection against short-circuit and overload by a safety fuse
- Input voltage: AC 230 V
- 3-MODULE, DIN rail mounting

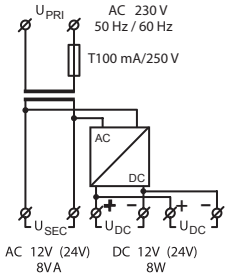
Technical parameters	ZSR-30	ZNP-10-12V	ZNP-10-24V
Entry (U prim)			
Voltage range:	AC 230 V / 50 - 60 Hz		
Supply voltage tolerance:	-15 %; +10 %		
Consumption without load (max):	6VA	7 VA	6.5 VA
Consumption with load (max):	10VA	11 VA	
Output (Usec)			
Output voltage:	DC 5-24 V stab. DC 24 V nonstab. AC 24 V	DC 12 V nonstab. AC 12 V	DC 24 V nonstab. AC 24 V
Output voltage-no load AC:	32V	17 V	32 V
Output voltage-no load DC:	44V	22 V	44 V
Fuse:	primary wind T100 mA		
Wave of output voltage:	300 mV	max.4 V	max.3 V
Efficiency:	75 %	x	
Tolerance of output voltage:	±5 %	x	
Electronic fuse:	Towards black-out and and current overloading	x	
Other information:			
Operating temperature:	-20.. +40°C (-4 °F to 104 °F)		
Storing temperature:	-20.. +60°C (-4 °F to 140 °F)		
Electrical strenght (prim/sec):	4 kV		
Protection degree:	IP 40 from front panel / IP 20 terminals		
Max. cable size (mm²):	solid wire max.1x2.5 or 2x1.5 / with sleeve max.1x1.5 (AWG 12)		
Dimensions:	90 x 52 x 65 mm (3.5˝ x 2˝ x 2.6˝)		
Weight:	390 g (13.8 oz.)	360 g (13.8 oz.)	360 g (13.8 oz.)
Standards:	EN 61010-1, EN 61558-2-1. EN 61558-1		

Connection

ZSR -30



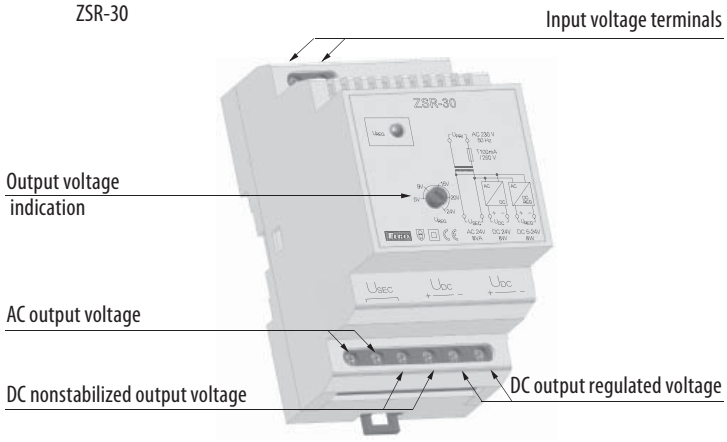
ZNP-10



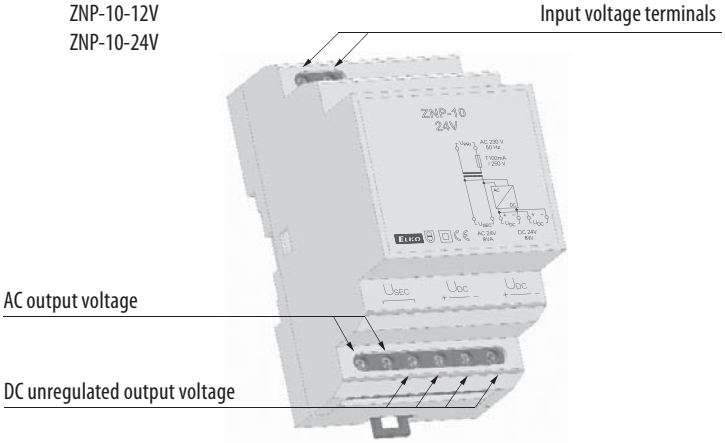
WARNING! Values of max. load are valid for (operational) temperature.
Total loads on all output terminals may not exceed this values:
by supplying 230 V-253 V – 8W
from 230 V. . . 207 V output power is proportionately decreesing onto 5 W

Description

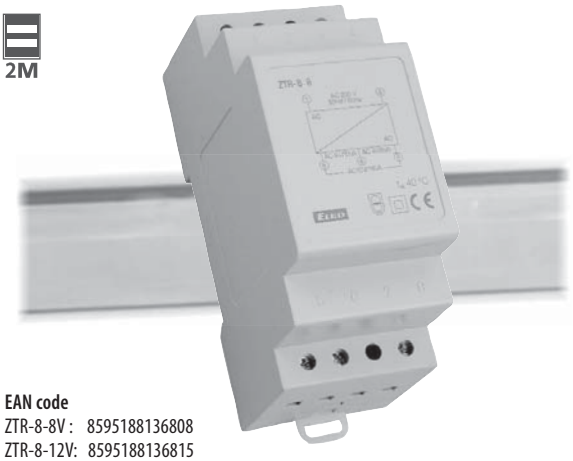
ZSR-30



ZNP-10-12V
ZNP-10-24V



2M



- Designated for general use – e.g. as home bells supply, door locks supply
- Input voltage: AC 230 V
- Short-circuit-proof, doubled output terminals

- 2-MODULE, DIN rail mounting

  ZTR-8-8: output voltage 8 V

  ZTR-8-12: output voltage 12 V

- 3-MODULE, DIN rail mounting

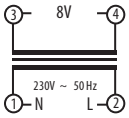
  ZTR-15-12: output voltage 4 - 8 -12V

EAN code
ZTR-8-8V : 8595188136808
ZTR-8-12V: 8595188136815
ZTR-15-12V: 8595188139281

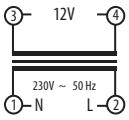
Technical parameters	ZTR-8-8	ZTR-8-12	ZTR-15-12
Entry (U prim)			
Voltage range:	AC 230 V / 50 Hz		
Supply voltage tolerance:	-15 %; +10 %		± 10 %
Consumption without load (max):	7.2 VA	9.4 VA	3.5 VA
Output (Usec)			
Output voltage:	AC 8 V	AC 12 V	AC 4 V AC 8 V AC 12 V
Output voltage-no load AC:	12 V	16 V	16 V
Max.loability:	8 VA	8 VA	4V 5VA - 8V 10VA - 12 V 15VA
Fuse:	short-circ.resistant		
Other information:			
Operating temperature:	-20.. +40°C (-4 °F to 104 °F)		
Storing temperature:	-20.. +60°C (-4 °F to 140 °F)		
Electrical strenght (prim/sec):	3.75 kV		
Protection degree:	IP20/40		
Max. cable size (mm²):	solid wire max.1x2.5 or 2x1.5 / with sleeve max.1x1.5 (AWG 12)		
Dimensions:	90 x 35.6 x 64 mm (3.5˝ x1.4˝ x 2.5˝)		90 x 52 x 65 mm (3.5˝ x 2˝ x 2.6˝)
Weight:	314 g (11.1 oz.)	312 g (11 oz.)	350 g (12.3 oz.)
Standards:	EN 61558-1, EN 61558-2-8, EN 61558-2-1		

Connection

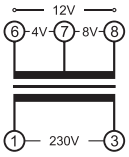
ZTR-8-8



ZTR-8-12



ZTR-15-12

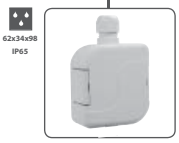


Twilight switches

SOU

SOU-1
Twilight switch.
Voltage range:
AC 230 V a AC/DC 12-240 V
Output contact:
1x changeover/SPDT 16 A.

SOU-2
Twilight switch with digital time clock.
Voltage range:
AC 230 V / 50 - 60 Hz
Output conatct:
1x changeover /SPDT 8 A.



SOU-3
Twilight and light switch
Voltage range:
AC 230 V / 50 - 60 Hz
Output conatct:
1x changeover/SPDT 16 A.

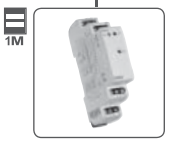
Accessories of twilight switches:

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

Memory relays

MR

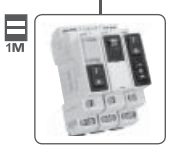
MR-41
Voltage range:
AC 230 V or AC/DC 12 -240 V
Output contact:
1x changeover/SPDT 16 A.



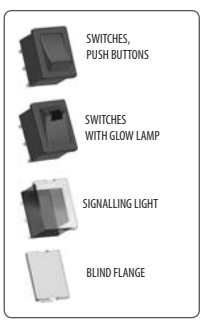
MR-42
Voltage range:
AC 230 V or AC/DC 12 -240 V
Output contact:
2x changeover / SPDT 16 A.

Control and signalling devices

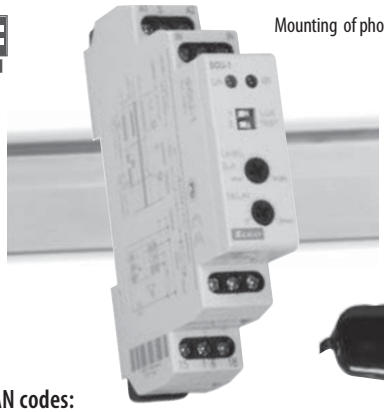
USS



USS
designated for switching, controlling and signalling by auxiliary any power circuits.



1M



Mounting of photosensor SKS on the wall

Mounting of photosensor SKS into the panel

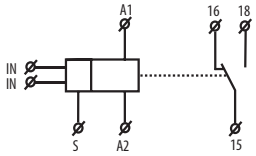
- It serves to control lights on the basis of ambient light intensity
- Used for switching street illumination and garden lights, illumination of advertisements, shop windows, etc.
- Level of ambient intensity is monitored by an external sensor and output is switched according to set level on the device
- 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 230 V or AC/DC 12 - 240 V
- Output contact: 1x changeover/ SPDT 16 A
- Red LED output indication
- 1-MODULE, DIN rail mounting

EAN codes:

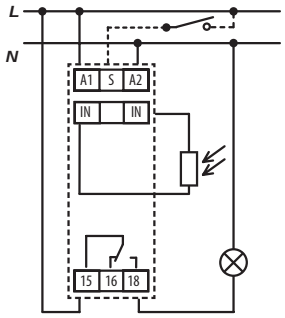
SOU-1 /230V + photosensor SKS: 8595188121002
SOU-1 /UNI + photosensor SKS: 8595188121019
Photosensor SKS: 8594030337288

Technical parameters		SOU-1
Supply terminals:		A1 - A2
Voltage range:	UNI	AC/DC 12 - 240 V (AC 50 - 60 Hz)
Burden:	UNI	AC 0.7 - 3 VA / DC 0.5 - 1.7 W
Voltage range:	230	AC 230 V / 50 - 60 Hz
Power input (apparent/loss):	230	AC max. 12 VA / 1.8 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:		16 A / AC1
Breaking capacity:		4000 VA / AC1, 384 W / DC
Inrush current:		30 A / <3 s
Switching voltage:		250 V AC1 / 24 V DC
Min. breaking capacity DC:		500 mW
Output indication:		red LED
Mechanical life:		$3x10^7$
Electrical life (AC1):		$0.7x10^5$
Control		
Power the control input:		0.8 - 530 mVA (UNI), 0.8 - 530 mVA (AC 230 V)
Load between S-A2:		Yes(UNI, AC 230 V)
Control. terminals:		A1-S
Glow tubes connetions:		AC 230 V - Yes / UNI - No
Max. amount of glow lamps		230 V - max. amount 20 pcs
connected to controlling input:		(Measured with glow lamp 0.68mA/230V AC)
Impulse length:		min. 25 ms / max. unlimited
Reset time:		150 ms
Other information		
Operating temperature:		-20 °C to +55 °C (-4 °F to 131 °F)
Storage temperature:		-30 °C to +70 °C (-22 °F to 158 °F)
Electrical strength:		4 kV (supply - output)
Operating position:		any
Mounting/DIN rail:		DIN rail EN 60715
Protection degree:		IP 40 from front panel / IP 20 terminals
Sensor cable length:		max. 50 m (standard wire)
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 10)
Dimensions of the sensor:		see page 133
Weight of sensor:		20 g (0.7 oz.)
Dimensions:		90x17.6x64 mm
Weight:		(UNI) - 75 g (2.6 oz.), (230) - 65 g (2.3 oz.)
Standards:		EN 60255-6, EN 61010-1

Symbol



Connection



Description of DIP switch

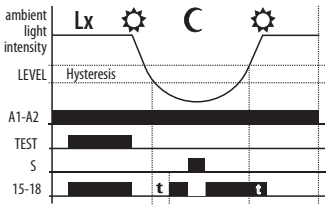
DIP 1 - LUX

ON
100 - 50000 Lx
1 - 100 Lx

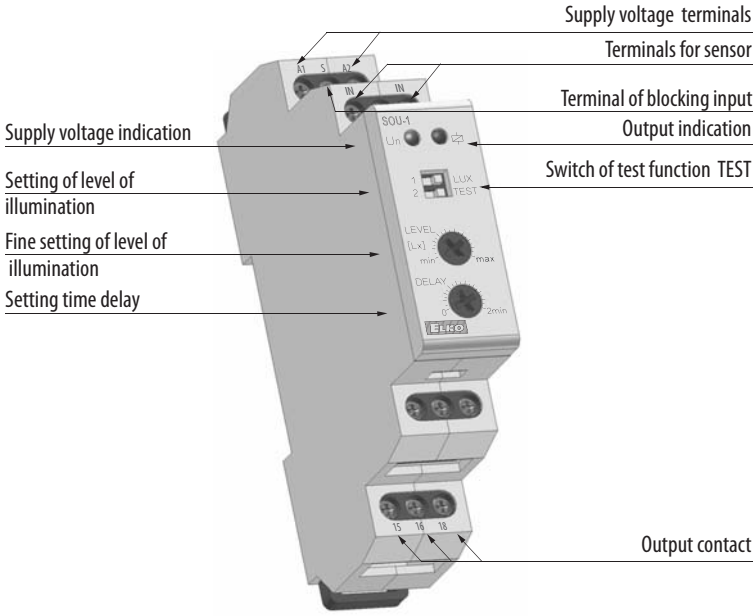
DIP 2 - TEST

ON
TEST ON
NORMAL

Function



Description



innovation!

2M

Mounting of photosensor SKS on the wall

Mounting of photosensor SKS into the panel

EAN code
SOU-2 /230V + photosensor SKS: 8595188130523
photosensor SKS: 8594030337288
SOU-2 : 85957888121644

- It serves for control of lights on the basis of ambient light intensity and real time (combination of SOU-1 and time switch clock SHT-1 in one device)
- Time clock can override the light sensor for applications when lights are not required
- Adjustable light intensity 1-50000 lx
- Function „random switching" enables simulation of presence in a house when nobody is at home
- Switching: according to a program (AUTO) / permanently manual / random (CUBE)
- External sensor IP56 issuitable for mounting on the wall/ in panel (cover and sensors are part of delivery)
- easy replacement of backup battery with plug-in module located on front panelof device (no disassembly required)
- 2-MODULE, DIN rail mounting

Technical parameters — SOU-2

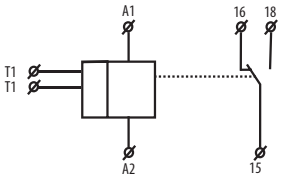
Supply terminals:	A1 - A2
Voltage range:	AC 230 V / 50 - 60 Hz
Burden:	max. 4 VA
Voltage range:	-15 %; +10 %
Back-up supply:	yes
Typ záložní baterie:	CR 2032 (3V)
Summer/winter time:	automatic
Output	
Number of contacts:	1x changeover/ SPDT ($AgSnO_2$)
Current rating:	8 A / AC1
Breaking capacity:	2000 VA / AC1, 240 W / DC
Switching voltage:	250 V AC1 / 30 V DC
Mechanical life:	$1x10^7$
Electrical life (AC1):	$1x10^5$
Time circuit	
Power back-up:	3 years
Accuracy:	max. ±1 s day (23 °C/ 73.4 °F)
Minimum interval:	1 min
Data stored for:	min. 10 years
Program circuit	
Illumination range:	1-50000 Lx
Program place number:	100
Program period:	daily, weekly
Data readout:	LCD display, illuminated by back up
Other information	
Operating temperature:	-10 °C to +55 °C (-4 °F to 131 °F)
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
Electrical strength:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 20 terminals
Overvoltage cathegory:	III.
Pollution degree:	2
Max. cable size (mm^2):	solid wire max.1x 2.5 or 2x1.5 (AWG 12)
	with sleeve max. 1x1.5 (AWG 12)
Dimensions:	90 x 35.6 x 64 mm (3.5˝ x 1.4˝ x 2.5˝)
Dimensions of the sensor:	see page 119
Weight:	110 g (3.9 oz.)
Weight sensor:	20 g (0.7 oz.)
Standards:	EN 61812-1, EN 61010-1, EN 60255-6

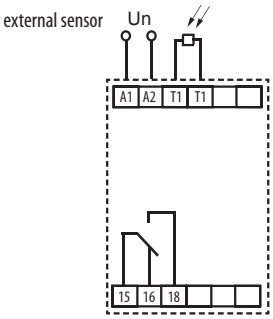
Plug-in module:

with battery backup

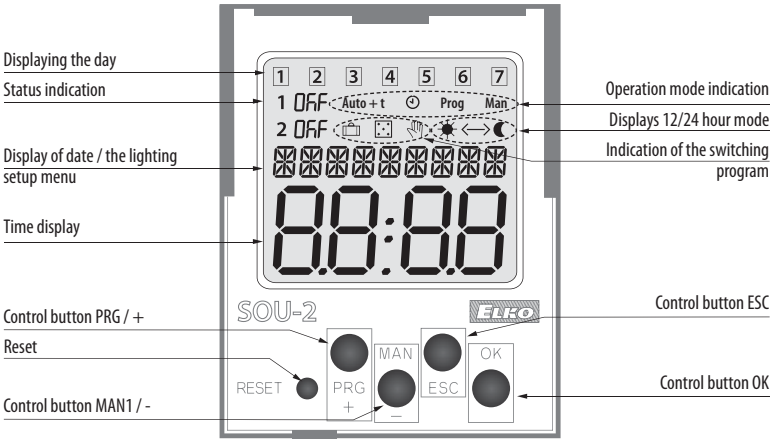
without battery backup

Symbol — Connection

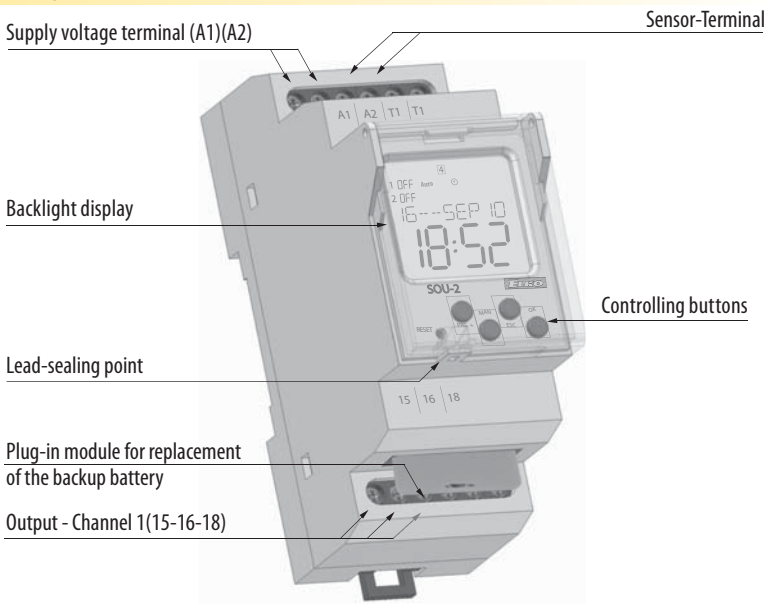




Description of visual elements on the display



Description



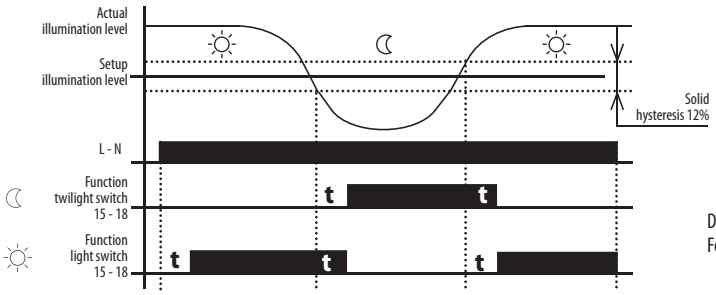
98x62x34
IP65

EAN code
SOU-3 /230V: 8595188140560

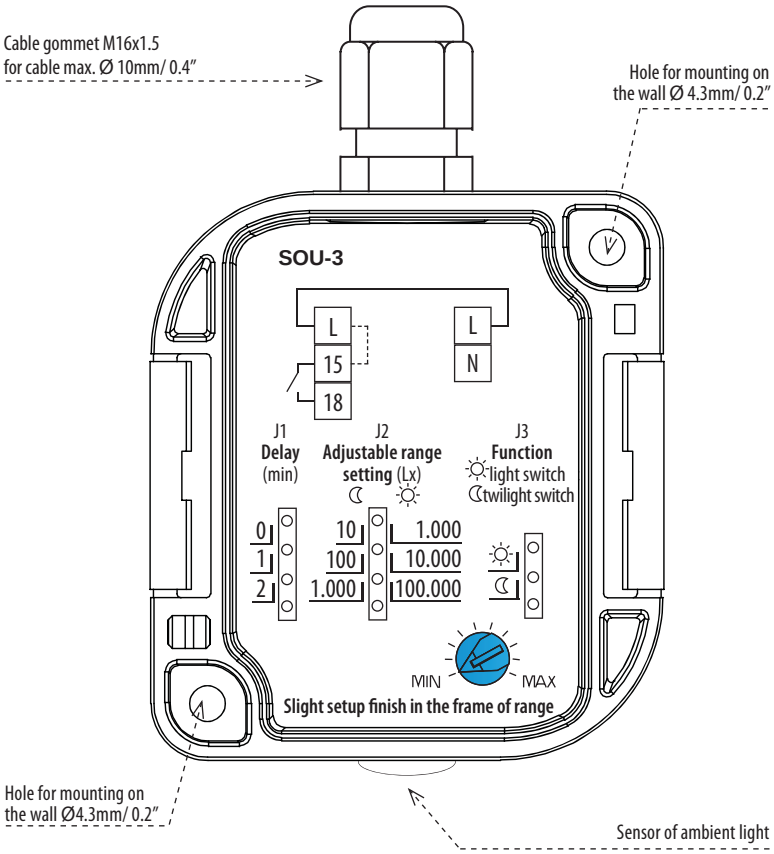
- It serves as control of the device on the basis of ambient light intensity
- External version in IP65, box for mounting on the wall, front cover removable without screws
- Built in high resolution light sensor
- Two devices in one, function is set by jumper:
  - twilight switch – contact closes by 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)
  adjustable (by jumper) ranges of light level
- 3 adjustable levels of time delay (for elimination of short-term fl uctuations of light intensity – for short increases in light intensity)
- Supply voltage 230 V AC
- Potential-free output contact 12A/AC1 switching

Technical parameters	SOU-3
Supply	
Supply terminals:	L - N
Voltage range:	AC 230V / 50 - 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:	12 A / AC1
Switching output:	3000 VA / AC1, 384 W / DC
Peak current:	30 A / < 3 s
Switched voltage:	250 V AC / 24 V DC
Min.switching output:	500 mW
Mechanical life:	3×10^7
Electrical life:	0.7×10^5
Other information:	
Operation temperature:	-30 °C to +60 °C (-22 °F to 140 °F)
Storing temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
Electrical strengh:	4kV (supply-output)
Operation position:	sensor-side down or on the sides
Protection degree:	IP65
Overvoltage cathegory:	III.
Pollution level:	2
Max. cable size (mm^2):	max.1x2.5, max. 2x1.5/ with sleeve max.1x2.5 (AWG 12)
Suggested power-supply cable:	CYKY 3x2.5 (CYKY4x1.5)
Dimensions:	98 x 62 x 34 mm (3.9″ x 2.4″ x 1.3″)
Weight:	122 g (4.3 oz.)
Standards:	EN 60255-6, 61010-1

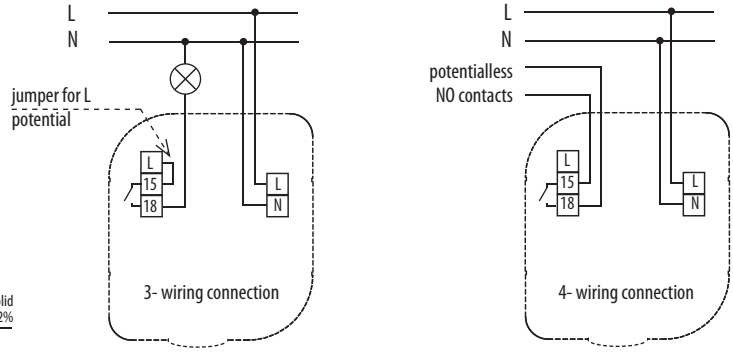
Function



Description (proportion is accordant to real size)



Connection



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

1M

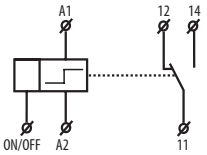
EAN code
MR-41 /230V 8595188115889
MR-41 /UNI 8595188115896
MR-42 /230V 8595188115902
MR-42 /UNI 8595188115919

- 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
- Relay 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-41
  - output contact: 1x changeover / SPDT 16 A
- MR-42
  - options - 2x parallel contacts or the other relay is latching
  - function selected via external jumper between B1 - B2
  - output contact: 2x changeover /SPDT 16 A
- Supply voltage AC 230 V or AC/DC 12-240 V
- 1-MODULE version, DIN rail mounting, controlling by buttons

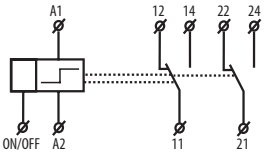
Technical parameters	MR-41	MR-42
Number of functions:	1	2
Supply terminals:	A1 - A2	
Voltage range:	AC/DC 12 - 240 V (AC 50 - 60 Hz)	
Burden:	AC 0.17 - 3 VA / DC 0.1 - 1.2 W	AC 0.17 - 12 VA / DC 0.11 - 1.9 W
Voltage range:	AC 230 V / 50 - 60 Hz	
Consumption (apparent/loss):	AC max. 12 VA / 1.2 W	AC max. 12 VA / 1.9 W
Supply voltage tolerance:	-15 %; +10 %	
Supply indication:	green LED	
Output		
Number of contacts:	1x changeover / SPDT ($AgSnO_2$)	2x changeover/ SPDT ($AgSnO_2$)
Current rating:	16 A / AC1	
Breaking capacity:	4000 VA / AC1, 384 W / DC	
Inrush current:	30 A / <3 s	
Switching voltage:	250 V AC1 / 24 V DC	
Min. breaking capacity DC:	500 mW	
Output indication:	red LED	
Mechanical life:	$3x10^7$	
Electrical life (AC1):	$0.7x10^5$	
Controlling		
Consumption of input:	AC 0.025 - 0.2 VA / DC 0.1 - 0.7 W (UNI), AC 0.53 VA (AC 230 V)	
Load between A2-ON/OFF:	Yes	
Control. terminals:	A1 - ON/OFF	
Glow tubes connetions:	Yes	
Max. amount of glow lamps connected to controlling input:	230V - max. amount 5 pcs (Measured with glow lamp 0.68mA/230V AC)	
Impulse length:	min. 25 ms / max. unlimited	
Other information		
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)	
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)	
Electrical strength:	4 kV (supply - output)	
Operating position:	any	
Mounting/DIN rail:	DIN rail EN 60715	
Protection degree:	IP 40 from front panel / IP 20 terminals	
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)	
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)	
Weight:	(UNI) - 62 g, (230) - 60 g	(UNI) - 89 g, (230) - 85 g
Standards:	EN 61810-1, EN 61010-1	

Symbol

MR-41

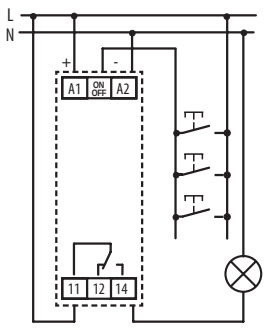


MR-42

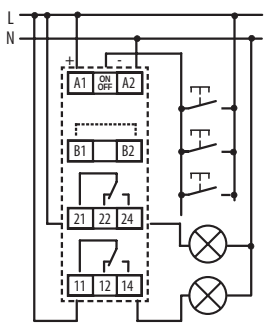


Connection

MR-41

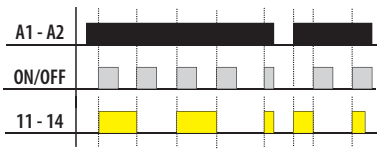


MR-42

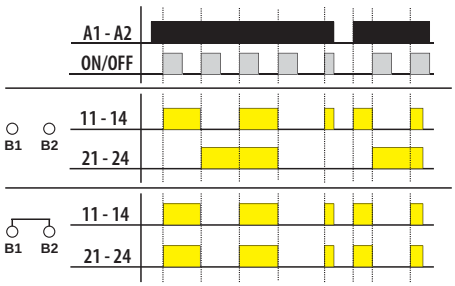


Function

MR-41



MR-42

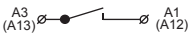
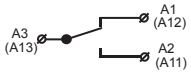
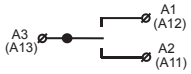
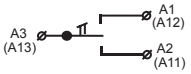
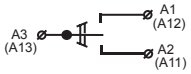
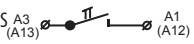
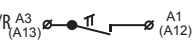
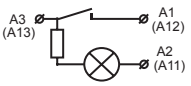
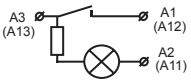
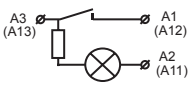
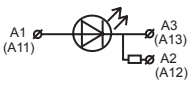
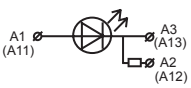
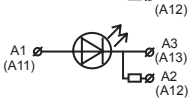
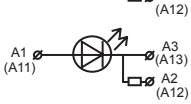
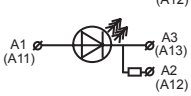
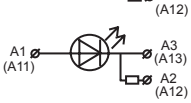


1M

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

	EAN code
USS-ZM	8595188124577
USS-00	8595188124614
USS-01	8595188124621
USS-02	8595188124638
USS-03	8595188124645
USS-04	8595188124652
USS-05	8595188124669
USS-06/S	8595188124676
USS-06/R	8595188136372
USS-07	8595188124683
USS-08	8595188124690
USS-09	8595188124706
USS-10	8595188124331
USS-11	8595188124348
USS-12	8595188124355
USS-13	8595188124362
USS-14	8595188124898
USS-15	8595188124379

Units

CONNECTION INDICATION		RATED CURRENT/VOLTAGE (FOR SWITCHES) SUPPLY VOLTAGE (FOR SIGNALLING LIGHTS)	DESCRIPTION
USS-ZM	MODUL		Basic MODULE (housing with terminals and contacts)
USS-00			Blind flange
USS-01		6A / 250 V AC	Switch
USS-02		8 A / 250 V AC	Alternation switch
USS-03		6 A / 250 V AC	Switch with cental position
USS-04		6 A / 250 V AC	Switch + button with central position
USS-05		6 A / 250 V AC	Switching button with central position
USS-06/S		8 A / 250 V AC	NO switch
USS-06/R		8 A / 250 V AC	NC switch
USS-07		10 A / 250 V AC	Switch with glow lamp (red)
USS-08		10 A / 250 V AC	Switch with glow lamp (green)
USS-09		10 A / 250 V AC	Switch with glow lamp (yellow)
USS-10		A1-A2. AC 250 V A1-A3, AC/DC 24 V	Signalling LED (red)
USS-11		A1-A2. AC 250 V A1-A3, AC/DC 24 V	Signalling LED (green)
USS-12		A1-A2. AC 250 V A1-A3, AC/DC 24 V	Signalling LED (yellow)
USS-13		A1-A2. AC 250 V A1-A3, AC/DC 24 V	Signalling LED (white)
USS-14		A1-A2. AC 250 V A1-A3, AC/DC 24 V	Signalling LED flashing (red)
USS-15		A1-A2. AC 250 V A1-A3, AC/DC 24 V	Signalling LED (blue)

Make your own device USS - easy and intelligent solution!

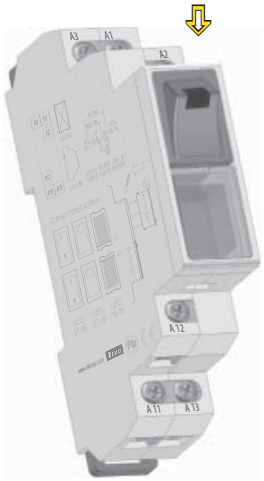
BLIND FLANGE
Used to fill in an empty position in the front panel of the USS Module
Color: Grey, RAL7035 (the same as the housing).
Unit: 00

SWITCHES, PUSH BUTTONS
They have a low uplift and a large fingerboard. High quality contacts, easy rock switch and large button area provide years of useful life.
Unit: 01-06

SWITCHES WITH GLOW LAMP
Switch and signalization in one unit.
Signalization is carried out by a glow lamp in dolly including series resistance. It is possible to instal it for permanent indication or for an intermittend by contact of the switch.
Colours: red, green, yellow.
Supply voltage of the signalling light:
AC 250 V.

SIGNALLING LIGHT
High luminescence SMD/LED that illuminates the entire button area surface. Input voltage can be either AC 230 V or AC/DC 24 V (output light may vary).
Red sig. light is delivered also in a flashing version.Unit: 14.
Colours: red, green, yellow, white, blue
Unit: 10-15

Example of an order: USS - ZM + USS - 07 + USS - 11



APEM

Terminal connection

Laser marking

Switches and buttons are marked by laser according to your request in case you order 50 pcs and more.

Max. number of symbols:

Dimensions

See page 117-121

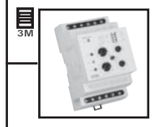
Monitoring relays

Voltage

1 phase

AC/DC

HRN-33(HRN-63)
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 (HRN-67)
as HRN-33(63), but in voltage range AC 24-150 V.

AC

HRN-41 (Hysteresis)
Monitoring DC and AC voltage 10-500 V, divided into 3 inputs and 3 ranges, 2 independent outputs 16 A, 2x time delay.

HRN-42 (Window)
as HRN-41 but function WINDOW. Other functions (applicable for HRN-41): faulty state memory, hysteresis, galv. separated supply AC 230, 400, or AC/DC 24 V.

HRN-34(HRN-64)
as HRN-33(63) but in voltage range DC 6-30 V for monitoring battery circuits (6,12,24 V).

3 phase

HRN-55
supply from all phases

HRN-55N
supply L1-N (monitors also disconnection of neutral wire) Time delay to eliminate peaks.

HRN-57
supply from all phases

HRN-57N
supply L1-N (monitos also neutral wire disconnection)

Adjustable voltage level.

HRN-54
supply from all phases

HRN-54N
supply L1-N (monitors also disconection of neutral wire).All parameters adjustable by potentiometers.

HRN-56
adjustable level Umin

HRN-56/120

HRN-56/208

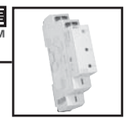
HRN-56/240

HRN-56/400

HRN-56/480

HRN-56/575

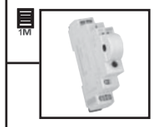
HRN-43
HRN-43N
galvanically separated supply AC 230V, AC 400 or AC/DC 24V, memory, adjustable hysteresis and delay, 2 x independent output.



MPS-1
Optical signaling of three-phase network.

Current

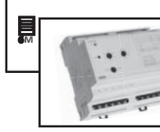
AC



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.

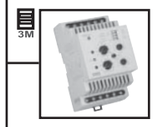
PRI-51
monitoring of current by in-built transformer, 5 ranges (in versions 1/2/5/8/16A), range 5A is suitable for current transformer (X/5), supply and output as PRI-32, difference from PRI-32: direct monitoring and finer ranges (higher sensitivity) = higher accuracy in measuring.

PRI-52
For scanning the current up to 25 A. Long distance device diagnostics (black-out, increasement of take-off)
Priority relay
Supplying voltage AC 230 V
Output 8A/ SPST switching over

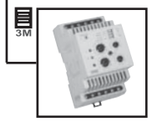


PRI-53
for monitoring the current in three-phase devices. Power supply: 24-240 V AC/DC, galvanically separated from the circuit of the monitored current 2 types depending on the strength of rated current In (1A, 5A)

AC/ DC



PRI-41 (Hysteresis)
3 inputs (0,4-1,6, 1,25-5, 4-16A) divided into 3 ranges (selectable by a switch).



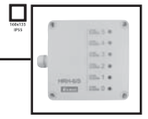
PRI-42 (Window)
as PRI-41 but function "WINDOW".

Level

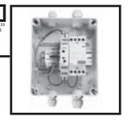
HRH-5
Replacemat for HRH-2, simple version , 2 functions, galvanically separated supply voltage UNI 24.. 240 V AC/DC

HRH-1
4 functions, advanced setting for various combinations, galvanically separated supply AC 230 V or AC/DC 24 V, 2 output contacts/2PDT 16A.

HRH-6
Device monitors 5 levels by using six probes. Supply voltage: 12-24 V DC or galvanically separated 230 V AC.



HRH-6/S
Additional signalization to HRH-6 with 6 control lights on the front panel of device.



HRH-4
a set of level relay HRH-5 and a contactor VS425. For automatic operation 1-phase and 3-phase pumps. 2 function. IP55.

Power factor

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

Frequency

HRF-10
for monitoring the frequency of AC voltage. The monitored frequency 50/60/400 Hz is selected by a switch.

Level switches accessories:

Level sensors SHR

SHR-1(M, N) - for monitoring flooding

SHR-2- for level detection

SHR-3 - for demanding and industrial environment

Monitoring relays review

Relays monitor voltage

Type	Design	Voltage	Secure variables							Nastavení			Description	Page
			Phases	Range	> U	< U	Failure	Phasesequence	Asymmetry	Delay	Hysteresis	Memory Errors		
HRN-33	1-M	from monitored	1	AC 48 - 276 V	●	●				●			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)	62
HRN-34	1-M	from monitored	1	DC 6 - 30 V	●	●				●				62
HRN-35	1-M	from monitored	1	AC 48 - 276 V	●	●				●				62
HRN-37	1-M	from monitored	1	AC 24 - 150 V	●	●				●				62
HRN-63	1-M	from monitored	1	AC 48 - 276 V	●	●				●				62
HRN-64	1-M	from monitored	1	DC 6 - 30 V	●	●				●				62
HRN-67	1-M	from monitored	1	AC 24 - 150 V	●	●				●				62
HRN-41/230V **HRN-41/110V** **HRN-41/400V** **HRN-41/24V**	3-M	AC 230V AC 110V AC 400V AC/DC 24V	1	AC/DC 10 - 50 V 32 - 160 V 100 - 500 V	●	●				●	●	●	Second relay function (independent/parallel) Galvanically separated power supply from measuring inputs	61
HRN-42/230V **HRN-42/110V** **HRN-42/400V** **HRN-42/24V**	3-M	AC 230V AC 110V AC 400V AC/DC 24V	1	AC/DC 10 - 50 V 32 - 160 V 100 - 500 V	●	●				●	●	●		61
HRN-43/230V **HRN-43/110V** **HRN-43/400V** **HRN-43/24V**	3-M	AC 230V AC 110V AC 400V AC/DC 24V	3	AC 3 x 84 - 480 V	●	●	●	●	●	●	●	●	2 output relays, functions of the second relay may be selected (independent/parallel) Galvanically separated power supply	68
HRN-43N/230V **HRN-43N/110V** **HRN-43N/400V** **HRN-43N/24V**	3-M	AC 230V AC-110V AC 400V AC/DC 24V	3	AC 3 x 48 - 276 V	●	●	●	●	●	●	●	●		68
HRN-55	1-M	from monitored	3	AC 3 x 300 - 500 V			●	●		●			Power supply from all phases, i.e. the relay function is preserved even if one phase fails	64
HRN-55N	1-M	from monitored	3	AC 3 x 172 - 287 V			●	●		●			Power supply L1-N, i.e. the relay also monitors the neutral wire interruption	64
HRN-57	1-M	from monitored	3	AC 3 x 300 - 500 V	●	●				●			Power supply from all phases, i.e. the relay function is preserved even if one phase fails	65
HRN-57N	1-M	from monitored	3	AC 3 x 172 - 287 V	●	●				●			Power supply L1-N, i.e. the relay also monitors the neutral wire interruption, replacement for HRN-52	65
HRN-54	1-M	from monitored	3	AC 3 x 300 - 500 V	●	●		●		●			If the supply voltage falls below 60% of Un (OFF lower level), the relay will immediately disconnects with no delay Power supply from all phases, i.e. the relay function is preserved even if one phase fails	66
HRN-54N	1-M	from monitored	3	AC 3 x 172 - 287 V	●	●		●		●			If the supply voltage falls below 60% of Un (OFF lower level), the relay will immediately disconnects with no delay Power supply L1-N, i.e. the relay also monitors the neutral wire interruption	66
HRN-56/120 **HRN-56/208** **HRN-56/240** **HRN-56/400**	1-M	from monitored	3	AC 3 x 72 - 160 V AC 3 x 125 - 276 V AC 3 x 144 - 276 V AC 3 x 240 - 460 V		●	●	●		●			Thanks to the power supply from all three phases, the relay is operational even if one phase fails	67
HRN-56/480 **HRN-56/575**	3-M	from monitored	3	AC 3 x 228 - 550 V AC 3 x 345 - 660 V		●	●	●		●				67

Signal relays

MPS-1	1-M	from monitored	3	AC 3 x 50 - 253 V		●	●	●					Optical signaling of three-phase network	70

Relay for current monitor

Type	Design	Supply voltage	Monitoring values				Setting					Description	Page
			Phases	Rozsah	> I	< I	Delay	Hysteresis	Memory Errors	> I	< I		
PRI-32	1-M	AC 24-240 V DC 24 V	1	AC 1-20 A	●					●		Exceeding the current value - the current flowing through the monitored conductor must not exceed 100 A even on a short-term basis	71
PRI-41/230V **PRI-41/24V**	3-M	AC 230 V AC/DC 24 V	1	AC/DC 0.12 - 1.6 A AC/DC 0.375 - 5 A AC/DC 1.2 - 16 A	●	●	●	●	●	●	●	The adjustable delay for elimination of short-term outages and peaks for every level Galvanically separated power supply	75
PRI-42/230V **PRI-42/24V**	3-M	AC 230 V AC/DC 24 V	1	AC/DC 0.12 - 1.6 A AC/DC 0.375 - 5 A AC/DC 1.2 - 16 A	●	●	●	●	●	●	●	The adjustable delay for elimination of short-term outages and peaks for every level Galvanically separated power supply	75
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	●		●			●		May be used for scanning the current from the current transformer - up to 600A Power supply is galvanically separated from the measured current	72
PRI-52	1-M	AC 230 V	1	AC 0.5 - 25 A	●		●			●		May be used for scanning the current from the external current transformer - up to 600A	73
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	●	●	●			●	●	Monitors the drop in the strength of current below the preset value Monitors exceeding the preset value	74

Level switches

Type	Design	Supply voltage	Monitoring values		Setting			Description	Page
			Level max.	Level min.	Delay	Sensitivity Probe	Function		
HRH-1/230V **HRH-1/110V** **HRH-1/400V** **HRH-1/24V**	3-M	AC 230 V AC 110 V AC 400 V AC/DC 24 V	●	●	●	●	●	Sensitivity adjustable by potentiometer. Galvanically separated power supply	78
HRH-4/230V **HRH-4/24V**	Set	AC 230 V AC/DC 24 V	●	●	●	●	●	Unit with no protection devices - adequate protection element needs to be integrated before the unit. Ingress protection of the assembly is IP55	82
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 Galvanically separated power supply	77
HRH-6/AC **HRH-6/DC**	box IP65	AC 230 V AC/DC 12-24V	●	●*	●	●	●	* devices mainly designated for monitoring water level in fire-engine tanks	80

Relay for factor cos-φ monitoring

Type	Design	Supply voltage	Monitoring values				Setting			Description	Page
			Phases	cos φ range	> cos φ	< cos φ	Delay	Hysteresis	Memory Errors		
COS-1/230V **COS-1/110V** **COS-1/400V** **COS-1/24V**	3-M	AC 230V AC 110V AC 400V AC/DC 24V	3	0.1 - 0.99	●	●	●	●		Two output relays, one independent relay for each level Galvanically separated power supply	84

Relay for frequency monitoring

Type	Design	Supply voltage	Monitoring values				Setting				Description	Page
			Phases	Frequency Range	Frekvence ^	Frekvence v	Delay	Hysteresis	Frekvence ^	Frekvence v		
HRF-10	3-M	AC 161 - 346V	1	40 - 60 Hz 48 - 72 Hz 320 - 480 Hz	●	●	●	●	●	●	Switchable ranges of rated frequency	85

3M

EAN code

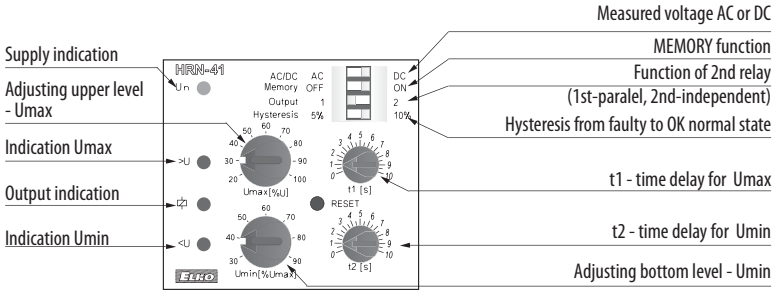
HRN-41 /110V	8595188140430
HRN-41 /230V	8595188140409
HRN-41 /400V	8595188121521
HRN-41 /24V	8595188140416
HRN-42 /110V	8595188140478
HRN-42 /230V	8594030337653
HRN-42 /24V	8594030338070

- 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
- Output contact: 1x changeover/SDPT 16 A / 250 V AC1 for all monitored levels
- 3-MODULE, DIN rail mounting

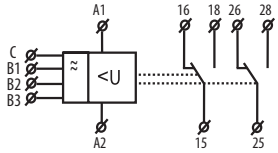
Technical parameters

	HRN-41	HRN-42	
Supply			
Supply terminals:	A1 - A2		
Voltage range:	AC 110 V, AC 230 V, AC 400 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 50Hz)	32 - 160 V (AC 50Hz)	100 - 500 V (AC 50Hz)
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 % / °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:	16 A / AC1		
Breaking capacity:	4000 VA / AC1, 384 W / DC		
Inrush current:	30 A / < 3 s		
Switching voltage:	250 V AC1 / 24 V DC		
Min. breaking capacity DC:	500 mW		
Output indication:	yellow LED		
Mechanical life:	$3x10^7$		
Electrical life (AC1):	$0.7x10^5$		
Other information			
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)		
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)		
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 cathegory:	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)		
Dimensions:	90 x 52 x 65 mm (3.5˝ x 2˝ x 2.6˝)		
Weight:	239 g (8.4 oz.)		
Standards:	EN 60255-6, EN 61010-1		

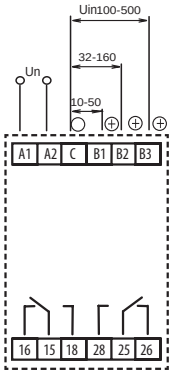
Description



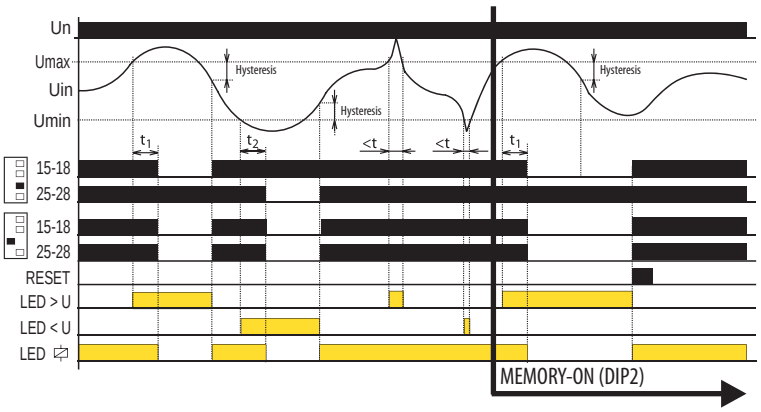
Symbol



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 flasching of both LEDs (LED <U a LED >U).

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
  - U max and U min 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)

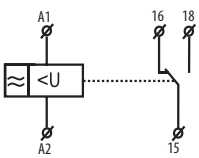
  HRN-35 - like HRN-33, but independent output relays for each voltage level
  - switching of other loads possible

  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

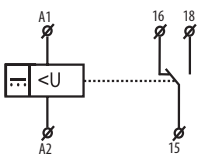
Technical parameters	HRN-33/ HRN-63	HRN-34/ HRN-64	HRN-35	HRN-37/ HRN-67
Supply and measuring				
Terminals:	A1 - A2	A1 - A2	A1 - A2	A1 - A2
Voltage range:	AC 48 - 276 V / 50Hz	DC 6 - 30 V	AC 48 - 276 V / 50Hz	AC 24-150 V / 50Hz
Burden:	AC max. 1.2 VA	DC max. 1.2 VA	AC max. 1.2 VA	AC max. 1.2 VA
Upper 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 % / °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 changeover/ SPDT (AgNi / Silver Alloy)	1x chang. for each level of voltage,(AgNi)	1x changeover/ SPDT (AgNi / Silver Alloy)
Current rating:	16 A / AC1			
Breaking capacity:	4000 VA / AC1, 384 W / DC			
Inrush current:	30 A / < 3 s			
Switching voltage:	250 V AC1 / 24 V DC			
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:	-20 °C to +55 °C (-4 °F to 131 °F)			
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)			
Electrical strength:	4 kV (supply - output)			
Operating position:	any			
Mounting:	DIN rail EN 60715			
Protection degree:	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)			
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)			
Weight:	61 g (2.2 oz.)	73 g (2.6 oz.)	85 g (3 oz.)	61 g (2.2 oz.)
Standards:	EN 60255-6, EN 61010-1			

Symbol

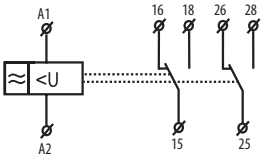
HRN-33, HRN-37.
HRN-63, HRN-67



HRN-34, HRN-64



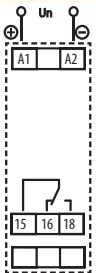
HRN-35



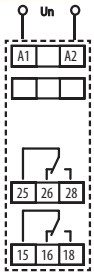
Connection

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

HRN-34,
HRN-64

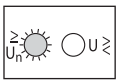


HRN-35

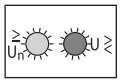


Indication LED

HRN-33, HRN-37



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

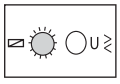


Exceeded Umax(overvoltage)
Drop below Umin(undervoltage)
Un>Umax or Un<Umax
Green LED = ON
Red LED = ON

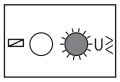
HRN-35

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

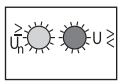
HRN-34



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

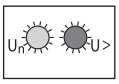


Exceeded Umax(overvoltage)
Drop below Umin(undervoltage)
Un>Umax or Un<Umax
Green LED = OFF
Red LED = ON

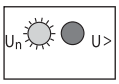


Exceeded Umax(overvoltage)
Un>Umax
Green LED = ON
Red LED = ON

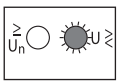
HRN-63, HRN-67



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

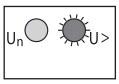


Drop below Umin(undervoltage)
Un<Umin
Green LED = ON
Red LED = OFF

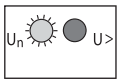


Drop below Umin(undervoltage)
Un<Umin
Green LED = OFF
Red LED = ON

HRN-64



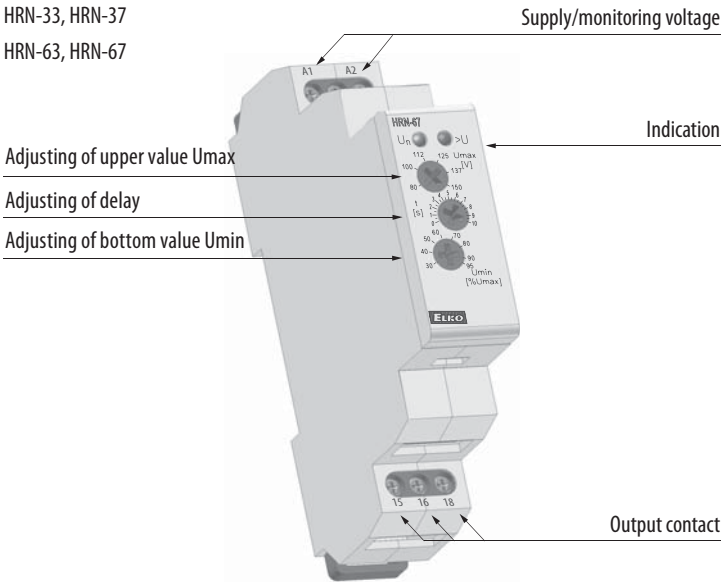
Exceeded Umax(overvoltage)
Un>Umax
Green LED = OFF
Red LED = ON



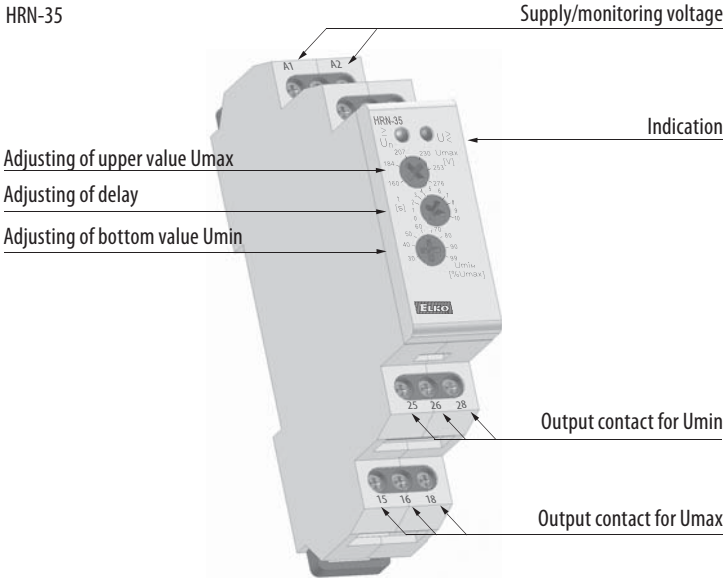
Drop below Umin(undervoltage)
Un<Umin
Green LED = ON
Red LED = OFF

Description

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

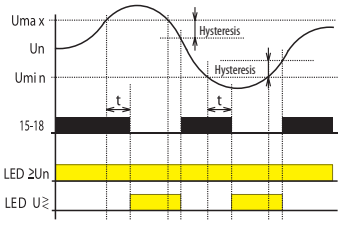


HRN-35

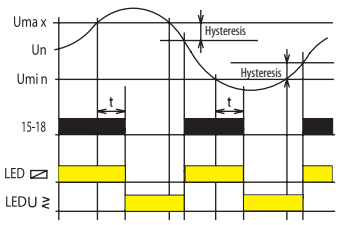


Function HRN-33, 34, 35, 37 (band voltage relay)

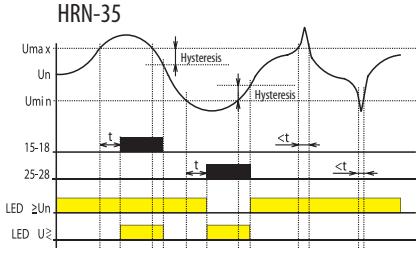
HRN-33,HRN-37



HRN-34



HRN-35



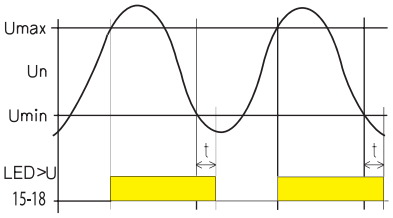
Legend:

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 - indication green
LED U ≷ - indication red

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 confi gurations and functions according to actual requirements of the application.

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

HRN-63, 64, 67



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> - indication red LED

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 in the frames of 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.

1M

- Replacement for HRN-51 and HRN -51N
- Relay monitors phase sequence and failure, exceeding of monitored voltage in 3 phase main
- HRN-55 - supply from all phases, which means that function of relay is applicable also if one phase fails
- HRN-55N - supply L1-N, it means that relay also monitors break of neutral point
- Fixed delay T1 (500ms) and adjustable delay T2 (0.1-10s)
- Faulty state is indicated by LED and output contact of relay is OFF.
- Output contact: 1x changeover / SPDT 16 A / 250 V AC1
- 1-MODULE, DIN rail mounting

EAN code
HRN-55 8595188137225
HRN-55N 8595188137232

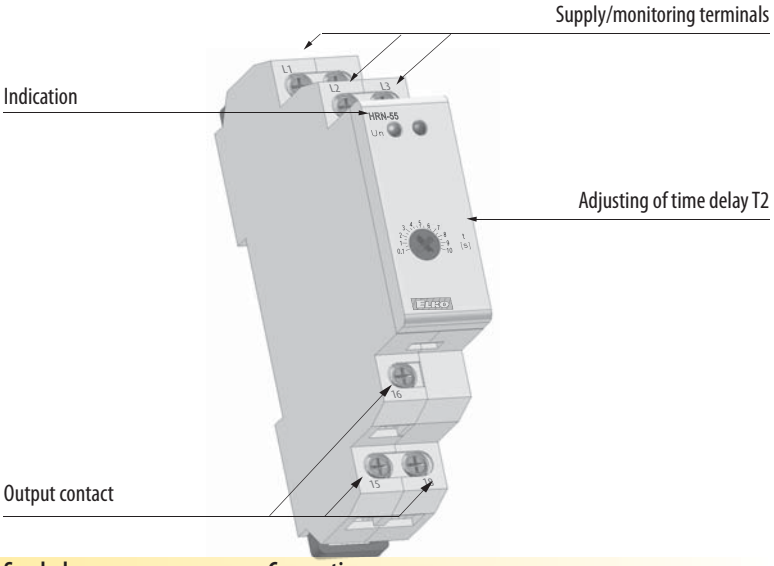
Technical parameters	HRN-55	HRN-55N
Monitoring terminals:	L1, L2, L3	L1, L2, L3,N
Supply terminals:	L1, L2, L3	L1, N
Voltage:	3x400 V / 50 Hz	3x400V/230V / 50 Hz
Level Umax:	125 % Un	
Level Umin:	75% Un	
Burden:	max. 2 VA	
Hysteresis:	5%	
Max. permanent:	AC 3x460 V	AC 3x265 V
Peak overload <1ms:	AC 3x500 V	AC 3x288 V
Time delay T1:	max. 500 ms	
Time delay T2:	adjustable 0.1-10 s	
Output		
Number of contacts:	1x changeover/ SPDT (AgNi / Silver Alloy)	
Current rating:	8 A / AC1	
Breaking capacity:	2500 VA / AC1, 240 W / DC	
Inrush current:	10 A	
Switching voltage:	250 V AC1 / 24 V DC	
Min. breaking capacity DC:	500 mW	
Output indication:	red LED	
Mechanical life:	$1x10^7$	
Electrical life (AC1):	$1x10^5$	
Other information		
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)	
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)	
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 (mm^2):	solid wire max. 2x2.5 or 1x4 with sleeve max. 1x2.5 or 2x1.5 (AWG 12)	
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)	
Weight:	67 g (2.36 oz.)	66 g (2.3 oz.)
Standards:	EN 60255-6, EN 61010-1	

Function description

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

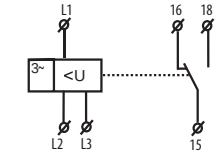
HRN-55: thanks to supply form all phases, this relay is able to stay operational also if one phase is out.
HRN-55N -supply L1-N, means that relay monitor also failure in neutral wire.

Description

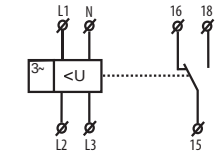


Symbol

HRN-55

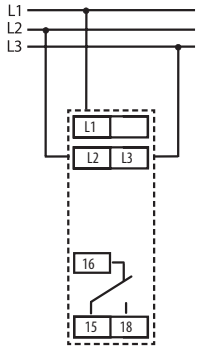


HRN-55N

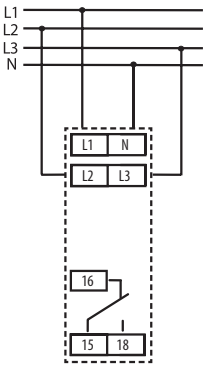


Connection

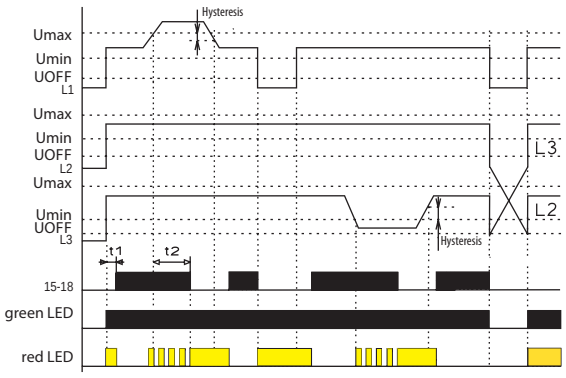
HRN-55



HRN-55N



Function



1M

EAN code

HRN-57 8595188137256
HRN-57N 8595188137249

- It serves to monitor voltage in a switchboard, protection of devices in 3-phase main
- It monitors value of voltage in 3-phase main
- It is possible to set upper and lower level independently
- Adjustable time delay eliminated short voltage peaks and failures in the main
- The device is supplied from monitored voltage
- Faulty state is indicated by red LED and by breaking output relay contact
- Output contact 1x changeover/ SPDT 8 A /250 V AC1
- Relay doesn't monitor phase sequence
- HRN-57 – supply from all phases, means that relay is functional also in case of failure in one phase
- HRN-57N -supply L1-N, means that relay monitors also failure of neutral wire, replacement for HRN-52
- 1-MODULE, DIN rail mounting

Technical parameters

Technical parameters	HRN-57	HRN-57N
Monitoring terminals:	L1, L2, L3	L1, L2, L3,N
Supply terminals:	L1, L2, L3	L1, N
Voltage:	3x400 V / 50 Hz	3x400V/230V / 50 Hz
Level Umax:	105 - 125 % Un	
Level Umin:	75 - 95 % Un	
Burden:	max. 2 VA	
Hysteresis:	5 %	
Max. permanent overload:	AC 3x460V	AC 3x265V
Peak overload <1ms:	AC 3x500V	AC 3x288V
Time delay T1:	max. 500 ms	
Time delay T2:	adjustable 0.1-10 s	
Output		
Number of contacts:	1x changeover/ SPDT (AgNi / Silver Alloy)	
Current rating:	8 A / AC1	
Breaking capacity:	2500 VA / AC1, 240 W / DC	
Inrush current:	10 A	
Switching voltage:	250 V AC1 / 24 V DC	
Min. breaking capacity DC:	500 mW	
Output indication:	red LED	
Mechanical life:	$1x10^7$	
Electrical life (AC1):	$1x10^5$	
Other information		
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)	
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)	
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 (mm^2):	solid wire max.2x 2.5 or 1x4, with sleeve max. 1x2.5 or 2x1.5 (AWG 12)	
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)	
Weight:	68 g (2.4 oz.)	66 g (2.3 oz.)
Standards:	EN 60255-6, EN 61010-1	

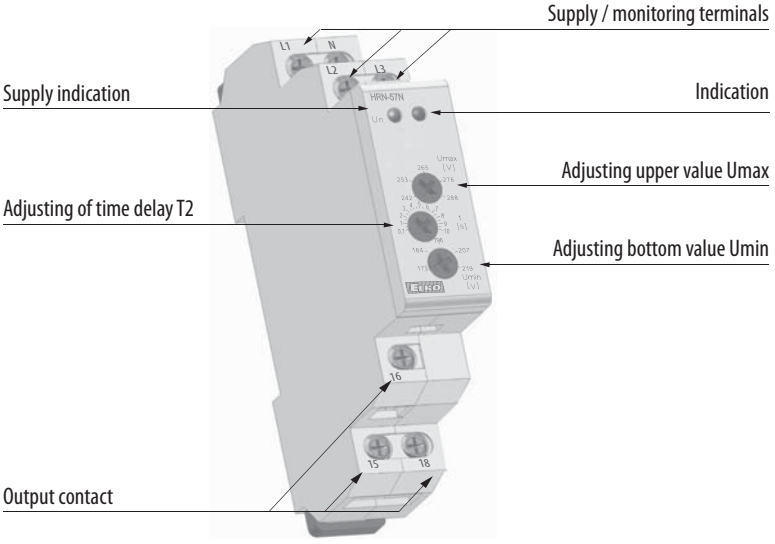
Function description

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

In case supply voltage falls below 60 % Un (UOFF lower level) relay immediately breaks without delay and faulty state is indicated by red LED.

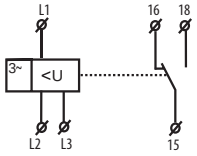
In case timing is in progress and faulty state is indicated, timing is immediately stopped.

Description

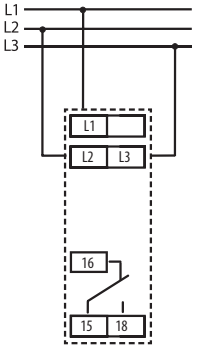


Symbol Connection

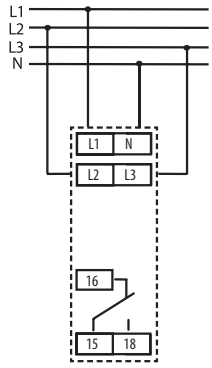
HRN-57



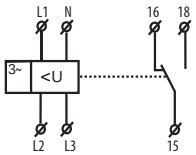
HRN-57



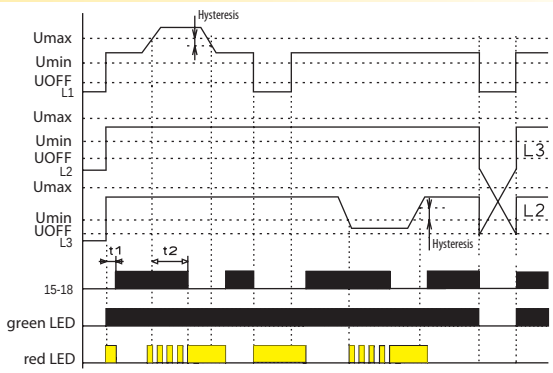
HRN-57N



HRN-57N



Function



1M

EAN code
HRN-54 8595188137201
HRN-54N 8595188137218

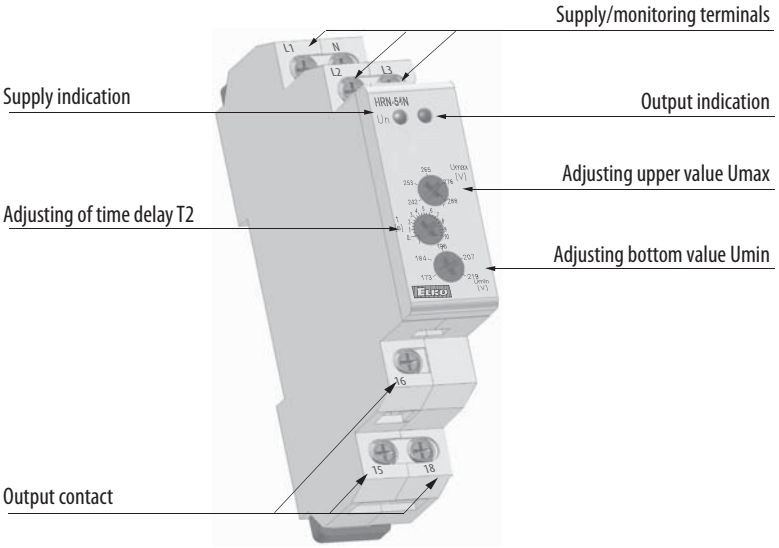
- It serves to monitor voltage, phase failure and sequence in switchboards, protection of devices in 3-phase mains
- It is possible to set upper and lower level of monitoring voltage
- Adjustable time delay eliminates short voltage peaks and failures in the main
- Supply is done from monitored voltage
- Faulty state is indicated by red LED and by opening of output relay contact
- Output contact 1x changeover / SPDT 8 A /250 V AC1
- In case supply voltage falls below 60 %Un (Uoff lower level) relay immediately opens without delay
- HRN-54 –supply from all phases which means that relay is functional also in case when one phase is faulty
- HRN-54N –supply L1-N, means that relay monitors also failure of neutral wire
- 1-MODULE, DIN rail mounting

Technical parameters	HRN-54	HRN-54N
Supply and measuring	L1, L2, L3	L1, L2, L3,N
Supply terminals:	L1, L2, L3	L1, N
Supply/measured voltage:	3x400 V / 50 Hz	3x400V/230V / 50 Hz
Level Umax:	105-125 % Un	
Level Umin:	75-95 % Un	
Burden:	max. 2 VA	
Hysteresis:	5%	
Max. permanent overload:	AC 3x460 V	AC 3x265 V
Peak overload <1ms:	AC 3x500 V	AC 3x288 V
Time delay T1:	max. 500 ms	
Time delay T2:	adjustable 0.1-10 s	
Output		
Number of contacts:	1x changeover/ SPDT (AgNi / Silver Alloy)	
Current rating:	8 A / AC1	
Breaking capacity:	2500 VA / AC1, 240 W / DC	
Inrush current:	10 A	
Switching voltage:	250 V AC1 / 24 V DC	
Min. breaking capacity DC:	500 mW	
Indication of state:	red LED	
Mechanical life:	$1x10^7$	
Electrical life (AC1):	$1x10^5$	
Other information		
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)	
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)	
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 (mm^2):	solid wire max. 2x2.5 or 1x4, with sleeve max. 1x2.5 or 2x1.5	
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)	
Weight:	69 g	67 g
Standards:	EN 60255-6, EN 61010-1	

Function description

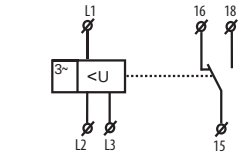
Relay in 3-phase main monitors size of phase voltage. It is possible to set two independent voltage levels and thus it is possible to set two independent voltage levels and monitor e.g. undervoltage and overvoltage independently. In normal state when voltage is within set levels, output relay is closed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

Description

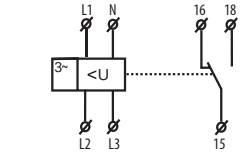


Symbol

HRN-54

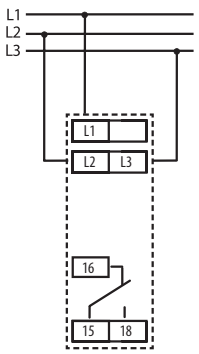


HRN-54N

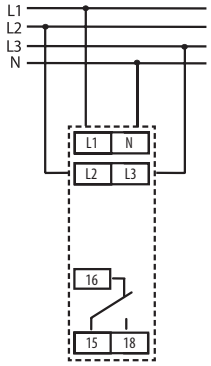


Connection

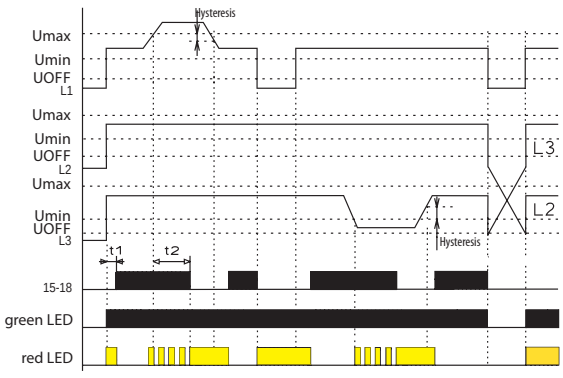
HRN-54



HRN-54N



Function



1M
3M

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

1-MODULE	3-MODULE
HRN-56/208 - 3x120V	HRN-56/480 - 3x480 V
HRN-56/208 - 3x208 V	HRN-56/575 - 3x575 V
HRN-56/240 - 3x240 V	
HRN-56/400 - 3x400 V	

- Fixed time delay T1 (500ms) and adjustable time delay T2 (0 -10s)
- Faulty state is indicated by LED and by opening of output relay contact
- Output contact 1x changeover/SPDT 8 A /250V AC1
- 1-MODULE, 3-MODULE, DIN rail mounting

EAN code

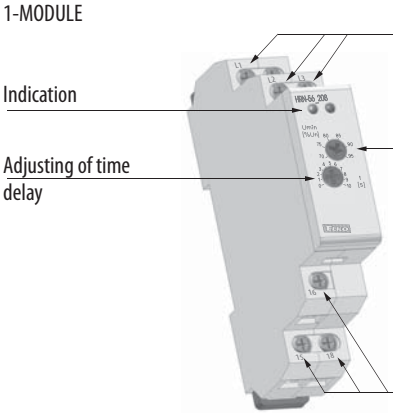
HRN-56 /120V	8595188130745
HRN-56 /208V	8595188130134
HRN-56 /240V	8595188130141
HRN-56 /400V	8595188130158
HRN-56 /480V	8595188130189
HRN-56 /575V	8595188130196

Technical parameters

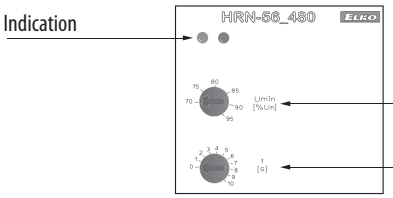
	HRN-56					
	120	208	240	400	480	575
Monitoring terminals:	L1, L2, L3					
Supply terminals:	L1, L2, L3					
Supply/measured voltage:	3 x 120V/50Hz	3 x 208V/50Hz	3 x 240V/50Hz	3 x 400V/50Hz	3 x 480V/50Hz	3 x 575V/50Hz
Level Umin:	adjustable 70 - 95 % Un					
Level Uoff:	60 % Un					
Burden:	max. 2 VA					
Hysteresis:	5%					
Max. permanent overload:	AC 3 x 160V	AC 3 x 276V		AC 3 x 460V	AC 3 x 550V	AC 3 x 660V
Peak overload <1s:	AC 3 x 180V	AC 3 x 300V		AC 3 x 500V	AC 3 x 600V	AC 3 x 700V
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:	8 A / AC1					
Breaking capacity:	2500 VA / AC1, 240 W / DC					
Inrush current:	10 A					
Switching voltage:	250 V AC1 / 24 V DC					
Indication of state:	red LED					
Mechanical life:	$1x10^7$					
Electrical life (AC1):	$1x10^5$					
Other information						
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)					
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)					
Electrical strength:	4 kV (supply - output)					
Operating position:	any					
Mounting:	DIN rail EN 60715					
Protection degree:	IP 40 from front panel / IP 10 terminals				IP 40 from front panel / IP 20 terminals	
Overvoltage cathegory:	III.					
Pollution degree:	2					
Max. cable size (mm^2):	solid wire max. 2x2.5 or 1x4,with sleeve max. 1x2.5 or 2x1.5				max.1x 2.5, max.2x1.5 with sleeve max. 1x1.5	
Dimensions:	90 x 17.6 x 64 mm (3.5″ x 0.7″ x 2.5″)				90 x 52 x 65 mm (3.5″x2″x2.6″)	
Weight:	66 g	66 g	66 g	67 g	108 g	108 g
Standards:	EN 60255-6, EN 61010-1					

Description

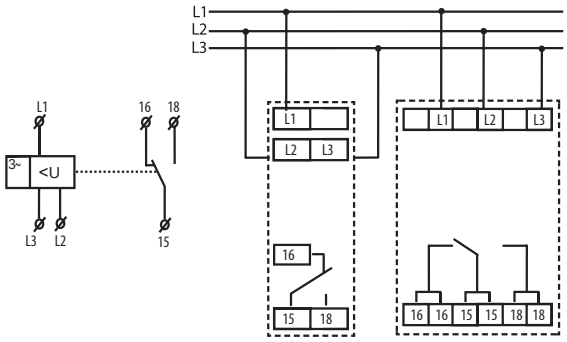
1-MODULE



3-MODULE front panel

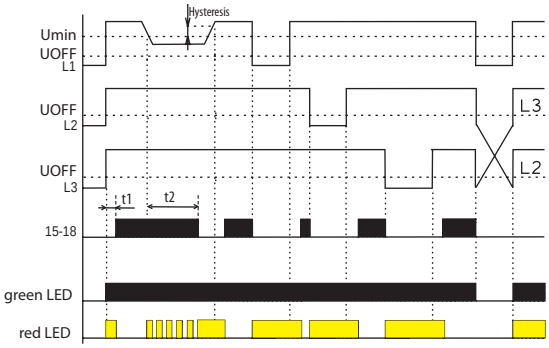


Symbol



Connection

Function



Function description

Relay in 3-phase main monitors correct phase sequence and phase failure. Green LED shines 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.

3M

EAN code

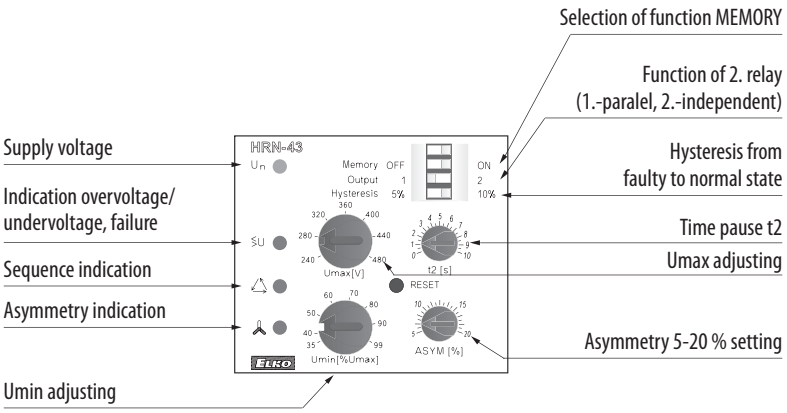
HRN-43 /230V	8594030337660
HRN-43 /400V **	8595188121316
HRN-43 /24V **	8594030338087
HRN-43N /230V	8594030338216
HRN-43N /400V	8595188120258
HRN-43N /24V	8594030338094

- Monitoring 3-phase mains:
  - voltage in 2 levels (undervoltage and overvoltage) in range 138-276V 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 3x400/230 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 400 V, AC 230 V, AC/DC 24 V
- Output contact: 2x changeover/ DPDT 16 A / 250 V AC1
- 3-MODULE, DIN rail mounting

Technical parameters

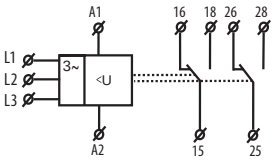
Technical parameters	HRN-43	HRN-43N
Supply		
Supply terminals:	A1 - A2	
Voltage range:	AC 230 V, AC 400 V, AC/DC 24 V / (AC 50-60Hz)	
Burden:	max. 4.5 VA	
Supply voltage tolerance:	-15 %; +10 %	
Measuring circuit		
Nominal voltage:	3x400V / 50Hz	3x400V / 230V / 50Hz
Terminals:	L1. L2. L3	L1. L2. L3, N
Upper level Umax:	240–480V	138–276V
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 % / °C	
Limit values tolerance:	5 %	
Output		
Number of contacts:	2x changeover/ SPDT (AgNi / Silver Alloy)	
Current rating:	16 A / AC1	
Breaking capacity:	4000 VA / AC1, 384 W / DC	
Inrush current:	30 A / < 3 s	
Switching voltage:	250 V AC1 / 24 V DC	
Min. breaking capacity DC:	500 mW	
Mechanical life:	$3x10^7$	
Electrical life (AC1):	$0.7x10^5$	
Other information		
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)	
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)	
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 cathegory:	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)	
Dimensions:	90 x 52 x 65 mm (3.5″ x 2″ x 2.6″)	
Weight:	239 g (8.4 oz.)	
Standards:	EN 60255-6, EN 61010-1	

Description

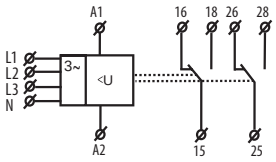


Symbol

HRN-43

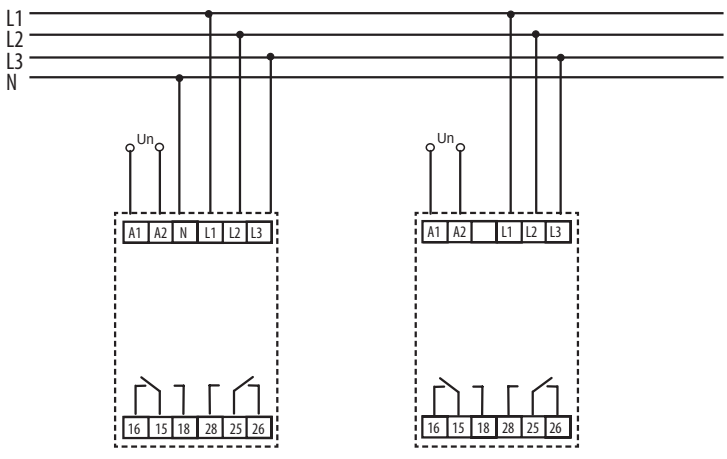


HRN-43N



Connection

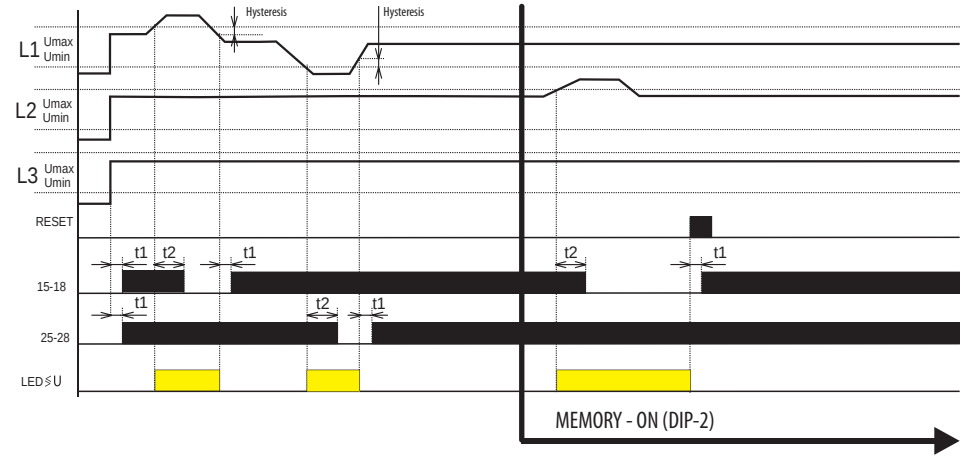
HRN-43N



HRN-43

Function

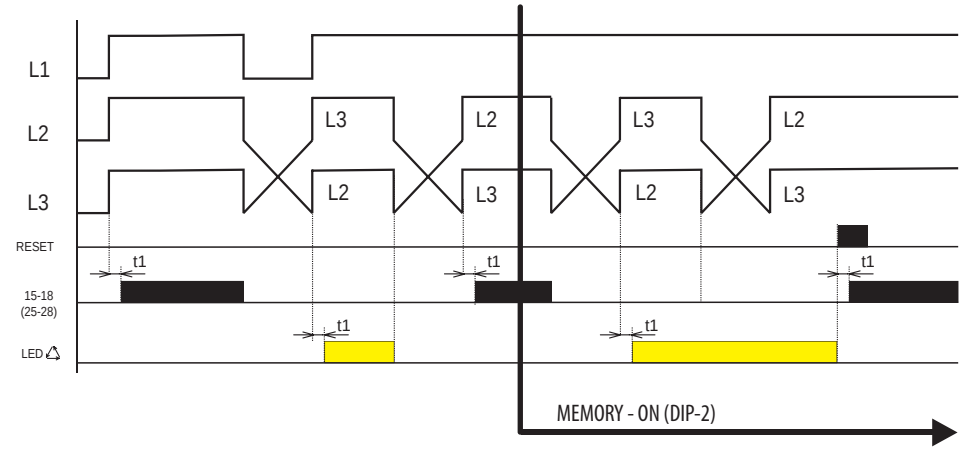
Overvoltage - undervoltage



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 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.

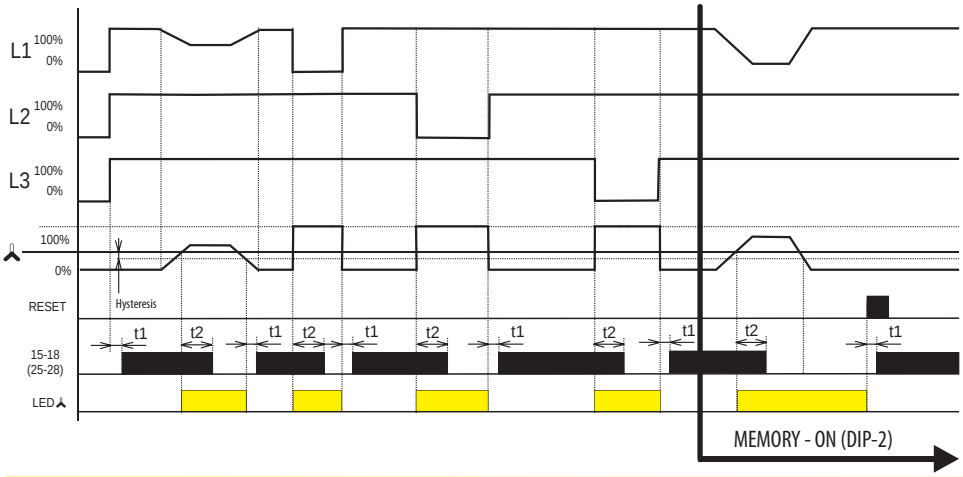
Phase sequence



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 when monitoring phase sequence, the relays are switched in parallel way.

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 when monitoring phase sequence, the relays are switched in parallel way.
DIP switch 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.

1M

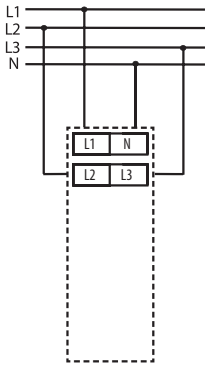
- Used for optical signaling of the voltage level in three phases
- Each phase features LED signaling broken down by color into voltage levels:
  - voltage in tolerance of +/-15% - green
  - overvoltage - red
  - undervoltage - yellow
  - voltage < 50V - LED not illuminated
- Four-wire connection - L1, L2, L3, N
- Monitors phase voltages against neutral wire
- Not dependent upon order of phases
- Four-wire connection - L1, L2, L3, N
- In 1-MODUL design, DIN rail mounting

EAN code

MPS-1 8595188145978

Technical parameters	MPS-1
Supply voltage:	AC 3x400/230V, 50/60Hz
Supply voltage tolerance:	+20%, -75%
Power consumption:	max.1.0VA / 0,5W
Indication:	
LED not illuminated:	0 ... 50V / 45 ... 0V
LED illuminated:	
- yellow	50 ... 207V / 195,5 ... 45V
- green	207 ... 264,5V / 253 ... 195,5V
- red	264,5 ... 276V / 276 ... 253V
Other information	
Design:	1 module
Mounting:	DIN rail EN60715
Pracovní poloha:	any
Coverage:	Panel IP40, terminals IP10
Overvoltage category:	III.
Contamination level:	2
Working temperature:	-20 ... +55°C
Storage temperature:	-30 ... +70°C
Dimensions:	90x17.6x64mm
Weight:	58 g
Standards:	EN60947-1, EN60947-5-1

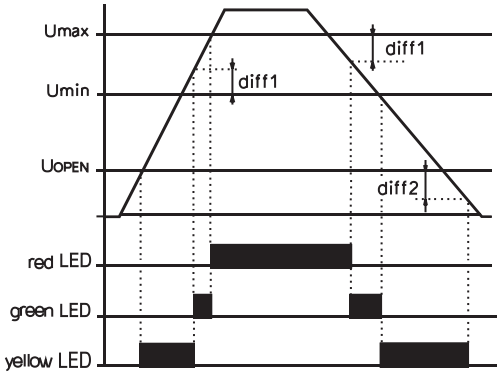
Connection



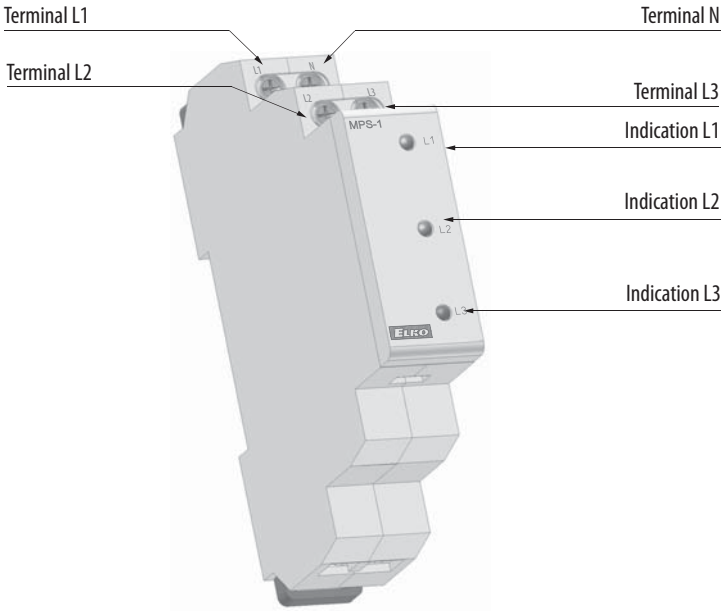
Function

After connecting the supply voltage, the LED illuminates - the color corresponds to the voltage size of individual phases. If the phase voltage drops under 40V (phase outage), the corresponding LED is not illuminated.

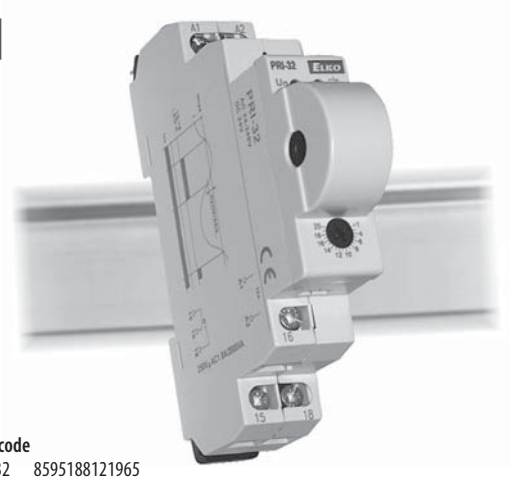
Description of function



Description of device



1M



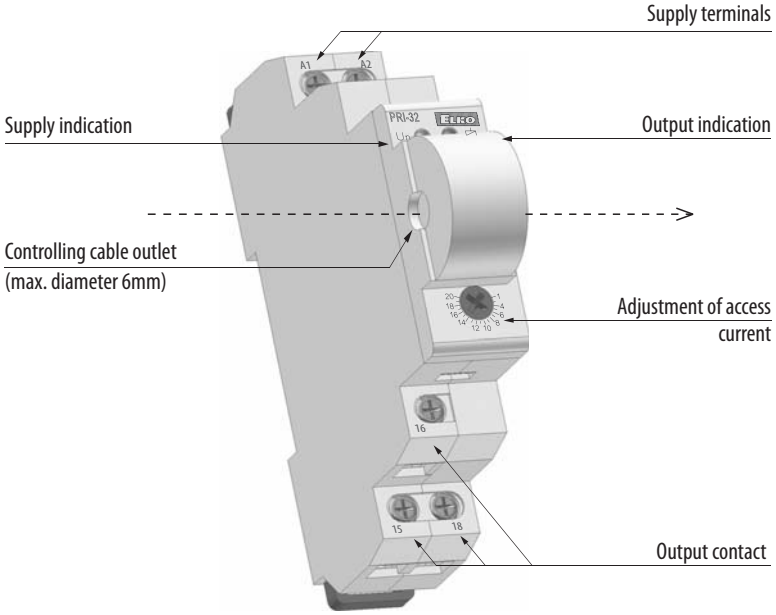
EAN code
PRI-32 8595188121965

- 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 galvanic separated from measuring current
- Current exceeding – current flowing through monitored wire must not exceed 100 A
- Output contact: 1x changeover/SPDT 8 A
- Clamp terminals
- 1-phase, 1-MODULE, DIN rail mounting

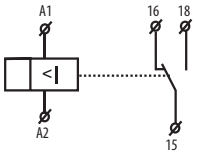
Technical parameters

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 % / °C
Limit values tolerance:	5%
Overload capacity:	max.100 A /10 s
Output	
Number of contacts:	1x changeover/ SPDT (AgNi / Silver Alloy)
Current rating:	8 A / AC1
Breaking capacity:	2500 VA / AC1, 240 W / DC
Output indication:	red LED
Other information	
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
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)
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)
Weight:	68 g (2.4 oz.)
Standards:	EN 60255-6, EN 61010-1

Description



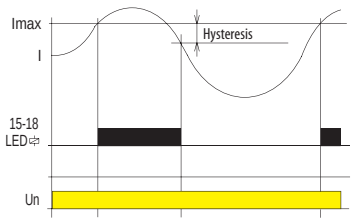
Symbol



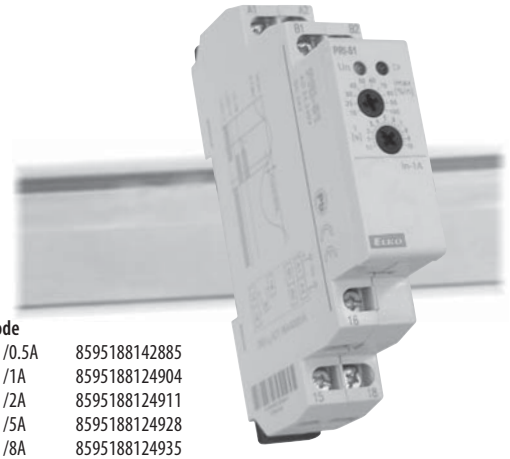
Connection

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.



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

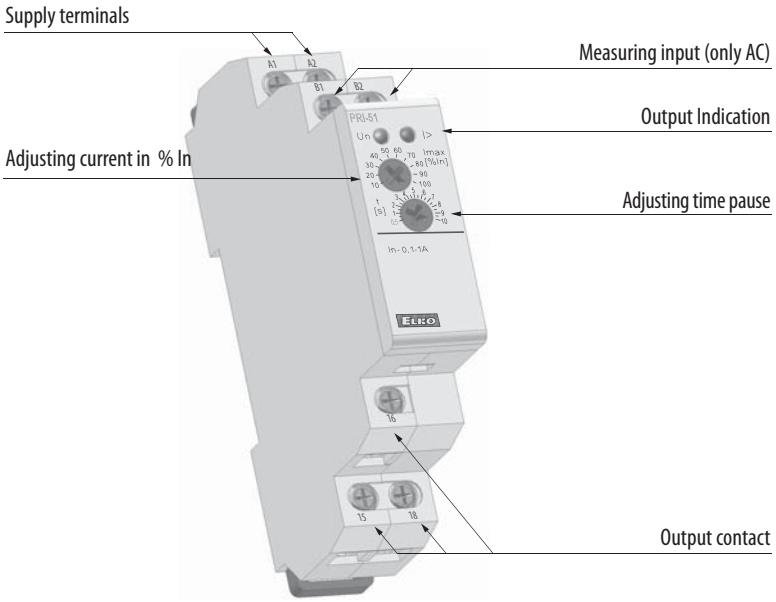
- It serves for monitoring of heating in rail-switches, heating cables, consumption of one-phase motors, indicates current flow
- Flexible adjustment by potentiometer, choice of 6 ranges:

  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 not galvanically separated from measured current, it must be in the same phase
- Output contact: 1x changeover/ SPDT 8 A
- 1-phase, 1-MODULE, DIN rail mounting, replacement for PRI-31

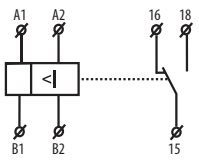
Technical parameters

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					
Recomended current transformers:	more information page 87					
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 % / °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:	8 A / AC1					
Breaking capacity:	2500 VA / AC1, 240 W / DC					
Output indication:	green / red LED					
Other information						
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)					
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)					
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)					
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)					
Weight:	58 g (2 oz.)					
Standards:	EN 60255-6, EN 61010-1					

Description

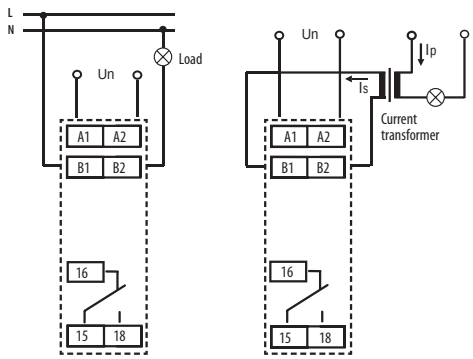


Symbol



Connection

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

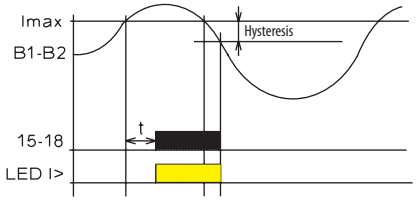


Example of an order

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

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.



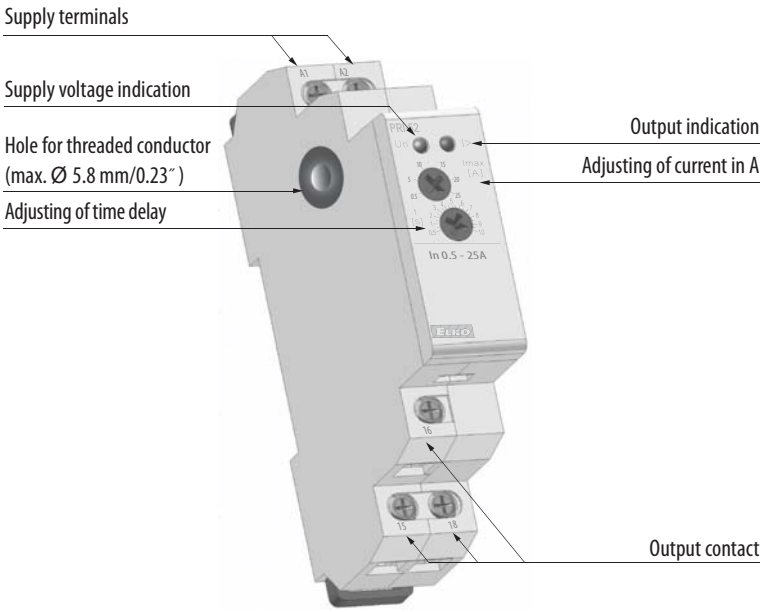
1M

EAN code
PRI-52 8595188136556

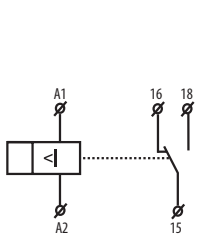
- Relay is designated for:
  - distant device diagnostic (short circuit, take-off increasing)
  - preferred (priority) relay – two appliances (boiler and floor heating) operating on one phase, but never run together – prevention against current overload and circuit breaker tripping. Enables to save your main breaker expenses.
  - current tranzit indicator – informs about heating activation, ceramic hob, ventilator….
  - changing over of appliances according to inverter's (converter) output by photocell applications
- NEW – hole for threaded conductor passes through the body of device
- Part of device is current transformer, which is sensing size of current in threaded conductor
- Possible to use also for sensing of current up to 600A from external current transformer
- Slight setting (by potentiometer) of tripping current – range AC 0.5….25A
- Slight setting (by potentiometer) of delay – adjustable in range 0.5…..10s
- Supply voltage AC 230V
- Output contact 1x changeover /SPDT 8A (AC1)
- 1-phase version, 1-MODULE, DIN rail mounting, clamp terminals

Technical parameters	PRI-52
Supply	
Supply terminals:	A1 - A2
Voltage range:	AC 230 V / 50 - 60 Hz
Tolerance of voltage range:	-15 %; +10 %
Burden (apparent):	max. 5 VA
Burden (loss):	max. 1.4 W
Measuring circuit:	
Current range:	AC 0.5 ... 25A / 50 Hz
Maximal permanent current:	25A
Inrush overload <1s:	100 A
Current adjustment:	potentiometer
Time delay:	adjustable 0.5 ... 10 s
Accuracy	
Setting accuracy (mechanical):	10 %
Repeat accuracy:	<1 %
Temperature dependance:	< 0.2 % / °C
Limit values tolerance:	10 %
Hysteresis:	0.25A
Output	
Number of contacts:	1x changeover /SPDT (AgNi/Silver Alloy)
Current rating:	8 A / AC1
Switching power:	2500 VA / AC1, 240 W / DC
Output indication:	red LED
Other information	
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)
Storing temperature:	-30°C to +70 °C (-22 °F to158°F)
Electrical strengh:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP40 from front panel / IP10 terminals
Overvoltage cathegory:	III.
Pollution level:	2
Max. cable size (mm²):	max. 2x2.5, max. 1x4/ with sleeve max. 1x2.5, max. 2x1.5 (AWG 12)
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)
Weight:	64 g (2.26 oz.)
Standards:	EN 60255-6, EN 61010-1

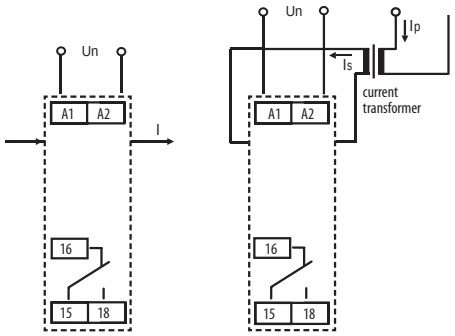
Device describtion



Symbol

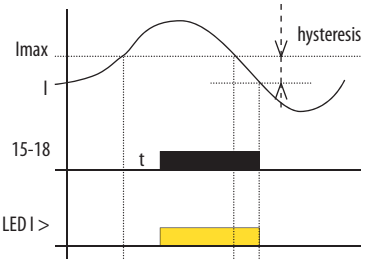


Connection



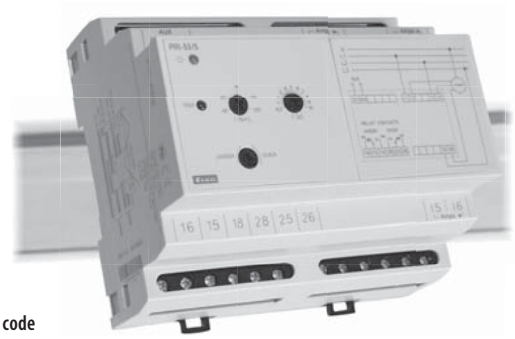
Connection example: PRI-52 with current transformer for increasing of current range.

Functions



Monitoring relay PRI-52 serves for monitoring of current level in 1-phase AC circuits. Slight setting of release current level designates this relay for many various applications. Output relay is in normal status switched off. When set current level is overrun, relay get closed after preset delay. By return from error to normal status is used hysteresis.
PRI-52 range is possible to increase with external current transformer.
Adventage of PRI-52 is that the hole for threaded conductor is located under the level of covering in the switchboard – thanks that, threaded conductor is not accessible for unwanted manipulation.

6M



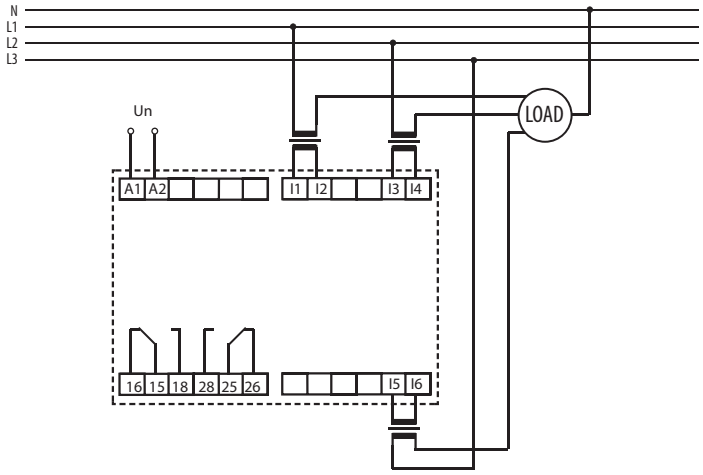
EAN code
PRI-53/1 8595188142137
PRI-53/5 8595188142144

- 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

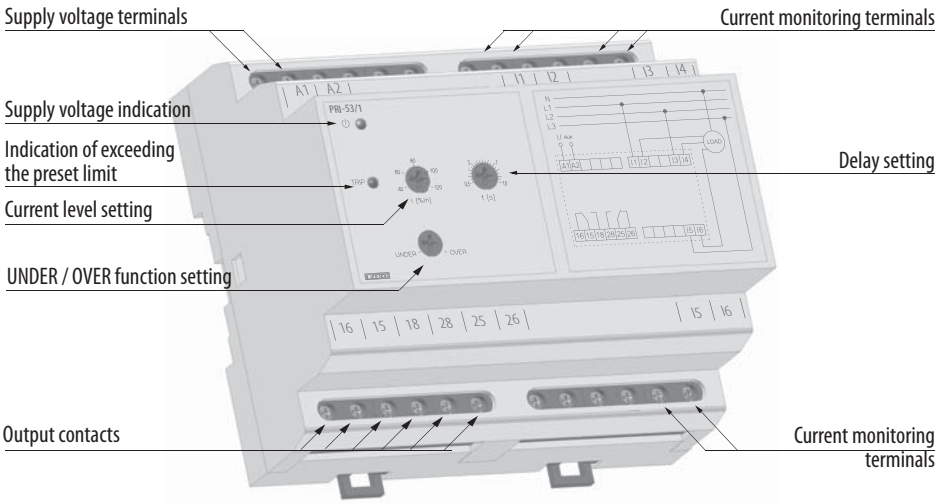
Technical parameters	PRI-53/1	PRI-53/5
Supply terminals:	A1, A2	
Current monitoring terminals:		
1st phase:	I1, I2	
2nd phase:	I3, I4	
3rd phase:	I5, I6	
Supply voltage:	24 - 240V AC/DC	
Tolerance of voltage range:	± 10%	
Operating AC frequency:	45 - 65 Hz	
Burden: (max):	3VA / 1.2W	
Rated current In:	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 / DPDT (AgNi) gilded	
AC contact capacity:	250V / 8 A, max. 2000VA	
DC contact capacity:	30V / 8A	
Mechanical life:	$3x10^6$ at rated load	
Other information		
Operating temperature:	-20.. +55 °C	
Storing temperature:	-30.. +70 °C	
Electrical strengh		
(power supply – relay contact):	4 kV / 1 min.	
Overvoltage cathegory:	III.	
Pollution level:	2	
Protection degree:	IP 40 from font panel / IP 20 terminal	
Max. cable size (mm^2):	max 2 x 1.5mm^2 / 1 x 2.5mm^2	
Dimensions:	90 x 105 x 64 mm	
Weight:	208 g	208 g
Standards:	EN 60255-6, EN 60255-27, EN 61000-6-2, EN 61000-6-4	

Connection

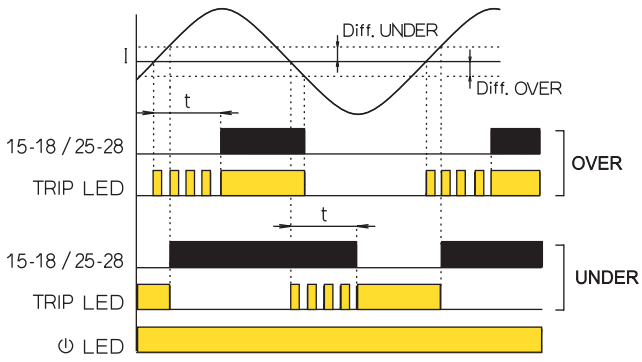
Example of connection: PRI - 53 with a current conversion transformer for increasing the current range.



Device describtion



Functions



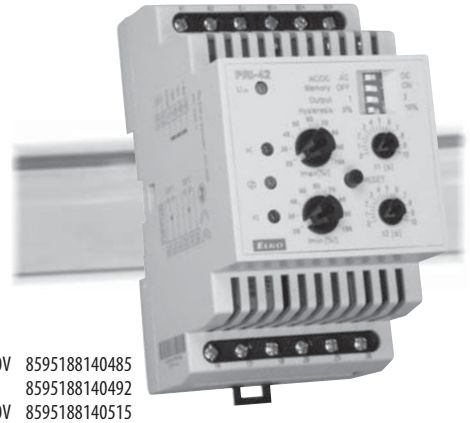
After the supply voltage is connected the green LED is on.

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.

3M



EAN code

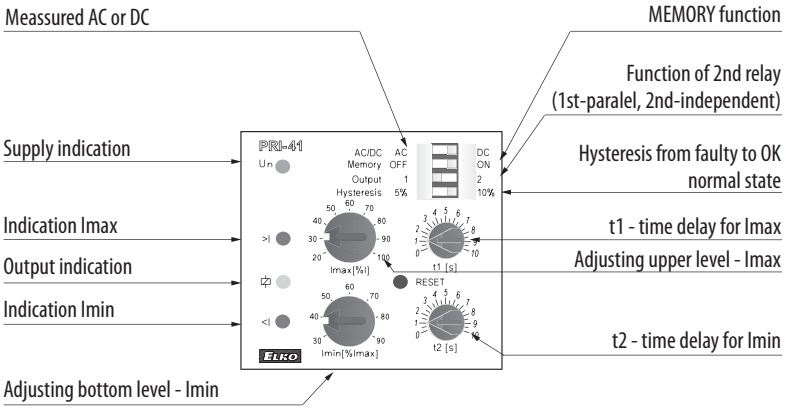
PRI-41 /230V	8595188140485
PRI-41/24V	8595188140492
PRI-42 /230V	8595188140515
PRI-42 /24V	8595188140522

- To monitor overloading / discharge (machine, motor...), load sensing, diagnostics of remote device (interrunption, 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
- Output contact: 1x changeover/ SPDT 16 A / 250 V AC1 for each current level
- 3-MODULE, DIN rail mounting

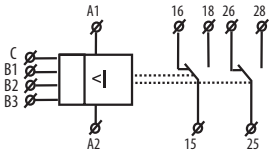
Technical parameters

	PRI-41		PRI-42
Supply circuit			
Supply terminals:	A1 - A2		
Voltage range:	AC 230 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 (AC50Hz)	1.25 - 5 A (AC50Hz)	0.4 - 1.6 A (AC50Hz)
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 % / °C		
Limit values tolerance:	5 %		
Hysteresis (fault to OK):	selectable 5 % / 10 %		
Output			
Number of contacts:	changeover/ SPDT (AgNi / Silver Alloy)		
Current rating:	16 A / AC1		
Breaking capacity:	4000 VA / AC1, 384 W / DC		
Inrush current:	30 A / < 3 s		
Switching voltage:	250 V AC1 / 24 V DC		
Min. breaking capacity DC:	500 mW		
Output indication:	yellow LED		
Mechanical life:	$3x10^7$		
Electrical life (AC1):	$0.7x10^5$		
Other information			
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)		
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)		
Electrical strength:	4 kV (supply - output)		
Operating position:	any		
Mounting:	DIN rail EN 60715		
Protection degree:	IP 40 from front panel / IP20 terminals		
Overvoltage cathegory:	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)		
Dimensions:	90 x 52 x 65 mm (3.5˝ x 2˝ x 2.6˝)		
Weight:	239 g (8.4 oz.)		
Standards:	EN 60255-6, EN 61010-1		

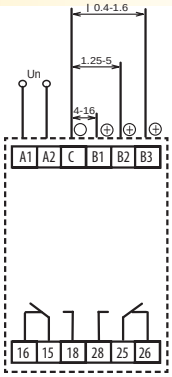
Description



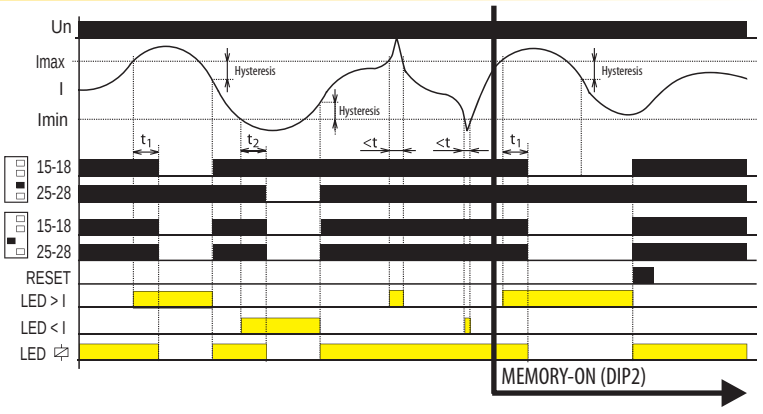
Symbol



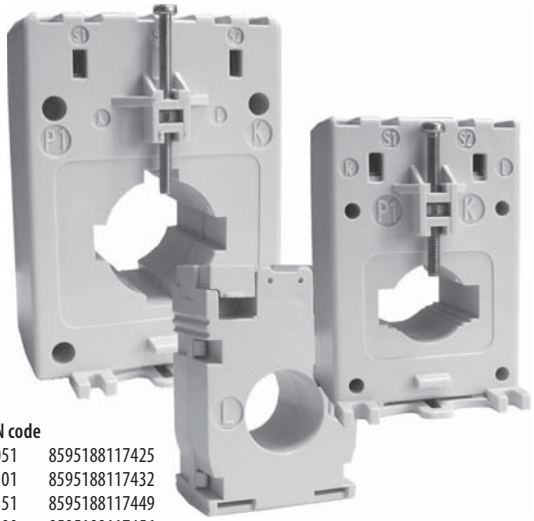
Connection



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).



EAN code

SR051	8595188117425
SR101	8595188117432
SR151	8595188117449
SR200	8595188117456
SR250	8595188117463
SR300	8595188117470
SR400	8595188117487
SR600	8595188117494

- Accessory to monitoring relay PRI series, for extension of max. controlled current max. cable 35 mm (1 ″)
- Max. cable size:
  - solid conductor: max. 6 mm^2
  - wire max. 4 mm^2
- Bus-bar to max. dimension 40x10 mm (2 ″ x 0.4 ″)
- Frenquency: 50 - 60 Hz
- Constant overload capacity: 1.2 x In
- Output current: 0 - 5 A
- 1-phase, DIN rail or panel mounting

Technical parameters	SR051	SR101	SR151	SR200	SR250	SR300	SR400	SR600
Max. wire diameter:	∅ 22	∅ 22	∅ 22	∅ 23	∅ 23	∅ 35	∅ 35	∅ 35
Max. bus-bar profi le:	—	—	—	30x10	30x10	40x10	40x10	40x10
Primary current (A):	50	100	150	200	250	300	400	600
	Rated capacity (VA):			Rated capacity (VA):		Rated capacity (VA):		
Accuracy class:								
0.5	—	2	3	4	6	4	8	12
1	1.25	2.5	4	7	9	8	12	15
3	1.5	3.5	5	8.5	11	12	15	15
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)			-20 °C to +55 °C (-4 °F to 131 °F)		-20 °C to +55 °C (-4 °F to 131 °F)		
Storage temperature:	-30 °C to +70 °C (-22 °F to +158 °F)			-30 °C to +70 °C (-22 °F to +158 °F)		-30 °C to +70 °C (-22 °F to +158 °F)		

1M

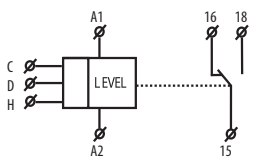
EAN code
HRH-5 /UNI 8595188136396

- 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
- Output contact 1xchangeover/SPDT 8A/250V AC1
- In 1-module type, mounting onto a DIN rail

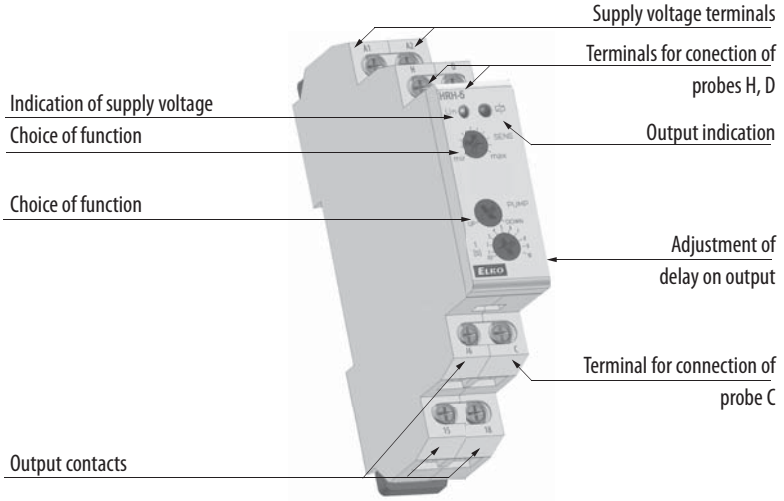
Technical parameters

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
Voltage n 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:	8 A / AC1
Switching voltage:	2500 VA , 240 W
Switched voltage:	250 V AC1 / 24 V DC
Min. switched output DC:	500 mW
Mechanical life (AC1):	$1x10^7$
Electrical life:	$1x10^5$
Other information	
Operational temperature:	-20 °C to +55 °C (-4 °F to 131 °F)
Storing temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
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:	III.
Pollution degree:	2
Profile of connecting wires (mm^2):	AWG 10 (2.5 mm2)
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)
Weight:	72 g (2.5 oz.)
Standards:	EN 60255-6, EN 61010-1
Recommended measuring probes:	pg. 83

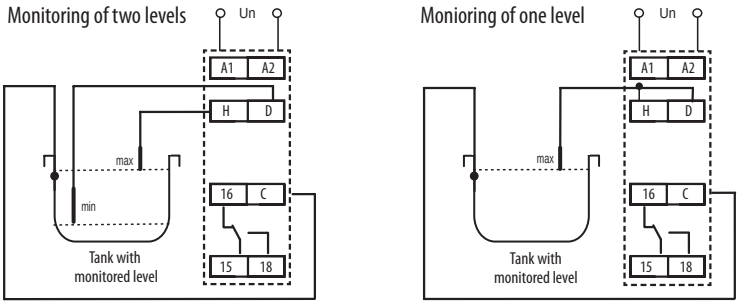
Symbol



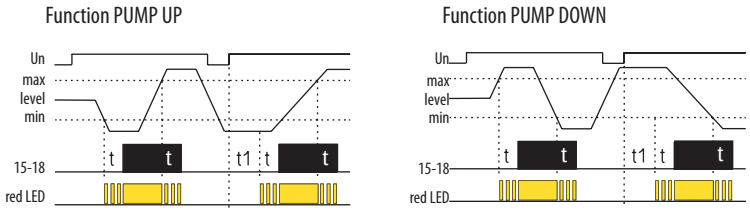
Device description



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 liguid (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.

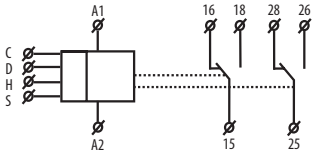
3M

EAN code
HRH-1 /230V 8594030337783
HRH-1 /24V 8594030338209

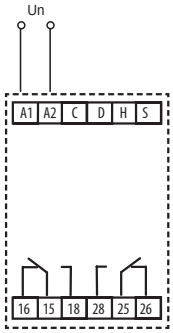
- Used to check the level in wells, reservoirs, tanks, pools, tankers, containers, etc.
- Within the framework of a single device, the following configurations can be selected (see functions graph):
  - two separate level switches
  - two probes in one tank
  - filling tank from well
- Single-state monitors 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 230 V, AC/DC 24 V or AC 110 V
- Output contact 2x switches 16 A / 250 V AC1
- In 3-MODULE design, fixing to DIN rail

Technical parameters	HRH-1
Function:	3
Supply terminals:	A1 - A2
Voltage range:	AC 230V, AC/DC 24V (galvanicaly separated)
Burden:	or AC 110V(AC 50-60Hz)
Operating range:	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/ DPDT (AgNi / Silver Alloy)
Current rating:	16 A / AC1
Breaking capacity:	4000 VA / AC1, 384 W / DC
Inrush current:	30 A / < 3 s
Switching voltage:	250 V AC1 / 24 V DC
Min. breaking capacity DC:	500 mW
Mechanical life:	$3x10^7$
Electrical life (AC1):	$0.7x10^5$
Other information	
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
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 cathegory:	III.
Pollution degree:	2
Max. cable size (mm^2):	solid wire max.1x 2.5 or 2x1.5/ with cavern max. 1x1.5
Dimensions:	90 x 52 x 65 mm (3.5″ x 2″ x 2.6″)
Weight:	240 g (8 oz.)
Standards:	EN 60255-6, EN 61010-1
Measuring sensors:	pg. 83

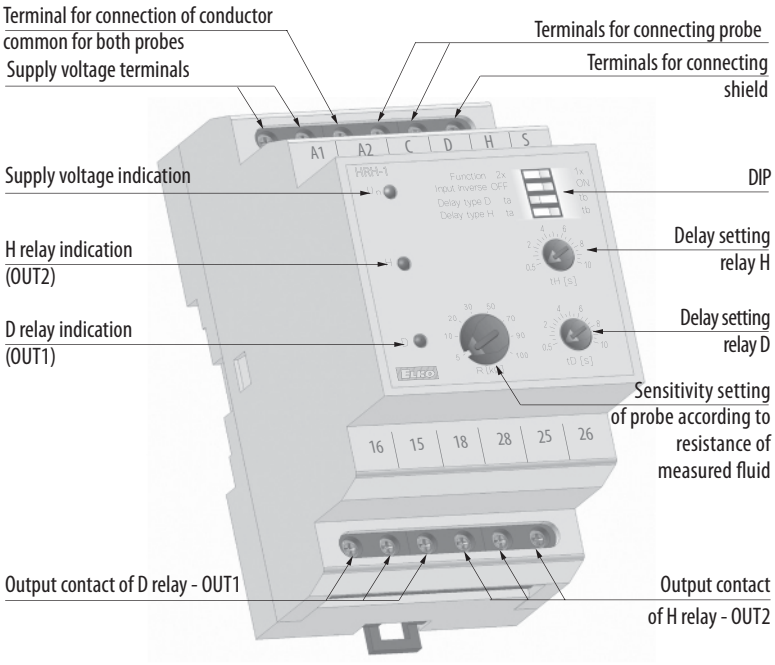
Symbol



Connection



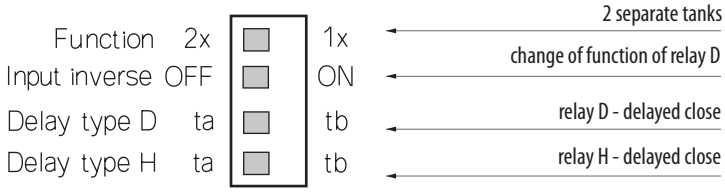
Description



Measuring probes

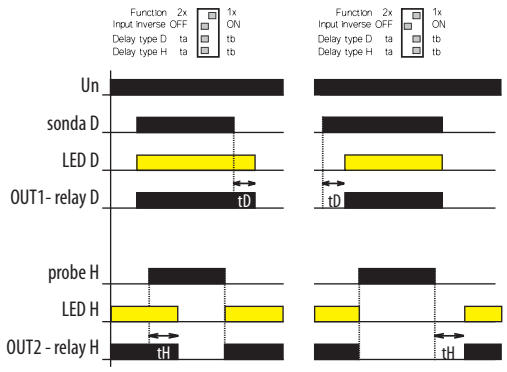
There can be any measuring probe (any conductive contact, it is recommended to use brass or stainless steel).
The probe wire does not need to be shielded, but it is recommended. When using a shielded wire, the shielding is connected to terminal S.

Description and importance of DIP switches

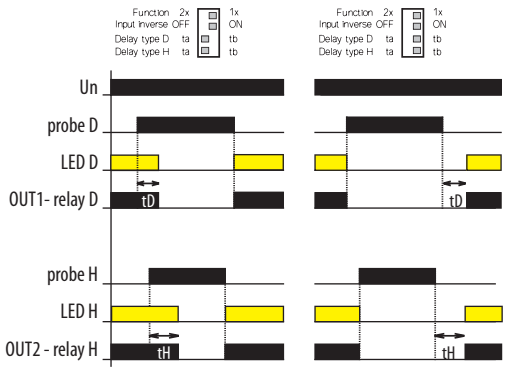


Functions

Two separate level switches

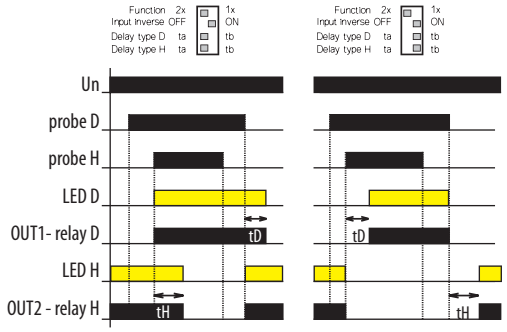


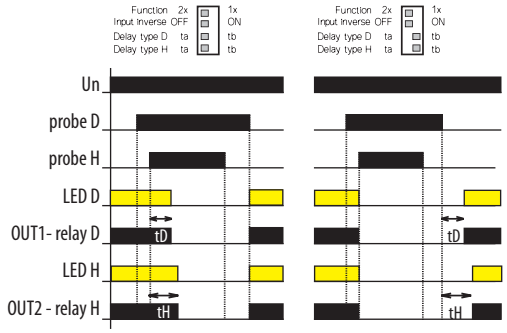
When the tank is empty relay D open, relay H is closed



When the tank is empty both relays are switched

Two probes in single tank

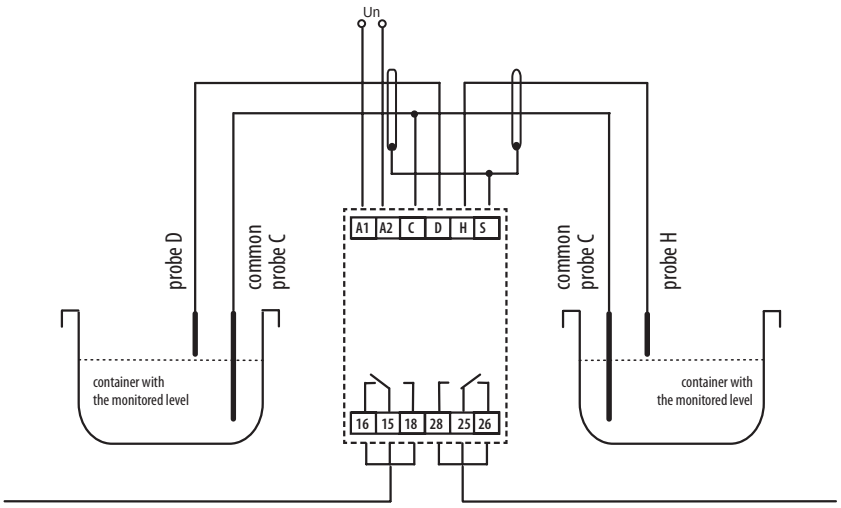




The relay, which is used to control the level liquids conductive (water, chemical solutions, food, etc.).
In this principle, it goes on about the measurement of liquids by measuring probes. As the measuring used signal is 5V AC/ 500Hz. Using an AC signal prevents the the increasing oxidation of probes 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:

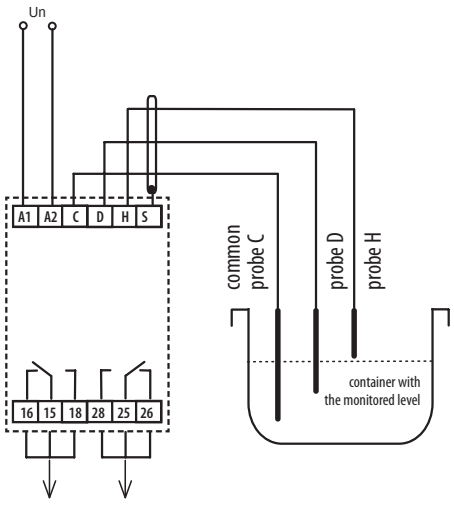
For controlling two independent tanks



Pump control or other output device

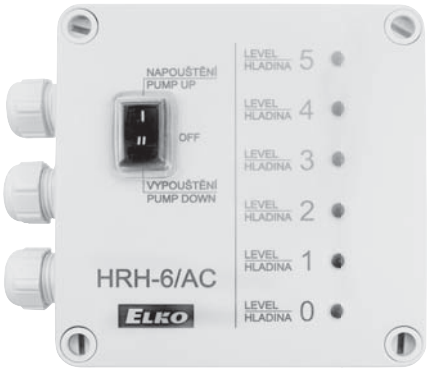
Pump control or other output device

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.



EAN code

HRH-6 /AC	8595188136990
HRH-6 /DC	8595188137409
HRH-6S	8595188137416

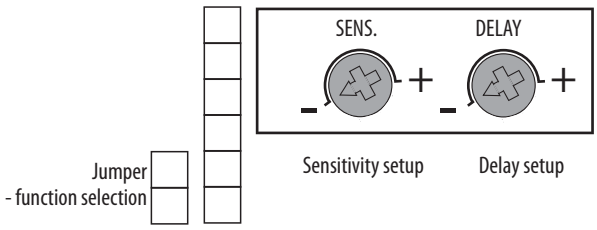
- Function 1 is monitoring minimal and maximal level depth, for example in fire engine cars, tanks etc.
- Function 2 is monitoring level depth in water collectors, basins, pools ec.
- Selection of particular function is made by jumper on the front panel
- Level depth is indicated on the panel of device by LED
- Device monitors 5 levels by using six probes (one probe is common)
- Common probe can be replaced by a metal (conductive) tank
- Level indicationby six LED's on the front panel of the device
- It is possible to connect another indication module (e.g. in fire-engine cabin)
- Adjustable sensitivity according to liquid conductvity
- Adjustable time delay - elimination of level movement, e.g. while a tank is being filled up
- Measuring frequency 10 Hz to prevent polarization of liquid
- Supply voltage 12.... 24 V DC (to be used in fire-engines) or galvanically separated 230 VAC for general use
- Contact relay 10A for signalization of full/empty tank (according to a chosen function)
- Choice of functions PUMP UP/OFF/PUMP DOWN by a switch located on the front panel of the device
- Protection degree IP65

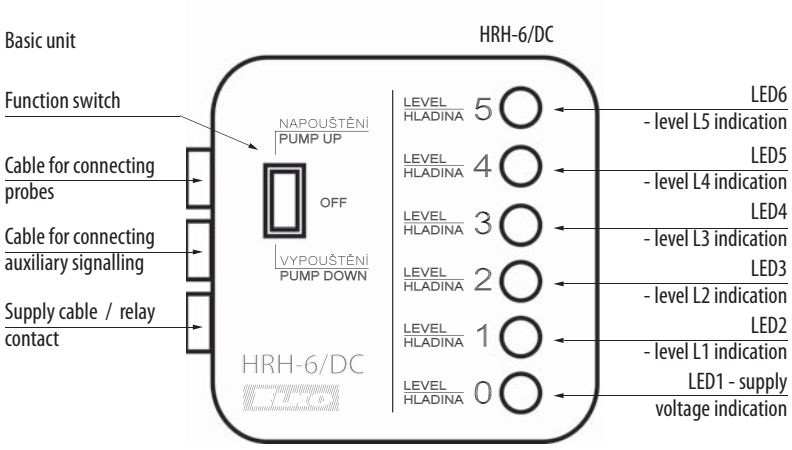
Technical parameters	HRH-6 / DC	HRH-6 / AC
Function:	2	
Voltage range:	12..24V DC	230V AC/50-60Hz
Burden:	max. 1.8 W	max.3.8 VA
Supply tolerance:	+/- 20%	-20 %; +10 %
Measuring circuit		
Sensitivityan adjustable range*:	min. 10...20kΩ max. 100...150kΩ	
Voltage on probes:	max. 3V AC	
Probe cable maximum capacity:	500nF (for min. sensitivity), 50nF (for maximum sensitivity)	
Time delay:	adjustable 1...10s	
Output	6xLED (1x red, 1x yellow, 4x green)	
Number of contacts:	1x NO-SPST (AgNi/ Silver Alloy)	
Current rating:	10A / AC1	
Switching voltage:	2500 VA / AC1, 200 W / DC	
Peak current:	16 A / < 3s	
Switching voltage:	250V AC1 / 24V DC	
Min. switching capacity DC:	500 mW	
Mechanical life (AC1):	$3x10^7$	
Electrical life:	$0.7x10^5$	
Other information		
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)	
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)	
El. strength (supply – probes):	x	3.75 kV
Operating position:	any	
Protection degree:	IP 65	
Overvoltage cathegory:	x	III.
Pollution degree:	2	
Dimensions:	110x135x72 mm (4.3˝ x 5.3˝ x 2.8˝)	
Weight:	384 g (13.55 oz.)	284 g (13.55 oz.)
Standards:	EN 60255-6, EN 61010-1	
Recommended measuring probe:	pg.83	

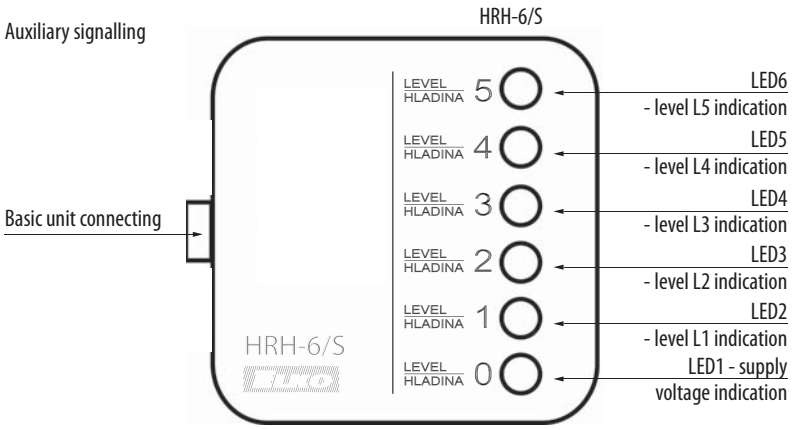
* Note: product is in a state of prototype, may be a subject of alternations .

Description of function:

Connection of HRH-6 in a block

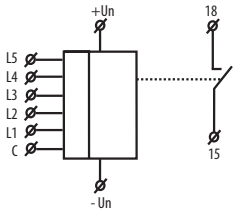




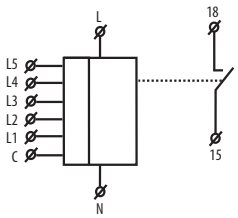


Connection

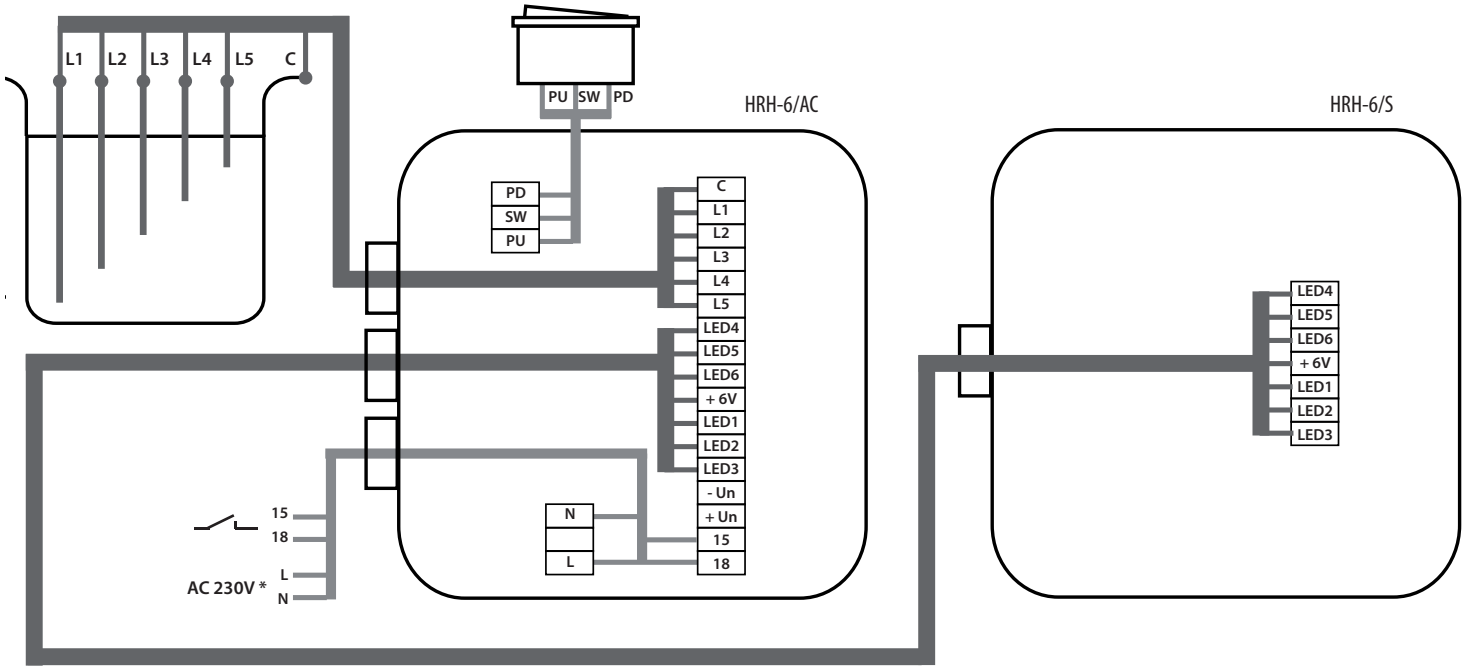
HRH-6/DC



HRH-6/AC

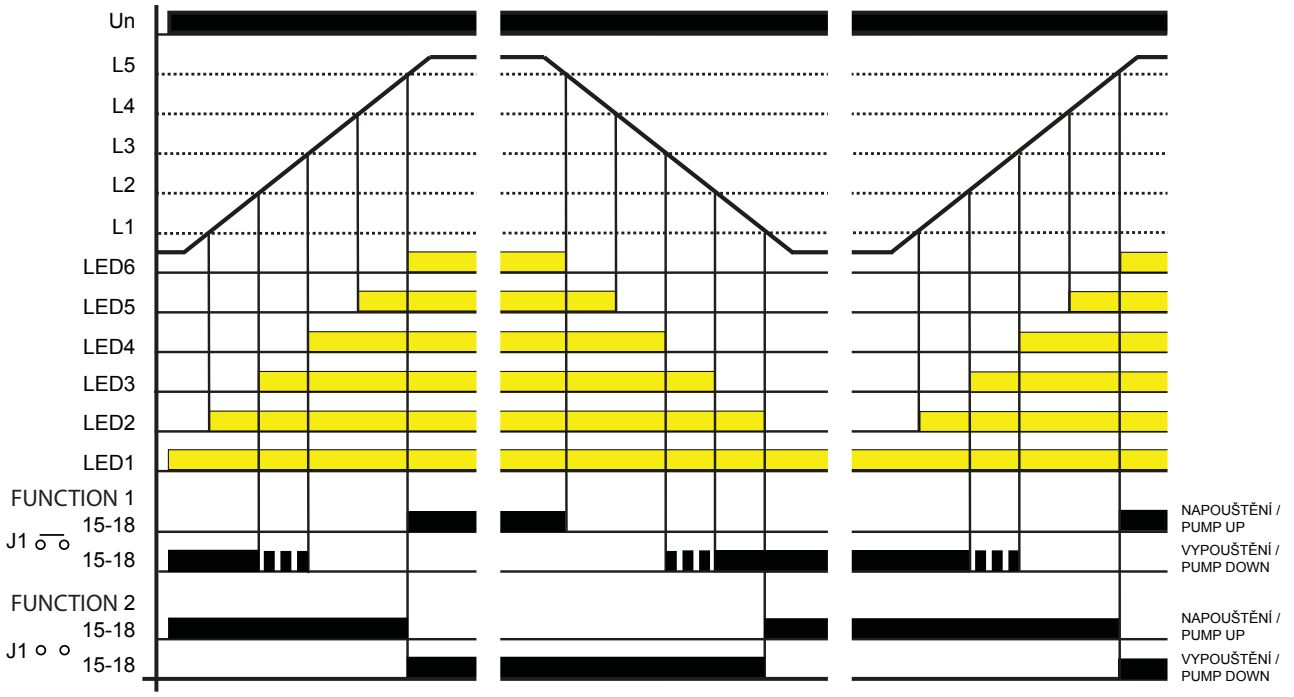


HRH-6 block connecting



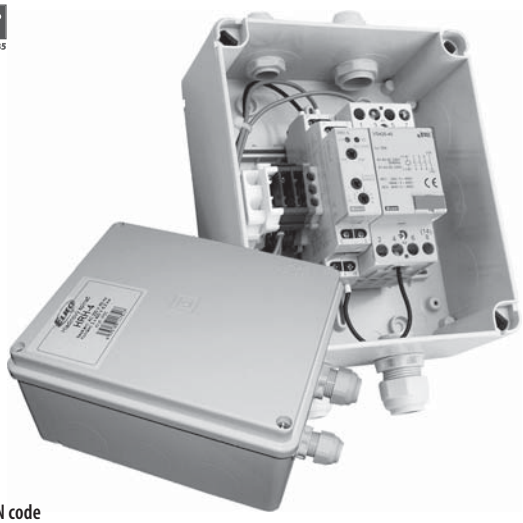
*By HRH-6/DC, incoming supply is connected on terminals +Un and - Un.

Functions



This device monitors level of a conuctive liquid in a tank by using six single probes or one 6-fold probe. In case you use a tank made of a conductive material, it is possible to use it as a common probe C. This common probe is connected to a pole of supply (for fire-engines it means its body) in case of supply voltage 12...24VDC.
In case of supply voltage 230VAC, the circuits are galvanically separated from the main.
The device is controlled by a three-position switch PUMP UP/OFF/ PUMP DOWN. After switching into a position PUMP UP or PUMP DOWN, red LED1 shines and then also LED2...LED6 according to liquid level. Output relay has 2 selectable functions.
Funtion setting is done by a jumper on basic board of HRH-6.
Function 1: (for use in fire-engines) - jumper is applied. In case of function PUMP UP and level reaching L5, the relay controlling e.g. acustic signalization, permanently closes and indicated full tank. In case of PUMP DOWN function and level dropunder level L3, relay priodically switches and under L2 it switches permanently (indicates almost empty tank).
Function 2: (for keeping liquid level) - jumper is not applied. In case of PUMP UP, sensor is switched until liquid reaches level L5. Then relay opens and switches again in case the lliguid level falls under level L1. In case of PUMP DOWN - relay is switched until liquid falls under level L1. Then relay opens and switches again on level L5.
To eliminate LED flashing while level gurgle it is possible to delay reaction of probes (set delay 1..10s). According to conductivity of liquid it is possible to set sensitivity of probes (corresponding to "resistance" of liquid).

160x135
IP55



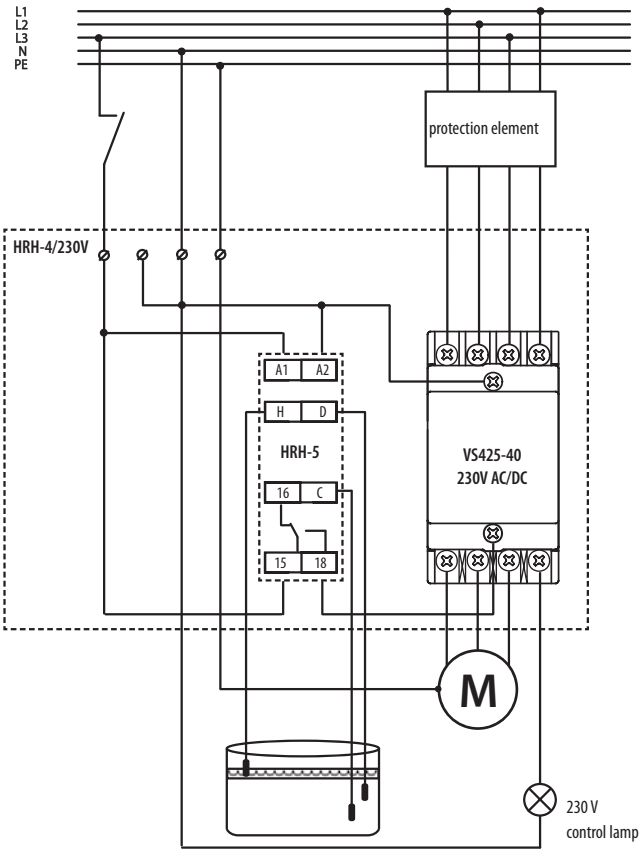
- In an easy way it automates operations of pumps depending on level
- Control of level in wells, tanks, reservoirs...
- It is delivered as a connected set – easy installation
- Possibility to monitor level of any type of conductive liquid
- It serves for an automatic operation in 1-phased and 3-phased pumps
- Set of level switch HRH-5 and a contactor VS425
- Function choice – pumping up or down
- Unit requires incoming over-current protection
- Protection degree of the set is IP55
- There is a possibility of 4 types of probes in a various design (they are not a part of this set, it is possible to deliver)
- Unit is placed in a plastic box with dimensions 160x135x83mm

EAN code

HRH-4 /230V	8595188117517
HRH-4 /24V	8595188117500

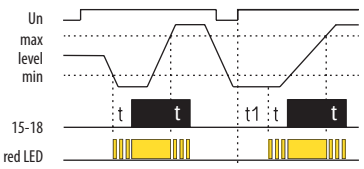
Technical parameters	HRH-4
Function:	2
Voltage range:	AC/DC 230 V or AC/DC 24 V (AC 50 - 60 Hz)
Burden:	7 VA
Operating range:	-15 %; +10 %
Measuring circuit	
Sensitivity (input resistance):	adjustable in range 5 kΩ -100 kΩ
Voltage n electrodes:	max. AC 3.5 V
Current on probes:	AC <0.1 mA
Time response:	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 (mech):	± 5 %
Output	
Number of contacts:	4x switching
Rated thermal current:	25 A
Loading in AC3:	5.5 kW / 400 V
Mechanical life:	$3x10^6$
Other information	
Operation temperature:	-20 °C to +55 °C (-4 °F to 131 °F)
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
Electrical strength (supply-output):	4 kV, galvanically insulated
Operating position:	any
Protection degree:	IP 55
Pollution degree:	2
Dimensions:	160 x 135 x 83 mm (6.3˝ x 5.3˝ x 3.3˝)
Weight:	834 g (29.4 oz.)
Standards:	EN 60255-6, EN 61010-1

Connection

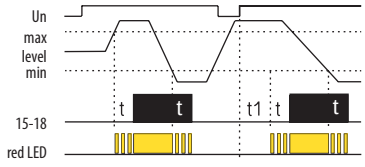


Function

Function PUMP UP



Function PUMP DOWN



Function description

1) PUMP UP - in case the level falls under a lower limit (sensor D), a relay switches and a pump pumps a liquid up until it reaches an upper limit (probe H), then a relay opens and a pump stops pumping. When a level reaches a lower limit again, all process is repeated.
   After the device is energized, relay automatically closes and a pump pumps liquid to upper limit.
2) PUMP DOWN - in case a level reaches over an upper limit, a relay closes and a pump pumps liquid down. In case a level reaches a lower limit, a relay opens and a pump stops pumping.
   When energized, a relay is in an open state and a pump operates only after an upper limit is exceeded.
3) In case you combine inputs H and D and connect them to one probe, the device will keep only one level (upper and lower limit will become one).
   In function PUMP UP relay closes in case the level falls under a probe level. A pump pumps liquid up and in case the level reaches a probe level, a relay opens and a pump stops.
   The level is kept in a small range around the probe.
   In function PUMP DOWN relays closes in case a level reaches a probe level. A pump pumps down until the level reaches a probe, then relay opens and pump stops.

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 4 mm / 0.2" 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: 9.7 g (0.3 oz.)
- Operating temperature: -25 °C to +60 °C (-13 °F to 140 °F)
- Total sensor lenght: 65.5mm /2.58 "

EAN code

SHR-2	8595188111263
wire to SHR-2	8595188129770

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: +1 °C to +80 °C (33.8 °F to 176°F) 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 ÖLFLON FEP 1x1.0 BK
- 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: 48.6 g / 1.7 oz.
- Dimensions: max. diameter 21 mm/ 0.8", lenght 96 mm / 3.8"

SHR-2 in open state

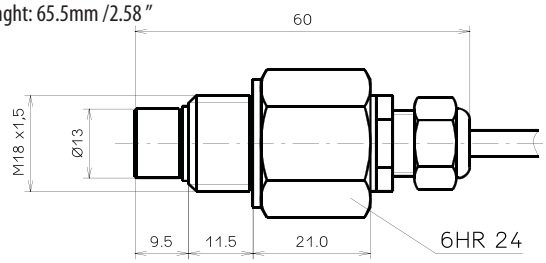
EAN code

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 24 mm (1") 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 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: 100 g (3.3 oz.)
- Operating surroundings: place without the danger of detonation , temperature on screw: max. 95°C / 203 °F
- Pressure immunity: on 25 °C / 77 °F 4 MPa, on 95°C / 203 °F 1.5 MPa
- Weight: 239 g (8.4 oz.)
- Material: bushing and sean electrode: stainless steel W.Nr. 1.4301, insulation insert of electrode: PTFE
- Internal material: self - extinguishing epoxide resin
- Operating temperature: -25 °C to +60 °C (-13 °F to 140 °F)
- Total sensor lenght: 65.5mm /2.58 "

Dimensions



3M

EAN code

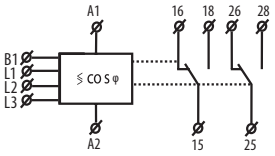
COS-1 /230V	8595188120906
COS-1 /110V	8595188120265
COS-1 /400V	8595188120272
COS-1 /24V	8594030338131

- Relay monitors phase shift between current and voltage - cos-φ in 3-phase and also 1-phase mains for monitoring overload/unloading of motors
- Supply set 3x400 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 AC 230 V, AC 400 V or AC/DC 24 V
- Output contact: 2x changeover/DPDT 16 A / 250 V AC1
- 3-MODULE, DIN rail mounting

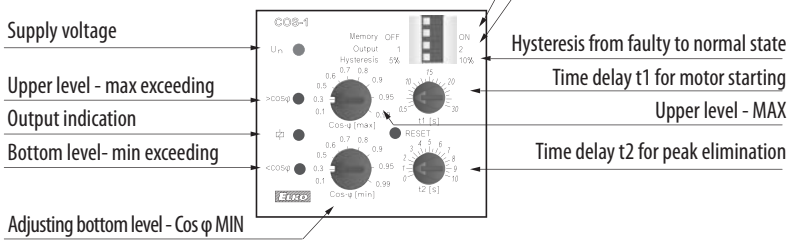
Technical parameters

Supply	
Supply terminals:	A1 - A2
Voltage range:	AC 230 V, AC 400 V or AC/DC 24 V (AC/50-60Hz)
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 % / °C
Limit values tolerance:	5 %
Output	
Number of contacts:	2x changeover/ DPDT (AgNi / Silver Alloy)
Current rating:	16 A / AC1
Breaking capacity:	4000 VA / AC1, 384 W / DC
Inrush current:	20 A / < 3 s
Switching voltage:	250 V AC1 / 24 V DC
Min. breaking capacity DC:	500 mW
Output indication:	yellow LED
Mechanical life:	$3x10^7$
Electrical life (AC1):	$0.7x10^5$
Other information	
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
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 cathegory:	III.
Pollution degree:	2
Max. cable size (mm^2):	max.1x 2.5, max.2x1.5/ with sleeve max. 1x1.5 (AWG 12)
Dimensions:	90 x 52 x 65 mm (3.5˝ x 2˝ x 2.6˝)
Weight:	240 g (8 oz.)
Standards:	EN 60255-6, EN 61010-1

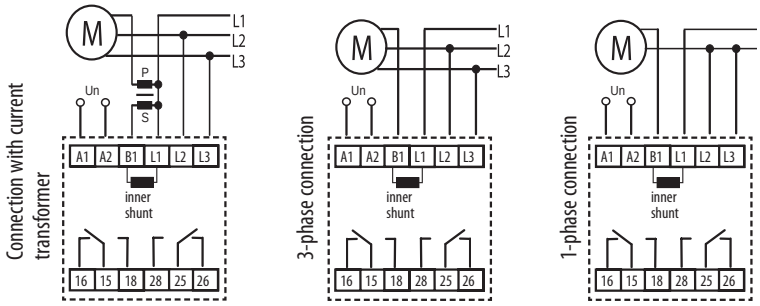
Symbol



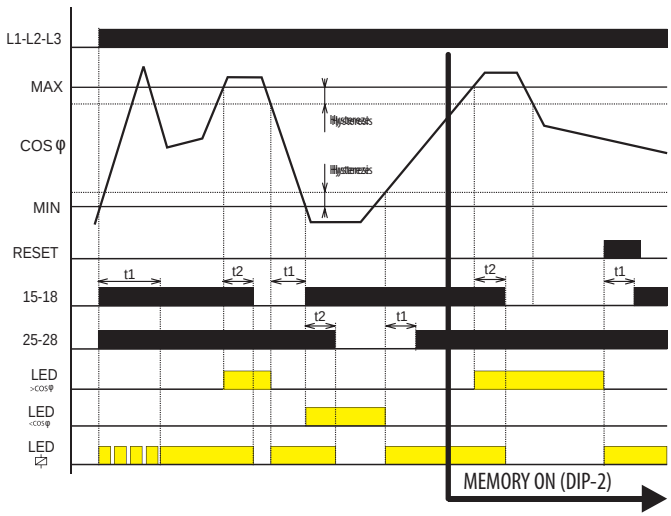
Description



Connection

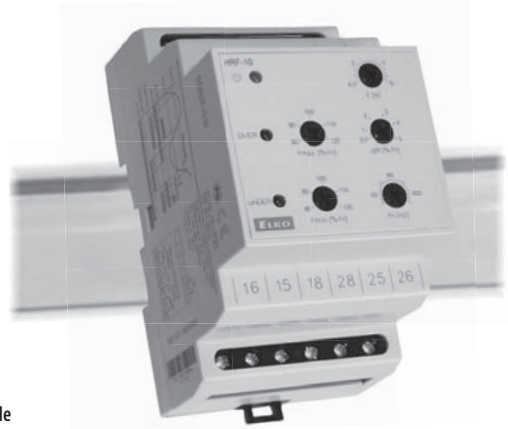


Function



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).

3M



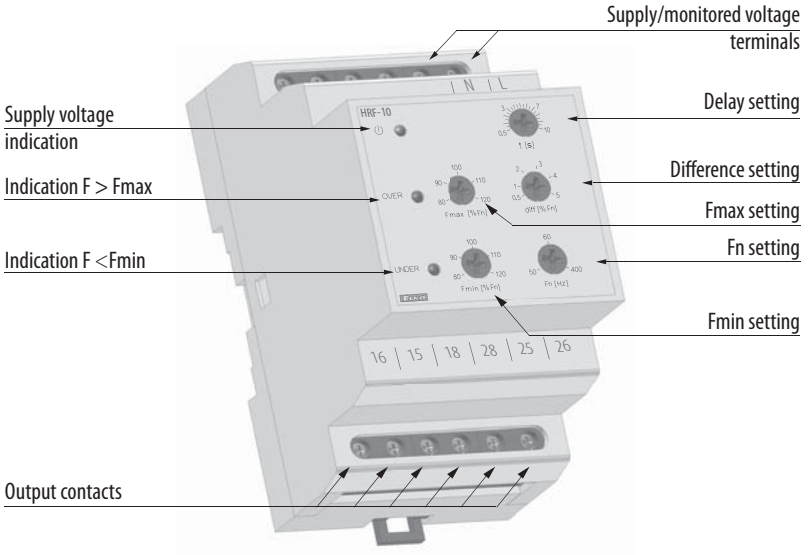
- The relay serves to monitor frequency of AC voltage, e.g. in photovoltaic power stations, generators

  The monitored frequency 50/60/400 Hz is selected by a switch
- Supply from monitored voltage
- Two adjustable levels of frequency (Fmin, Fmax) in the range of 80 - 120% Fn
- Adjustable difference level
- Adjustable delay level
- Switchable ranges of rated frequency Fn
- 3-MODULE, DIN rail mounting

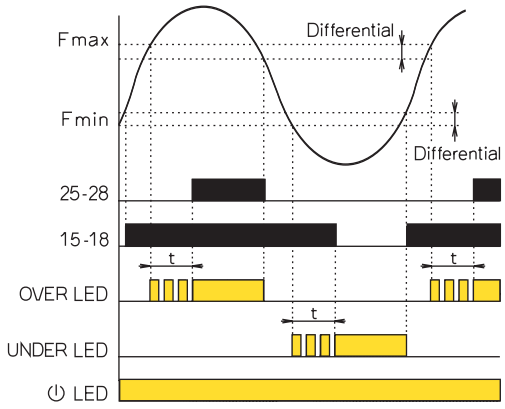
EAN code
HRF - 10 8595188144827

Technical parameters	HRF-10
Supply and monitoring terminals:	L, N
Supply voltage:	161 - 346V
Rated frequency Fn:	50 / 60 / 400 Hz
Burden: (max):	1.7VA / 1.1W
Overload capacity:	
- continuous:	346V
- max.10s:	416V
Frequency Fmax:	adjustable 80 - 120 %Fn
Frequency Fmin:	adjustable 80 - 120 % Fn
Difference:	adjustable 0.5 - 5 % Fn
Delay (until failure):	adjustable 0.5 - 10 s
Opening level (Uopen):	161V
Output relay - contact:	1x changeover/ SPDT (AgNi) gilded
AC contact capacity:	250V / 8 A, max. 2000VA
DC contact capacity:	30V / 8A
Mechanical life :	$3x10^6$ at rated load
Other information	
Operational temperature:	-20 °C to +55 °C (-4 °F to 131 °F)
Storing temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
Electrical strenght:	
(napájení - kontakt relé):	4 kV / 1 min.
Protection degree:	III.
Overvltage category:	2
Pollution degree:	IP 40 from font panel / IP 20 terminals
Profile of connecting wires (mm^2):	max. 2 x 1.5mm^2 / 1 x 2.5mm^2 (AWG 12)
Dimensions:	90 x 52 x 64 mm (3.5˝ x 2˝ x 2.6˝)
Weight:	125 g (4.4 oz.)
Standards:	EN 60255-6, EN 60255-27, EN 61000-6-2, EN 61000-6-4

Device description

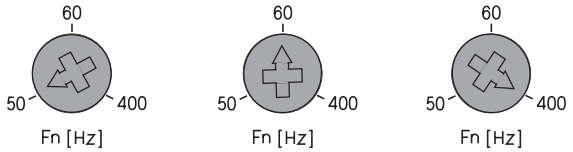


Functions

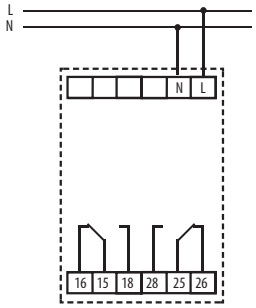


After the supply (monitored) voltage is connected the green LED is on.
If the value of the monitored frequency falls within the range between the two set levels Fmin - Fmax no red LED is on. The relay UNDER is triggered (contacts 15-16-18) and the relay OVER is disconnected (contacts 25-26-28).
If the monitored frequency exceeds the set level Fmax, the relay OVER is triggered after the set delay timing elapses and the red LED OVER goes on. The red LED flashes during the timing.
If the monitored frequency drops below Fmax - difference, the relay is activated without delay and the red LED OVER goes off.
If the monitored frequency drops below the set level Fmin, the relay UNDER is disconnected after the set delay timing elapses and the red LED UNDER goes on. The red LED flashes during the timing. If the monitored frequency exceeds the level Fmin + the difference, the relay is triggered without delay and the red LED UNDER goes off.
If the monitored voltage is lower than the opening level Uopen both the relays are disconnected and both the red LED (UNDER and OVER) start flashing slowly - indicating insufficient supply voltage.

Rated frequency setting



Connection

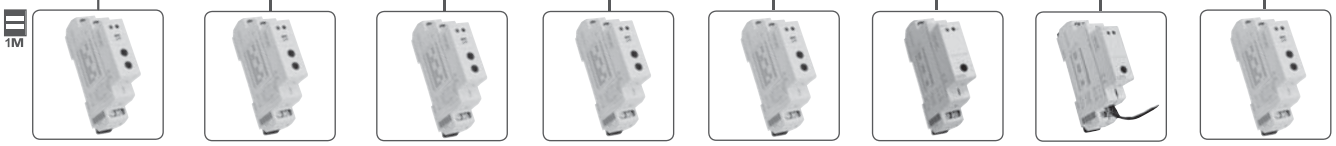


Thermostats and hygrostats

Analog

TER

single thermostats



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

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

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

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

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

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

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

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

TER-4
Wide and accurate range of setting -40 °C to +110 °C
(-40 °F to 230 °F) in ten ranges
in one device, fine temperature setting.
2 inputs for NTC senzor, 2 outputs 16 A changeover/ SPDT, additional function
(memory, hysteresis, indication of faulty sensor).
Supply: AC 230 V or AC/DC 24 V (galv. separated).

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 2x8A changeover/ SPDT,
supply: AC/ DC 24-240 V.

Thermo

ATR
Analog room thermostat with temperature range +5 to +40° C
(+41 °F to +104 °F)
night decline, flush mounted in to wiring box.

ATF
Analog floor thermostat with temperature range +5 to +50 °C
(+41 °F to +122 °F)
„temporary temperature change" in range ±10 °C/ 50 °F.

ATC
Combined thermostat with room and floor sensor, temperature range +5 to +50 °C
(+41 °F to +122 °F).

TEV

TEV-1
Thermostat with „dead zone", independent adjustable range -20 to+20 °C (-4 °F to +68 °F), protection against freezing, water--proof type IP65.

TEV-2
Thermostat for regulation of heating (cooling), adjustable range -20 to+20 °C (-4 °F to +68 °F), externí sensor NTC, external sensor NTC, output contact 16A changeover/SPDT.

TEV-3
Thermostat for regulation of heating (cooling), adjustable range +5 to +35 °C (41°F to 149 °F), external sensor NTC, output contact 16 A, control potentio-meter and indication on panel.

TEV-4
Single exteriors thermostat for monitoring and regulation of temperature in demanding enviroments (humid and contaminated, agressive and defective, industrial workshops, washing rooms, green-houses, cellars and cooling boxes…)
Temperature range:
-30 °C to +60 °C/
-30 °C to 140 °F

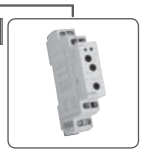
Digital

TER

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

Hygro-thermostat

Hygrostat



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

RHV-1
Hygro-thermostat for humidity monitoring and regulation in range 0.. 90 % RH

Thermo

DTR
Digital room thermostat with temperature range +5 to +50 °C
(+41 °F to +122 °F)
with in-built
(internal) sensor.
Intelligent regulation.

DTF
Digital floor thermostat with temperature range +5 ..+50 °C
with external sensor,
16 A potential-free contact.

DTC
Digital combined thermostat with room and floor sensor with temperature range +5 to +50 °C
(+41 °F to +122 °F),
pre-programmed programs

ATV-1
Energy-saving digital thermostat for radiators, with temperature range +8..+28°C.

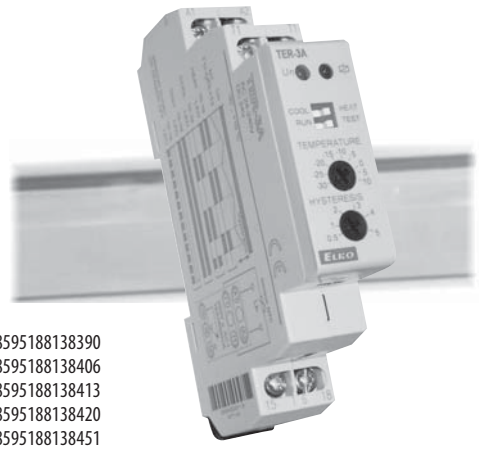
Accessories to thermostats:

TC, TZ , PT-100
- external temperature sensors for thermostats in lengths 3m, 6m,12m
-TC/TZ: thermistor NTC 12 kΩ/ 25 °C
PT: element PT-100 (only TER-3G)

LKM-45
Wiring box for thermostat mounting on a surface.

Type	DESIGN	Type		Sensor			Supply				Temperature range	Hysteresis	Relative humidity	Designation	
		Analog	Digital	In-built	External	Type	AC 230V	AC 24V	AC/DC 24 ..240V	Galv. separated					
TER-3A	1M-DIN	●			●	NTC			●		-30 °C to +10 °C (-22 °F to 50 °F)	0.5 - 5 °C (32.9 °F to 41 °F)		single thermostat into a switchboard with external sensor for temperature in cooling and against freezing	88
TER-3B	1M-DIN	●			●	NTC			●		0 °C to +40 °C (32 °F to 104 °F)	0.5 - 5 °C (32.9 °F to 41 °F)		single thermostat into a switchboards with external sensor for sensing room and operational temperature	88
TER-3C	1M-DIN	●			●	NTC			●		+30 °C to +70 °C (86 °F to 158 °F)	0.5 - 5 °C (32.9 °F to 41 °F)		single thermostat into a switchboards with external sensor for sensing temperature in devices (overheating...)	88
TER-3D	1M-DIN	●			●	NTC			●		0 °C to +60 °C (32 °F to 140 °F)	0.5 - 5 °C (32.9 °F to 41 °F)		single thermostat into a switchboard with external sensor for sensing operational temperature of machines and devices	88
TER-3E	1M-DIN	●			●	NTC			●		0 °C to +60 °C (32 °F to 140 °F)	1 °C (34 °F)		as TER-3D but with fixed hysteresis	88
TER-3F	1M-DIN	●		●		NTC			●		-15 °C to +45 °C (5 °F to 113 °F)	1 °C/ 34 °F		single thermostat into a switchboard with in-built sensor, monitors operational temperature in a switchboard	88
TER-3G	1M-DIN	●			●	PT100			●		0 °C to +60 °C (32 °F to 140 °F)	0.5 - 5 °C (32.9 °F to 41 °F)		as TER-3D but with input for sensor PT100	89
TER-3H	1M-DIN	●			●	NTC			●		-15 °C to +45 °C (5 °F to 113 °F)	0.5 - 5 °C (32.9 °F to 41 °F)		as TER-3A but with a different temperature range - for cooling and heating	89
TER-4	3M-DIN	●			● (2x)	NTC	●	●		●	-40 °C to +110 °C (-40 °F to 230 °F)	0.5 - 2.5 °C (32.9 °F to 37 °F)		two-state thermostat (2 inputs, 2 outputs), two independent or dependent thermostats, accurate setting, wide temperature range	90
TER-7	1M-DIN	●			●	PTC			●		x	Resistance 1.8-3.3 kΩ		thermistor relay for protection of motor overheating, input designated for sensor PTC in-built in motor winding	91
TER-9	2M-DIN		●		● (2x)	NTC	●	●		●	-40 °C to +110 °C (-40 °F to 230 °F)	0.5 - 5 °C (32.9 °F to 41 °F)		multifunction(6thermo functions) digital thermostat with in-built time switch clock, 2 inputs/2 outputs	92
TEV-1	IP65 box	●			●	INTC	●				-20 to +20 °C (-4 °F to +68 °F)	1.5 °C (35 °F)		thermostat with "dead zone", control of heating and protection against freezing, box for outdoor use with	98
TEV-2	IP65 box	●			●	NTC	●				-20 to +20 °C (-4 °F to +68 °F)	1.5 °C(35 °F)		single thermostat for regulation of heating, short sensor is a part of this device, protection degree IP65	97
TEV-3	IP65 box	●			●	NTC	●				+5 to +35 °C (41°F to 149 °F)	1.5 °C(35 °F)		as TEV-2 but potentiometer and indication are placed on front panel	97
TEV-4	IP65 box				●	NTC	●				-30 °C to +65 °C (-22 °F to 149 °F)	0.5 / 1.5 / 4 °C 32.9/ 35/39 °F		single exteriors thermostat for monitoring and regulation of temperature in demanding enviroments	99
ATR	ELEGANT	●		●		NTC	●				+5 to +40 °C (+41 °F to +104 °F)	1 °C (34 °F)		room analog thermostat line THERMO for mounting into a wiring box	94
ATF	ELEGANT	●			●	NTC	●				+5 to +50 °C (+41 °F to +122 °F)	1 °C (34 °F)		floor analog thermostat line THERMO for mounting into a wiring box	94
ATC	ELEGANT	●		●	●	NTC	●				+5 to +50 °C (+41 °F to +122 °F)	1 °C (34 °F)		room and floor (combined) analog thermostat line THERMO for mounting into a wiring box	94
DTR	ELEGANT		●	●		NTC	●				+5 to +50 °C (+41 °F to +122 °F)	0.5 -1°C (32.9 °F to 34 °F)		room digital thermostat line THERMO for mounting into a wiring box	95
DTF	ELEGANT		●		●	NTC	●				+5 to +50 °C (+41 °F to +122 °F)	0.5 -1 °C (32.9 °F to 34 °F)		floor digital thermostat line THERMO for mounting into a wiring box	95
DTC	ELEGANT		●	●	●	NTC	●				+5 to +50 °C (+41 °F to +122 °F)	0.5 -1 °C (32.9 °F to 34 °F)		room and floor (combined) digital thermostat line THERMO for mounting into a wiring box	95
RHT-1	1M-DIN	●		●		built -in			●		0 to +60 °C (32 °F to 140 °F)	H - 4 % T- 2.5 °C	H - 4 % T- 2.5 °C(36.5 °F)	hygro-thermostat for temperature monitoring and regulation in range 0 °C to +60 °C (32 °F to 140 °F) and relative humidity in range 50.. 90%	100
RHV-1	IP65	●		●		built -in					-30 °C to +60 °C (-22 °F to 140 °F)	2%, 3%, 4%	0 ... 30 % RH 30 ... 60 % RH 60 ... 90 % RH	hygro-thermostat for humidity monitoring and regulation in range 0.. 90 % RH	101
ATV-1	valve		●	●		built -in					+8..+28 °C			thermostatic direction valves, temperature regulation +8..+28°C	96

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 -30 °C to +70 °C (-22 °F to 158 °F) 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 0.5 to 5°C/ 32.9 to 41 °F
- Choice of external temperature sensors with double insulation in standard lengths 3, 6 and 12 m (9.8´,19.7´ and 29.5´)
- 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
- Output contact 1x NO - SPST 16 A /250 V AC1
- Red LED indicates status of output, green LED indicates energization of the device
- 1-MODULE, DIN rail mounting

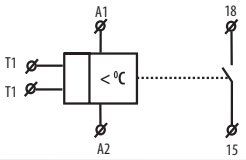
Technical parameters:

	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 -30 °C to +10 °C (-22 °F to 50 °F) TER - 3B 0 °C to +40 °C (32 °F to 104 °F) TER - 3C +30 °C to +70 °C (86 °F to 158 °F) TER - 3D 0 °C to +60 °C (32 °F to 140 °F) TER - 3G 0 °C to +60 °C (32 °F to 140 °F) TER - 3H -15 °C to +45 °C (5 °F to 113 °F)
Hysteresis:	ajustable in range 0.5 to 5°C/ 32.9 to 41 °F
Sensor:	external, termistor NTC , except for TER-3G (PT100)
Sensor fault indication:	flashing red LED
Accuracy	
Setting accuracy (mech.):	5 %
Switching difference:	0.5 °C / 32.9 °F
Temperature dependance:	< 0.1 % / °C (< 0.1 % / °F)
Output	
Number of contacts:	1x NO ($AgSnO_2$)
Current rating:	16A / AC1, 10A / 24V DC
Breaking capacity:	4000 VA / AC1, 300 W / DC
Switching voltage:	250 V AC1 / 24 V DC
Min. breaking capacity DC:	500 mW
Output indication:	red LED
Mechanical life:	$3x10^7$
Electrical life (AC1):	$0.7x10^5$
Other information	
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
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 cathegory:	III.
Pollution degree:	2
Max. cable size (mm^2):	solid wire max. 2x 2.5 or 1x4 (AWG 12) with sleeve max. 1x2.5 or 2x 1.5 (AWG 12)
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)
Weight:	73 g (2.6 oz.)
Standards:	EN 60730-2-9, EN 61010-1

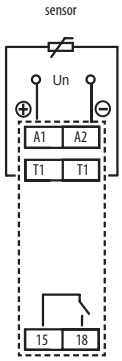
Example of an order

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

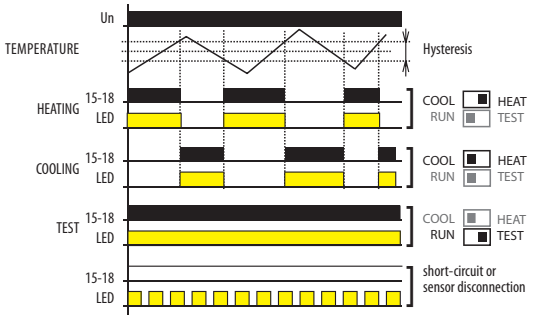
Symbol



Connection



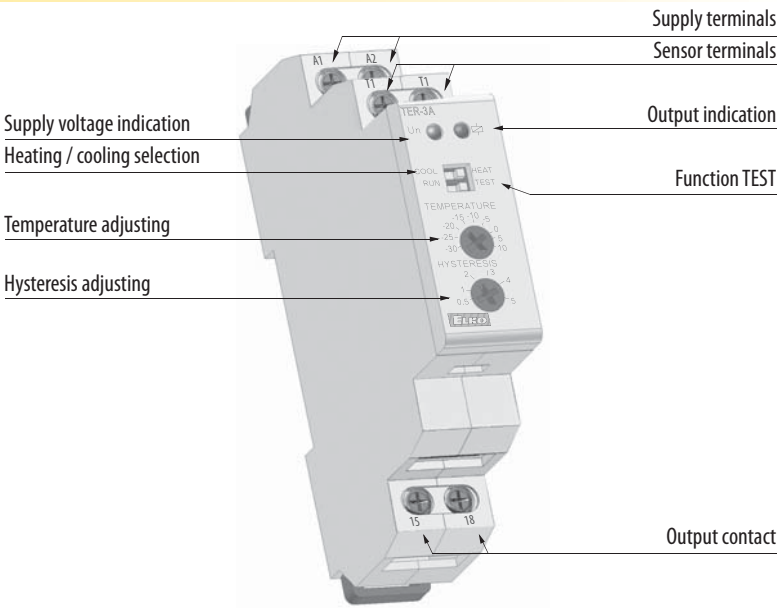
Function



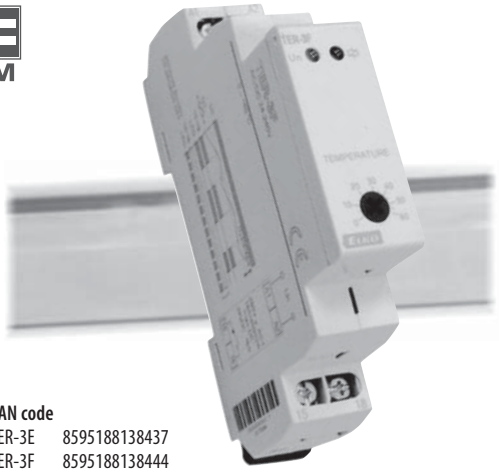
Function description

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 12m/ 29.5´. device has in-built indication of sensor damage, which means that in case of short-circuit or disconnection red LED fl ashes. 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



1M

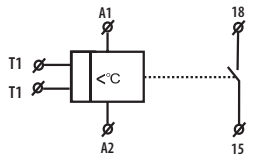


EAN code
TER-3E 8595188138437
TER-3F 8595188138444

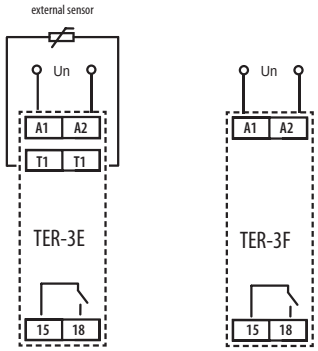
- Single thermostat for temperature monitoring and regulation in range 0 to +60 °C /(32 °F to 140 °F)
- It can be used for temperature monitoring e.g. in switchboards, heating systems, iquids, radiators, motors, devices, open spaces, etc
- Fixed hysteresis at 1 °C / 32 °F
- TER-3E - choice of external temperature sensors with double insulation in standard lengths 3, 6 and 12 m (9.8´,19.7´ and 29.5´)
- TER-3F - sensor is a part of device, serves for monitoring temperature in a switchboard
- Supply voltage AC /DC 24 - 240 V
- Output contact 1x NO- SPST 16 A / 250 V AC1
- Output status is indicated by red LED
- 1-MODULE, DIN rail mounting

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:	0 to +60 °C /(32 °F to 140 °F)	
Hysteresis:	fixed 1 °C/ 34 °F	
Sensor:	thermistor NTC	in-built
Sensor fault indic. (short-circuit / disconnection):	flashing red LED	
Accuracy		
Setting accuracy (mech.):	5%	
Switching difference:	0.5 °C	
Temperature dependance:	< 0.1 % / °C	
Output		
Number of contacts:	1x NO- SPST ($AgSnO_2$)	
Current rating:	16A / AC1,10 A / 24 V DC	
Breaking capacity:	4000 VA / AC1, 300 W / DC	
Switching voltage:	250 V AC1 / 24 V DC	
Min. breaking capacity DC:	500mW	
Output indication:	red LED	
Mechanical life:	$3x10^7$	
Electrical life (AC1):	$0.7x10^5$	
Other information		
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)	
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)	
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 cathegory:	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
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)	
Weight:	73 g (2.58 oz.)	74 g(2.61 oz.)
Standards:	EN 60730-2-9, EN 61010-1	

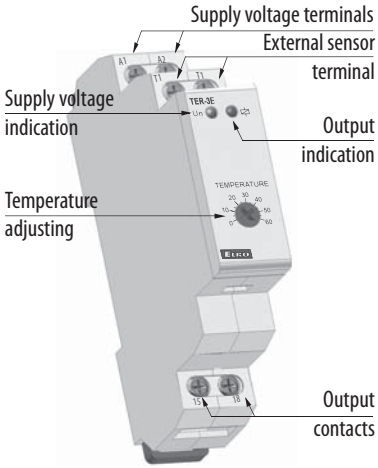
Symbol

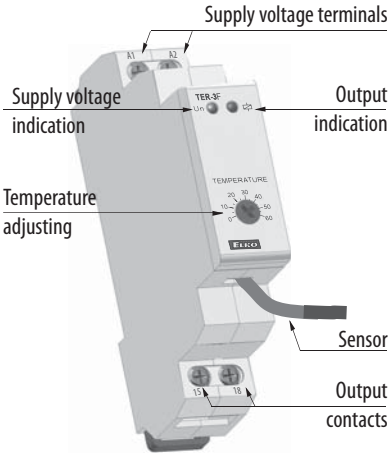


Connection



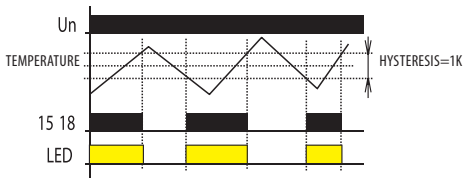
Description





Function

TER-3E, TER-3F



Example of an order

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

Function description

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 12 m (29.5´). 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.

3M

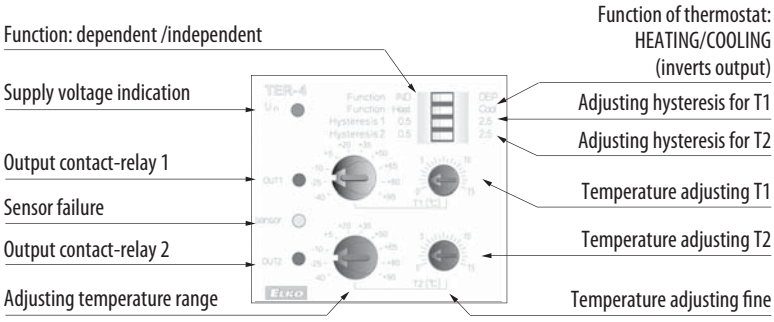
EAN code
TER-4 /230V: 8594030337806
TER-4 /24V: 8594030338148

- Two-state thermostat for temperature monitoring and regulation in a wide range -40 °C to +110 °C (-40 °F to 230 °F) 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/25 °C (77 °F)
- 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 0.5 or 2.5 °C (32.9 or 37 °F) (DIP switch)
- Choice of external thermo sensors with double insulation in standard lengths 3, 6 and 12 m (9.8´,19.7´ and 29.5´)
- 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 230 V or AC/DC 24 V galvanically unseparated
- 2 independent output with changeover contacts/ SPDT 16 A /250 V AC1
- Output status indicated by red LED, faulty status of sensor by yellow LED
- 3-MODULE, DIN rail mounting

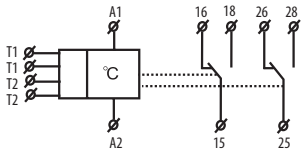
Technical parameters:

	TER-4
Function:	double thermostat
Supply terminals:	A1-A2
Voltage range:	AC 230 V (AC 50-60 Hz) galvanically separated, AC/DC 24V
Burden:	max. 4.5 VA
Supply voltage tolerance:	- 15 %; + 10 %
Measuring circuit	
Measuring terminals:	T1-T1 a T2-T2
Temperatue ranges: (set via switch individually for each level)	-40 to -25 °C/ -40 to 77 °F; -25 to -10 °C/ 77 to 50 °F; -10 to +5 °C/ 50 to 41 °F; + 5 to+20 °C/ 41 to 70 °F; +20 to+35 °C/ 70 to 95 °F; +35 to +50 °C/ 95 to 122 °F; +50 to +65 °C/122 to 149 °F; +65 to +80 °C/149 to 176 °F; +80 to +95 °C/176 to 203 °F; +95 to +110 °C/203 to 230°F
Fine temperature setting:	0-15 °C, in selected range
Hysteresis for T1:	adjustable, 0.5 or 2.5 °C / 32.9 or 37°C (DIP switch)
Hysteresis for T2:	adjustable, 0.5 or 2.5 °C / 32.9 or 37°C (DIP switch)
Sensor:	termistor NTC 12 kΩ/ 25 °C (77 °F)
Sensor failure indication:	yellow LED
Accuracy	
Setting accuracy (mech.):	5 %
Repeat accuracy:	0.5 °C / 32.9 °F
Temperature dependance:	< 0.1 % / °C (< 0.1 % / °F)
Output	
Number of contacts:	2x changeover/ DPDT (AgNI / Silver Alloy)16A / AC1
Current rating:	4000 VA / AC1, 384 W / DC
Breaking capacity:	30 A /< 3 s
Inrush current:	250 V AC1 / 24 V DC
Switching voltage:	500mW
Min. breaking capacity DC:	red LED
Output indication:	$3x10^7$
Mechanical life:	$0.7x10^5$
Electrical life (AC1):	
Other information	- 20.. +55 °C
Operating temperature:	- 30.. +70 °C
Storage temperature:	4 kV (supply - output)
Electrical strength:	any
Operating position:	DIN rail EN 60715
Mounting:	IP 40 from front panel / IP 20 terminals
Protection degree:	III.
Overvoltage cathegory:	2
Pollution degree:	solid wire max.1x 2.5 or 2x1.5/ with sleeve max. 1x1.5 (AWG 12)
Max. cable size (mm^2):	90 x 52 x 65 mm (3.5˝ x 2˝ x 2.6˝)
Dimensions:	238 g (8.4 oz.)
Weight:	EN 60730-2-9, EN 61010-1
Standards:	

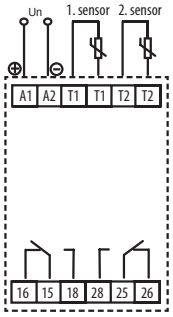
Description



Symbol

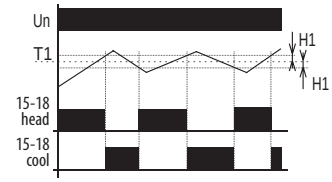


Connection



Function

Independent function



Dependent function

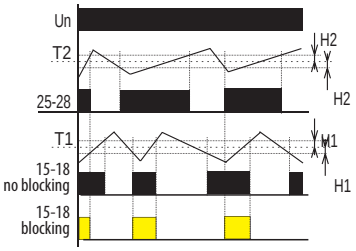


Chart information:
Un –supply voltage
T1 –set temperature of thermostat 1
T2 –set temperature of thermostat 2
H1 –set hysteresis of thermostat 1
H2 –set hysteresis of thermostat 2
15-18 output contact of thermostat 1
25-28 output contact of thermostat 2

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 functions 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.. +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 15 °C(59 °F) . VIt is possible to use fine tuning by potentiometer by 0-15 °C(32-59 °F) with accuracy ±1 °C/ 34 °F . Device has in-built control of sensor fault (yellow LED). It is possible to set hysteresis 0.5 or 2.5 °C (32.9 or 37 °F).
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 a part of delivery.

1M

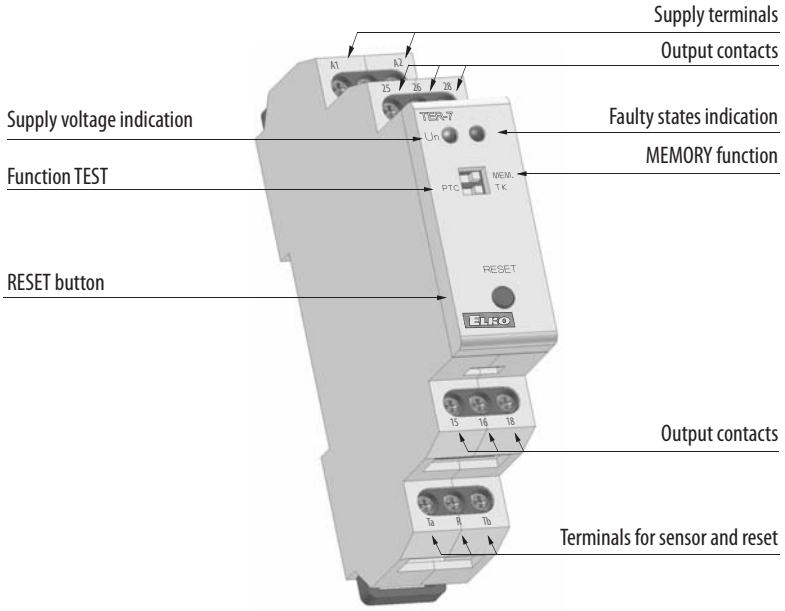
EAN code
TER-7: 8595188137164

- It monitors temperature in range of PTC thermistor
- Fixed levels of switching
- PTC sensor is used for sensing, It is in-built in motor winding by its manufacturer
- MEMORY function - active by DIP switch
- 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
- Output contact: 2x changeover/DPDT 8 A /250 V AC1
- 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

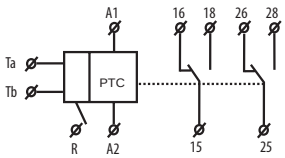
Technical parameters:

	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 % / °C
Output	
Number of contacts:	2x changeover/DPDT (AgNI / Silver Alloy)8 A / AC1
Current rating:	2000 VA / AC1, 192 W / DC
Breaking capacity:	10 A / < 3 s
Inrush current:	250 V AC1 / 24 V DC
Min. breaking capacity DC:	500mW
Mechanical life:	$3x10^7$
Electrical life (resistive):	$0.7x10^5$
Other information	
Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)
Storage temperature:	-30 °C to +70 °C (-22 °F to +158 °F)
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 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)
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)
Weight:	83 g (2.9 oz.)
Standards:	EN 60730-2-9, EN 61010-1

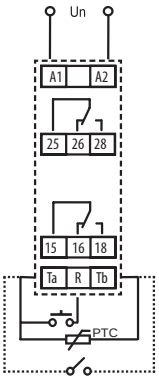
Description



Symbol



Connection

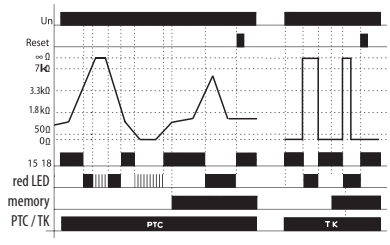


Note

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

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

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).

2M

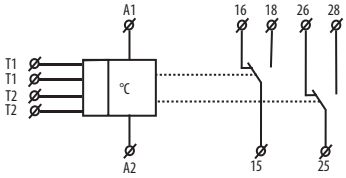
INNOVATION!

EAN code
TER-9/230V: 8595188124478
TER-9/24V: 8595188129190

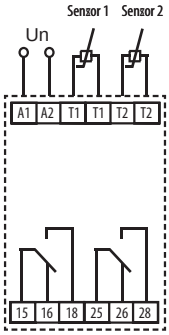
- Digital thermostat with 6 functions and built-in time switch clock with day, week and year program. You can also limit temperature functions and courses this way in real time.
- Complex control of home and water heating, solar heating, etc.
- Two thermostats in one, two temperature inputs, two outputs 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 °C and °F
- Clear display of set and measured data on a backlit LCD
- Power supply: AC 230V 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
- Output contact 1x changeover/SPDT 8 A / 250 V AC1 for each output
- 2-MODULE, DIN rail mounting

Technical parameters:	TER-9
Supply	
Number of function:	6
Supply terminals:	A1 - A2
Voltage range:	AC 230 V (AC 50-60 Hz) galvanically separated, AC/DC 24V galvanically unseparated
Burden:	max. 4 VA
Operating range:	-15 %; +10 %
Measuring circuit	CR 2032 (3V)
Measuring terminals:	T1-T1 and T2-T2
Temperature range:	-40.. +110 °C
Hysteresis (sensitivity):	in an adjustable range 0.5.. 5 °C
Diference temperature:	adjustable 1.. 50 °C
Sensor:	termistor NTC 12 kΩ při 25 °C
Sensor failure indication:	displayed on the LCD
Accuracy	
Measuring accuracy:	5 %
Repeat accuracy:	< 0.5 °C
Temperature dependance:	< 0.1 % / °C
Output	
Number of contacts:	1x changeover for each input/SPDT, (AgNi)
Current rating:	8 A / AC1
Max. breaking capacity:	2000 VA / AC1, 240 W / DC
Switching voltage:	250 V AC1 / 30 V DC
Min. breaking capacity DC:	symbol ON/OFF
Output indication:	
Mechanical life:	$1x10^7$
Electrical life (AC1):	$1x10^5$
Time circuit	
Power back-up:	up to 3 year
Accuracy:	max. ±1 s per day, at 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:	-10 °C to +55 °C (+14 °F to 131 °F)
Storage temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
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 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)
Dimensions:	90 x 35.6 x 64 mm
Weight:	(230V) 127 g (24V) 120 g
Standards:	EN 61812-1. EN 61010-1. EN 60730-2-9; EN 60730-1; EN 60730-2-7

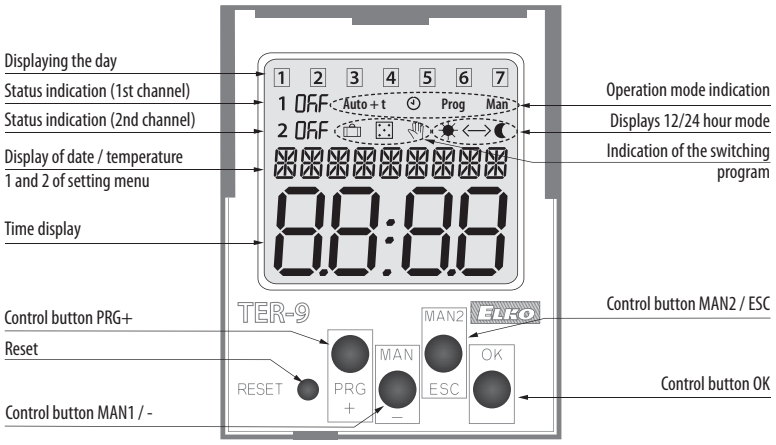
Symbol



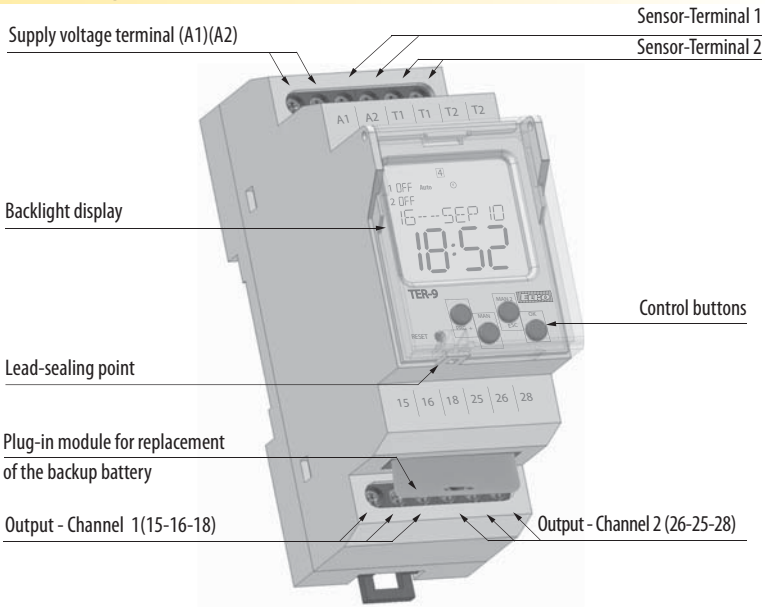
Connection



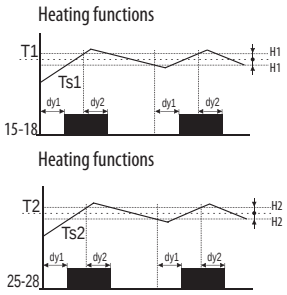
Description of visual elements on the display



Device description



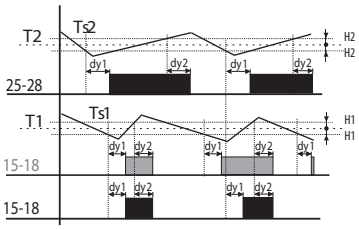
2 independent single-stage thermostats



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.

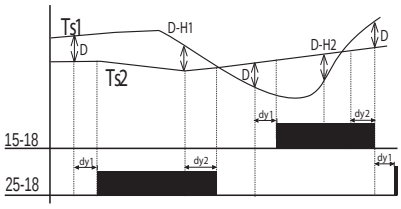
Depending functions of 2 thermostats



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).

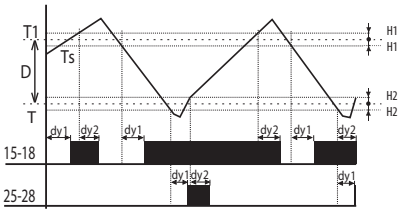
Differential thermostat



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.

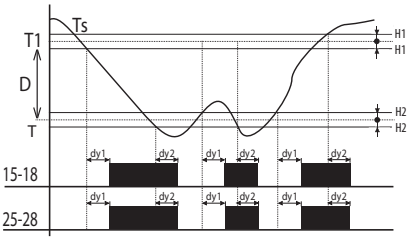
2-stage thermostat



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.

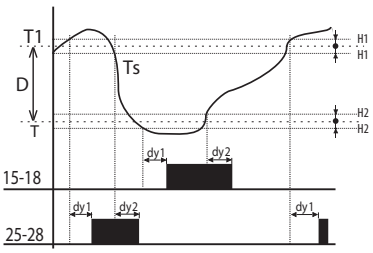
Thermostat with "WINDOW"



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 diff erence (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.

- ATR - Analog Thermo Room:
  Room thermostat with temperature range +5 to +40 °C (+41 °F to +104 °F) with a built-in sensor
- ATF - Analog Thermo Floor:
  Floor thermostat with temperature range +5 to +50 °C (+41 °F to +122 °F) with external sensor
  Function „temporary temperature change" in range ±10 °C (decreasing / increasing temperature)
- ATC - Analog Thermo Combined:
  Room and floor thermostat, sensors are connected in series and block each other
  Function „temporary temperature change" , fix -5 °C /+23 °F (night decline)
  Temperature range +5 to +50 °C (+41 °F to +122 °F) for both sensors, adjustable separately
  It is possible to use it without external sensor

- ATR, ATF, ATC
  Night decline is activated by a pushbutton on device or external contact (only ATR)
  Night decline setting is done by an auxiliary button 2(under main button, only ATR/ATF)
  Ofset setting (calibration ±10 °C/ 50 °F) with „known" thermometer.
  External sensor (TC-3, 3m / 9.84') is a part of delivery (only ATF/ATC), it is possible to extend its length up to 100 m/ 328'
  Design ELEGANT*, wide range of colors, possibility to combine more frames together

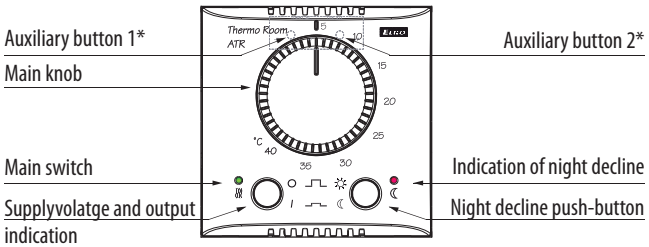
EAN code - DEVICE:
ATR : 8595188125000
ATF : 8595188130165
ATC : 8595188130172

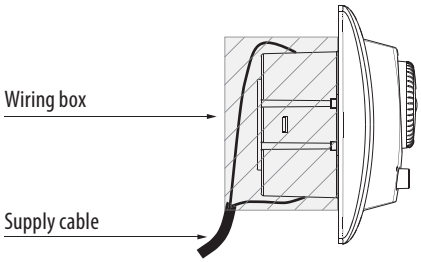
EAN code - COMPLET:
ATR, white frame Elegant: 8595188136228
ATF, white frame Elegant, termosensor TC-3m : 8595188135870
ATC, white frame Elegant, termosensor TC-3m: 8595188135887

To devices is neccessary to order additionally - frame in design ELEGANT and external sensor (except ATR)

Technical parameters:	ATR	ATF	ATC
Supply			
Power supply and tolerance:	AC 230 V ±10 %,		
Consumption, frequency:	6.5 VA/ 50-60 Hz		
Measuring			
Temperature range:	+5 to +40 °C (+41 °F to +104 °F)	+5 to +50 °C (+41 °F to +122 °F)	
Accuracy:	±2 °C/ 36 °F		
Hysteresis:	±1 °C/ 34 °F		
Temperature sensor:	room	floor	room + floor
Night decline:	adj. ± 7 °C/45 °F	adj. ±10 °C/50 °F	fix - 5 °C/ 41 °F
Off set/calibration:	adj. ± 7 °C/45 °F	adj. ± 10 °C/50 °F	
Setting			
Room temperature setting:	main knob	x	main knob
Floor temperature setting:	x	main knob	auxiliary button 2
Offset setting:	auxiliary button 1		
Night decline setting:	auxiliary button 2		x
Night decline switching:	internal / external	internal pushbutton	
Display			
Power supply indication:	green LED 1		
Output ON indication:	red LED 1		
Night decline indication:	red / orange LED 2	red LED 2	
Indication of faulty fl oor sensor:	x	LED 1 flashing	
Indication- exceeded temp./ext. sensor:	x		LED 1 flashing
Output			
Type:	potential-free contact NO, material of contact - AgNi		
Max. loadability:	16A/250 V, 4000 VA for AC1		
Contact separation:	galvanic		
Mechanical life:	$3x10^7$		
Electrical life (AC1):	$0.7x10^5$		
Other information			
Operating temperature:	-10 °C to +55 °C (+14 °F to +131 °F)		
Storage temperature:	-20 °C to +70 °C (-4 °F to +158 °F)		
Electrical strength:	4kV		
Mounting:	wiring box with min. depth 30mm /1.18 ˝ , Ø min.65 mm / 2.6 ˝		
Protection degree:	IP30 in standard conditions		
Max. cable size (mm^2):	solid wire 1x 2.5 / 1.5 with sleeve (AWG 12)		
Dimensions:	84 x 89 x 56.4 mm (3.3 ˝ x 3.5 ˝ x 2.22˝)		
Weight:	110 g (3.9 oz.)		
Standards:	EN 60730-2-9, EN 61010-1		

Description

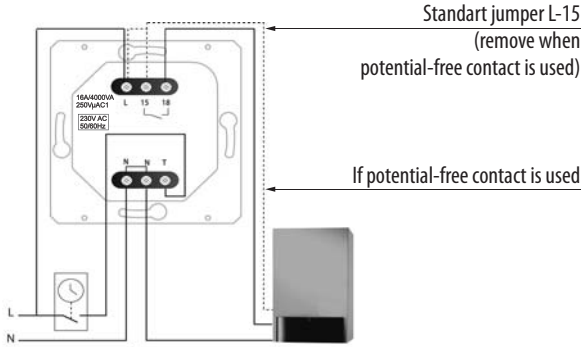




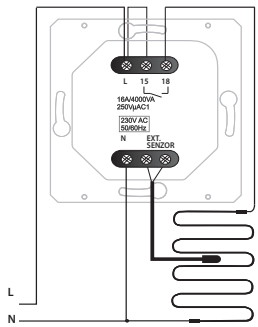
* Auxiliary button 1 and 2 are accessible after removal of the main knob

Connection

ATR



ATF
ATC



Design

Complete offer of switching devices line ELEGANT can be found in an individual catalogue ELEGANT Home switches, which can be sent to you upon request.

Accessories:

See page 102

30mm
Ø 65mm

- DTR - Digital Thermo Room:
  Room thermostat with temperature range +5 to +50 °C (+41 °F to+122 °F) with a built-in sensor
- DTF - Digital Thermo Floor:
  Floor thermostat with temperature range +5 to +50 °C (+41 °F to+122 °F) with external sensor
- DTC - Digital Thermo Combined:
  Combined thermostat with room and floor sensors and temperature range +5 to +50 °C (+41 °F to+122 °F)
  Choice of temperature display from internal or external sensors
  By program it is possible to choose,which sensor is active and if it should function in serial or in parallel
- DTF, DTC
  External sensor (TC-3,3m)is a part of delivery (only ATF/ATC), it is possible to extend its length up to 100 m(328')
  Monitoring of disconnection or short-circuit of external sensor, fault is displayed

EAN code - DEVICE:	**EAN code - COMPLET:**
DTR : 8595188125017	DTR, white frame Elegant: 8595188136235
DTF : 8595188135924	DTF, white frame Elegant, termosensor TC-3m : 8595188135863
DTC : 8595188135931	DTC, white frame Elegant, termosensor TC-3m: 8595188135856

To devices is neccessary to order additionally - frame in design ELEGANT and external sensor (except DTR)

Technical parameters

	DTR	DTF	DTC
Supply			
Power supply and tolerance:	AC 230V ±15%,		
Consumption, frequency:	1.5 VA, 50-60 Hz		
Backup:	rechargable accumulator LIR2032 (40mAh) charging time from 0 to 100%: 3 hours backup time when capacity is 100% 72 hours		
Measuring			
Temperature range:	+5 to +50 °C (+41 to +122 °C)		
Accuracy:	± 0.5 °C / 0.5 °C (± 32.9 °C / 32.9 °C)		
Hysteresis:	adjustable 0.5 °C or 1 °C /32.9 or 33.8 °C		
Temperature sensor:	room (internal)	floor (external)	room (internal) and floor (external)
Adjusting			
Min. temperature cycle:	0.5 °C (32.9 °F)		
Min. time cycle:	10 min.		
Number of programs:	4; pre- set program 1		
Number of events:	2- 6 in a program		
Offset/calibration:	adjustable ±0.5 °C (32.9 °F)		
Display			
LCD display:	26x24 mm, with backlight (ON or OFF pernamently)		
Displaynig date:	current time, set/ current temperature, day in a week, output status		
Output indication:	red LED and symbol SSS on LCD		
Output			
Type:	potential- free contact NO - SPST, material of contact - AgNi (Silver Allow)		
Max.loadability:	16A/250V, 4000VA by AC1		
Contact separation:	galvanic, electrical strength 4kV		
Mechanical life:	$3x10^7$		
Elektrical life:	$0.7x10^5$		
Other information			
Operating position:	-10 °C to +55 °C (+14 °F to +131°F)		
Storing position:	-20 °C to +70 °C (-4 °F to +158°F)		
Electical strenght:	4kV		
Mounting:	IP30 in standard conditions		
Protection degree:	wiring box with min. depth 30mm /1.18 ″ , ∅ min.65 mm / 2.6 ″		
Max. cable size (mm^2):	solid wire 1x 2.5 / 1.5 with sleeve (AWG 12)		
Dimensions:	84 x 89 x 54.3 mm (3.3 ″ x 3.5 ″ x 2.14 ″)		
Weight:	120 g (0.26oz.)		
Standards:	EN 60730-2-9, EN 61812-1, EN 61010-1		

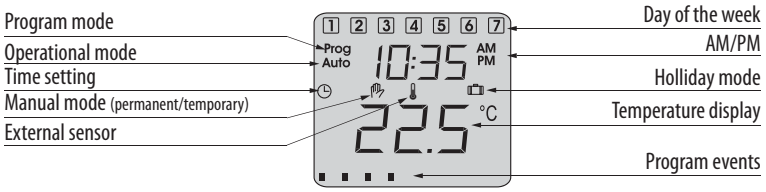
Design

Complete offer of switching devices line ELEGANT can be found in an individual catalogue ELEGANT Home switches, which can be sent to you upon request.

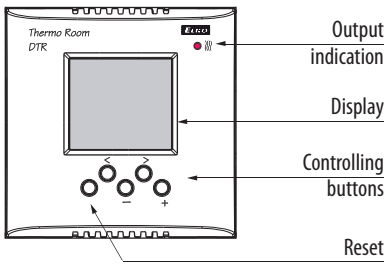
Other Funktions DTR, DTF, DTC

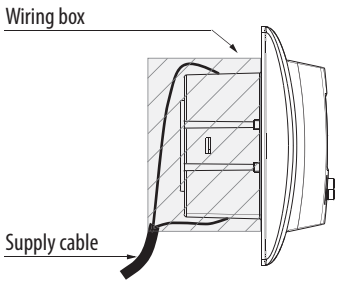
- programs are pre-set according to most frequently used functions =„Plug and Play"
- pushbutton lock to prevent unwanted manipulation with thermostat
- choice of display current/set temperature
- „freezing protection" in case temperature drops below +50 °C (+122 °F) thermostat always switches heating on
- choice of function heating or cooling
- easy and intuitive control by four push-buttons
- automatic shift summer/winter time
- holiday mode -it is possible to set temperature and time from 1 hour to 99 days without any intervention into program settings or turning heating off (suitable in case of planned absence holiday...)
- modern desing in Elegant line of wall switch buttons, combinations with many colors and multiframes are possible

Description of visual elements on the display



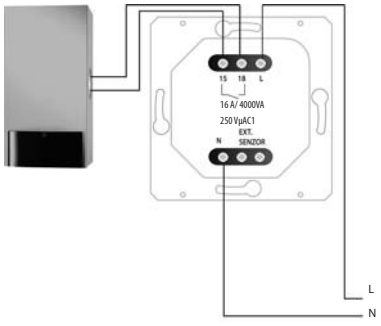
Description



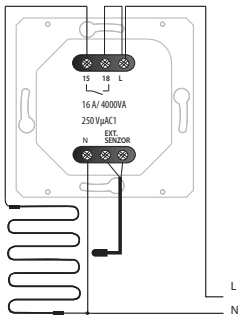


Connection

DTR



DTF
DTC



Accuracy:

See page 102

NEW!

- This energy-saving digital radiator thermostat 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 setting 21°C)
  - energy-saving temperature (factory setting 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 adapte	8595188160995

Technical parameters: ATV-1

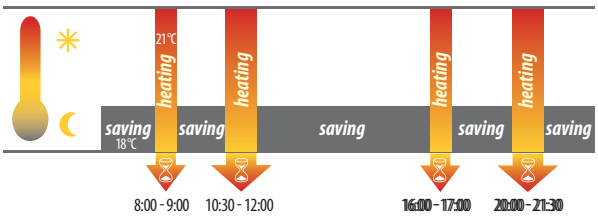
Operating voltage:	3 V / DC (2 AA batteries 1.5 V / DC AA)
Temperature range:	+ 8.. +28 °C
Color:	White
Dimensions (L x W x H):	76.5 x 53.5 x 63 mm
Design:	Thermostatic direction valves, electronic

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 6 °C, the valve opens until the temperature again exceeds 8 °C. This keeps heaters from freezing.

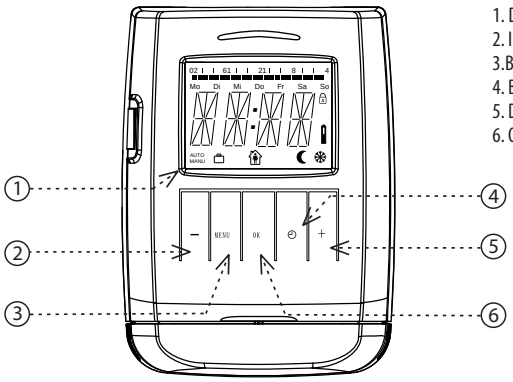
Examples of daily heating program:

BATHROOM



LIVING ROOM

Description of device



1. Display
2. Increase temperature
3. Button MENU
4. Button - timer function
5. Decrease temperature
6. OK button - confirm settings

Setting for ATV-1:

- **manual**
- **via USB programming adapter PROGmatic**

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

Package content	
Thermostat	
Adapters	
Instruction manual	

TEV-2

110x133
IP65

TEV-3

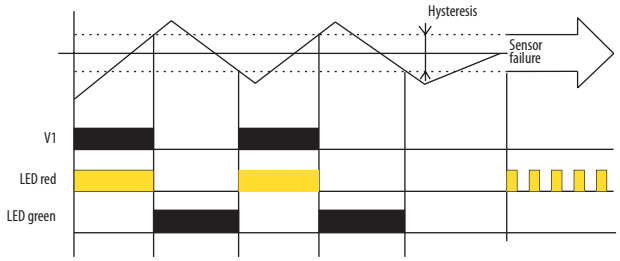
110x133
IP65

- Single thermostat with possibility of temperature management in adjustable range (it is possible to modify this range or make a special one on request)
- Used to regulate heating (or cooling) in demanding environments (outside , humidity, dustiness, etc.)
- Thermostat is placed in water-proof box with IP65, which enables installation outside, with in-built sensor TC-0
- TEV-2 - control and indication elements are placed under transparent cover
- TEV-3 - control and indication elements are placed directly on the cover (for easy orientation and frequent change of temperature)
- Thermostat status is indicated by LED (2 colours)
- Function of monitoring sensor disconnection and short-circuit
- Output changeover /SPDT contact 16A(AC-1)

EAN code
TEV-2: 8595188129251
TEV-3: 8595188129268

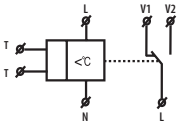
Technical parameters	TEV-2	TEV-3
Function:	one-level thermostat	
Supply terminals:	L - N	
Voltage range:	230V AC / 50 - 60 Hz	
Input:	max. 2.5 VA	
Tolerance of voltage range:	±15%	
Measuring circuit		
Measuring terminals:	T- T	
Temperature ranges:	-20 to +20 °C / -4 °F to +68 °F	+5 to+35 °C/ +41 °F to +95 °F
Hysteresis (sensitivity):	3 °C (± 1.5 °C) / 37,4 °F (± 34.7 °F)	
Sensor:	thermistor NTC 12 kΩ	
Faulty sensor indication:	red LED flashing	
Accuracy		
Accuracy of settings (mechanical):	5 %	
Dependance on temperature:	< 0.1 % / °C	
Output		
Number of contacts:	1x changeover/ SPDT (AgNI / Silver Alloy)	
Current rating:	16 A / AC1	
Max. breaking capacity:	4000 VA / AC1, 384W / DC	
Peak current:	30 A/ < 3 s	
Switched voltage:	250 V AC1 / 24V DC	
Min.switching output DC:	500 mW	
Output indication:	red LED	
Mechanical life:	$3x10^7$	
Electrical life (AC1):	$0.7x10^5$	
Other information		
Operation temperature:	-30 to +50 °C (-22 °F to 122°F)	
Operation position:	any	
Protection degree:	IP 65	
Overvoltage cathegory:	III.	
Polution level:	2	
Max. cable size (mm^2):	solid wire 2.5/ with sleeve 1.5 (AWG 12)	
Dimensions:	110 x 135 x 66 mm (4.33˝x 5.3˝x 2.3˝)	
Weight:	266 g (9.38 oz.)	277 g(9.77 oz.)
Standards:	EN 60730-2-9, EN 61010-1	

Function TEV-2,TEV-3



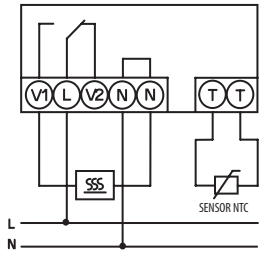
TEV-2 and TEV-3 are universal single thermostats for universal use. In case ambient temperature is higher than set temperature relay is open (function HEATING), for cooling function (opposite function) is possible to use NC contact of relay (V2).

Symbol

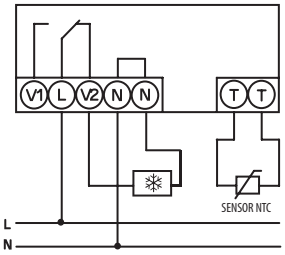


Connection

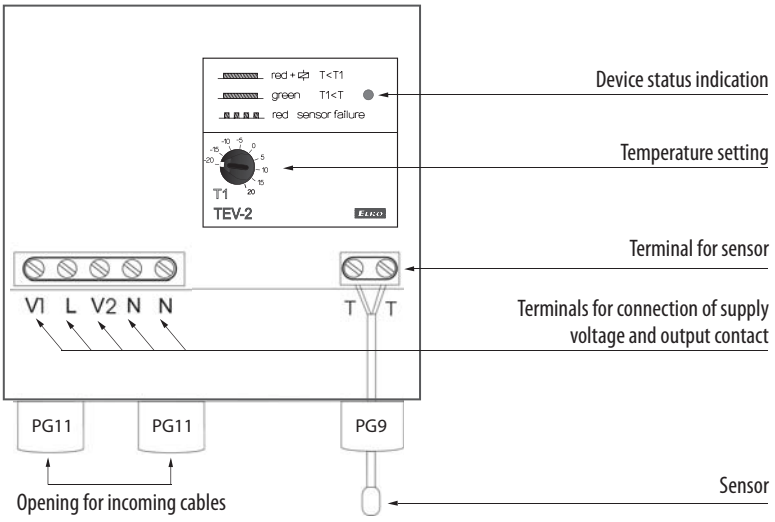
Function heating



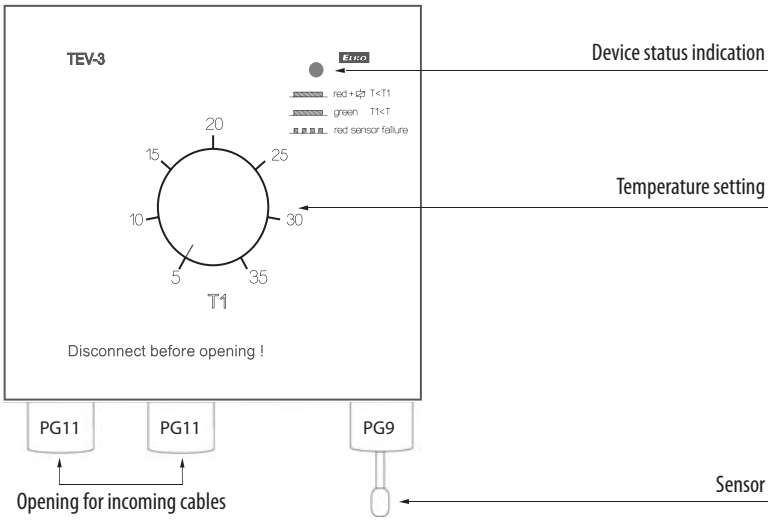
Function cooling



Description TEV-2 (without cover)



Description TEV-3 (cover)



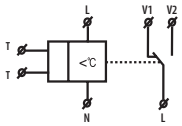
110x133
IP65

- Two-level thermostat with function "WINDOW" meaning that output is switched in case the measured temperature is within set range (adjustable in range -20.. +20 °C/ -4 °F to +68 °F)
- Used as protection against freezing (water-shoots, pavements, drives, pipes, etc.) heating is on when temperature falls under set upper level (e.g.+5 °C/ +41 °F) and off in case it falls under lower level (e.g.-10 °C /-50 °F , when heating is not able effectively operate)
- Thermostat is placed in water-proof box with IP65, which allows installation outside, with in-built sensor TC-0
- Thermostat status is indicated by LED (3colors) under transparent cover
- Function monitoring short-circuit and sensor disconnection (break)
- Output changeover contact 16A/ SPDT (AC-1)

EAN code
TEV-1: 8595188129121

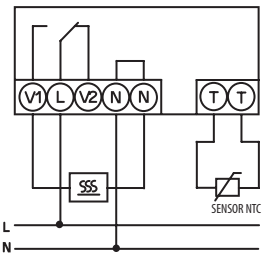
Technical parameters	TEV-1
Function:	two-level thermostat
Supply terminals:	L - N
Voltage range:	230V AC / 50 - 60 Hz
Input:	max. 2.5 VA
Tolerance of voltage range:	±15 %
Measuring circuit	
Measuring terminals:	T - T
Temperature ranges:	
thermostat 1	-20.. +20 °C (-4 °F to +68 °F)
thermostat 2	-20.. +20 °C (-4 °F to +68 °F)
Hysteresis (sensitivity):	3°C (± 1.5 °C)
Sensor:	thermistor NTC 12 kΩ/ 25 °C (77 °F)
Faulty sensor indication:	red LED flashing
Accuracy	
Accuracy of settings (mechanical):	5 %
Dependance on temperature:	< 0.1 % / °C
Output	
Number of contacts:	1x changeover/ SPDT (AgNI / Silver Alloy)
Current rating:	16 A / AC1
Max. breaking capacity::	4000 VA / AC1, 384 W / DC
Peak current:	30 A / < 3 s
Switched voltage:	250 V AC1 / 24 V DC
Min.switching output DC:	500 mW
Output indication:	LED
Mechanical life:	$3x10^7$
Electrical life:	$0.7x10^5$
Other information	
Operation temperature:	-30 °C to +50 °C (-22 °F to 140 °F)
Operation position:	any
Protection degree:	IP 65
Overvoltage cathegory:	III.
Pollution level:	2
Max. cable size (mm^2):	solid wire 2.5/ with sleeve 1.5 (AWG 12)
Dimensions:	110 x 135 x 66 mm (4.33 ˝x 5.3 ˝x 6.6 ˝)
Weight:	238 g (8.4 oz.)
Standards:	EN 60730-2-9, EN 61010-1

Symbol

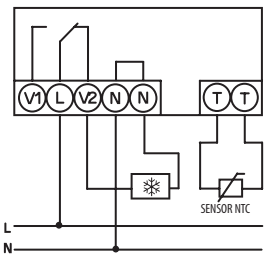


Connection

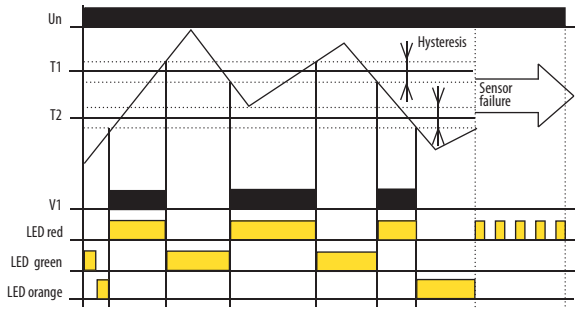
Function heating



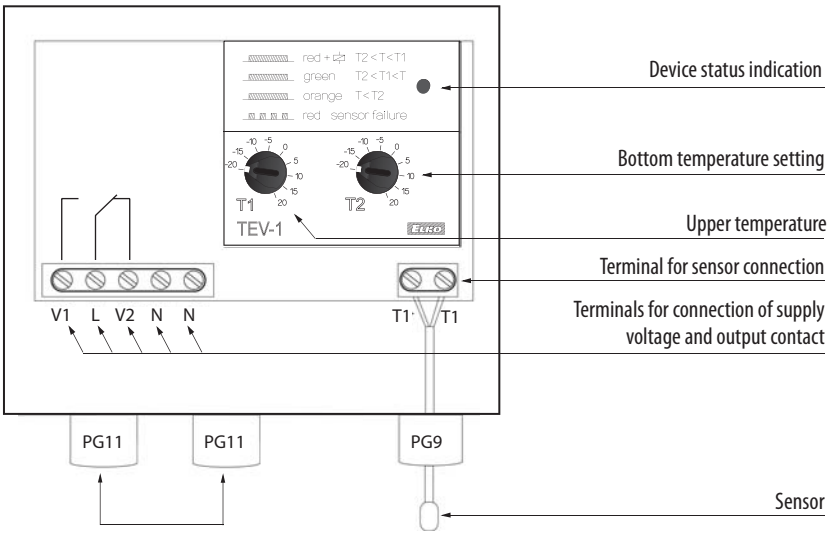
Function cooling



Function



Description



Description of function

TEV-1 is a double thermostat designated for system of protection of roof water-shoots against freezing. The device is placed in a waterproof box (IP65), sensor with double insulation,which is a part of the device, senses ambientrature. The device operates as zonal thermostat with independent setting of upper and bottom operational temperature. In case the ambient temperature is higher than T1 (upper temperature), thermostat switches heating of watershoots off (icing melts down). In case the ambient temperature is lower than T2 (bottom temperature), thermostat also switches heating off (to big freezing heating cannot manage to melt the ice).

153x62x34
IP65

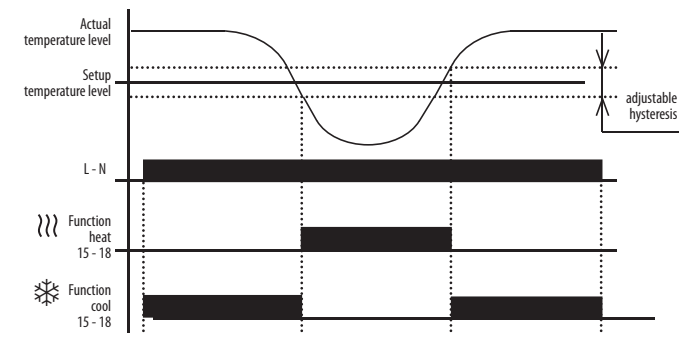
EAN code
TEV-4: 8595188140577

- Single point thermostat for monitoring and regulation of temperature in demanding enviroments (humid and contaminated, agressive and defective, industrial workshops, washing rooms, green-houses, cellars and cooling boxes. . .)
- External version in IP65, box for mounting on the wall
- Built-in thermo-sensor is integrated in the device
- Two fuctions adjustable by jumper: heating and cooling
- 3 adjustable (by jumper) ranges of temperature, and fine adjustment through potentiometer
- 3 adjustable (by jumper) levels of hysteresis
- Supply voltage 230 V AC
- Potentialless NO- SPST contact 12A AC1 switching

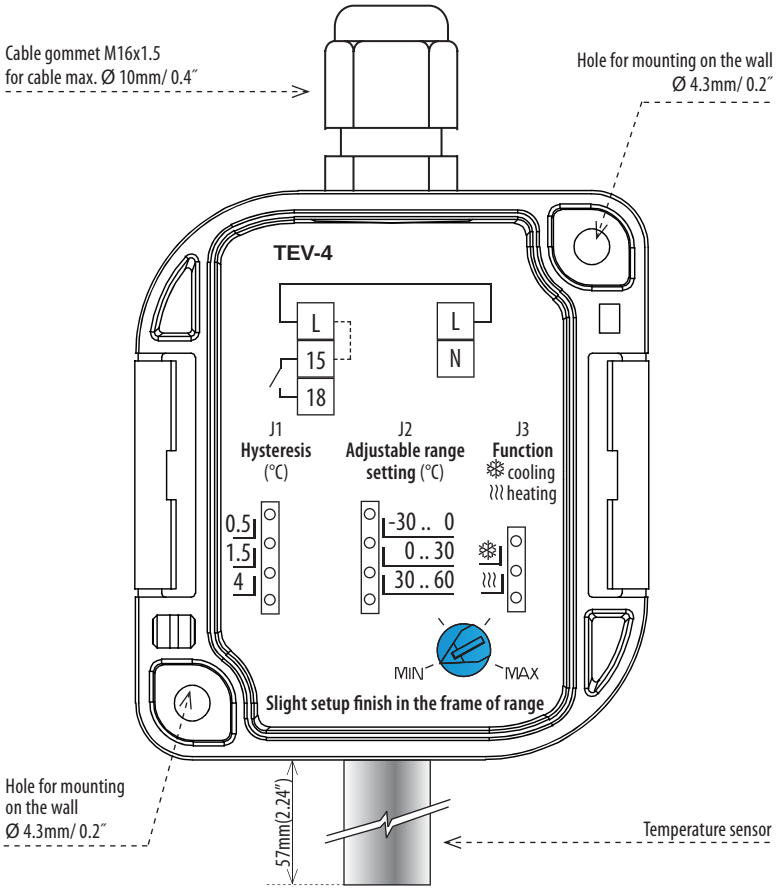
Technical parameters:

	TEV-4
Supply	
Supply terminals:	L - N
Voltage range:	AC 230V / 50 - 60Hz
Tolerance of voltage range:	- 15% .. +10%
Input (apparent/loss):	max. 6VA / 0.7W
Function	setting by jumper J3
Function - ❄:	cooling
Function - ≀≀≀:	heating
Temperature setting	by jumper J2
- range 1:	-30 °C to 0 °C (-22 °F to 32 °F)
- range 2:	0 °C to +30 °C (32 °F to 86 °F)
- range 3:	+ 30 °C to +60 °C (86 °F to 140 °F)
Slight temperature setting:	potentiometer
Hysteresis:	0.5 / 1.5 / 4 °C (32.9 °F/ 34.7 °F/ 39.2 °F)
Hysteresis setting:	by jumper J1
Output	
Output contact:	1 x NO- SPST ($AgSnO_2$)
Current rating:	12 A / AC1
Max. breaking capacity:	3000 VA / AC1, 384 W / DC
Peak current:	30 A / < 3 s
Switched voltage:	250 V AC / 24 V DC
Min.switching output:	500 mW
Mechanical life:	3×10^7
Electrical life:	0.7×10^5
Other information	
Operation temperature:	-30 °C to +65 °C (-22 °F to 149 °F)
Storing temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
Electrical strengh:	4kV (supply-output)
Operation position:	sensor-side down
Protection degree:	IP65
Overvoltage cathegory:	III.
Pollution level:	2
Max. cable size (mm^2):	max.1x2.5, max. 2x1.5/ with sleeve max.1x2.5 (AWG 12)
Suggested power-supply cable:	CYKY 3x2.5 (CYKY4x1.5)
Dimensions:	153 x 62 x 34 mm (6˝ x 2.4˝ x 1˝)
Weight:	148 g (5.2 oz.)
Standards:	EN 60730-2-9, 61010-1

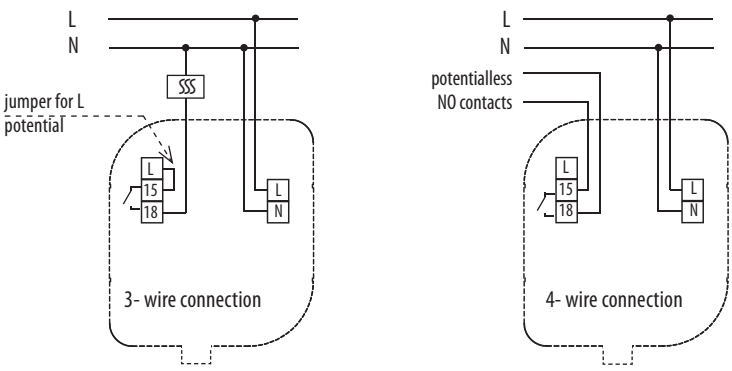
Function



Description (proportion is accordant to real size)

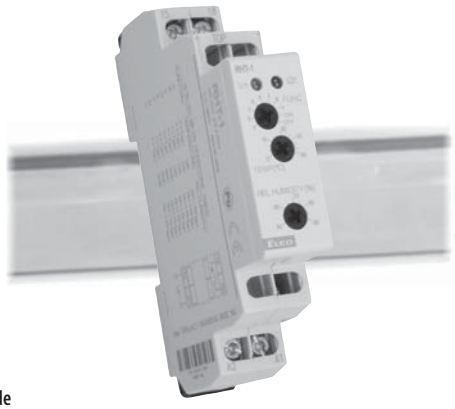


Connection



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

1M



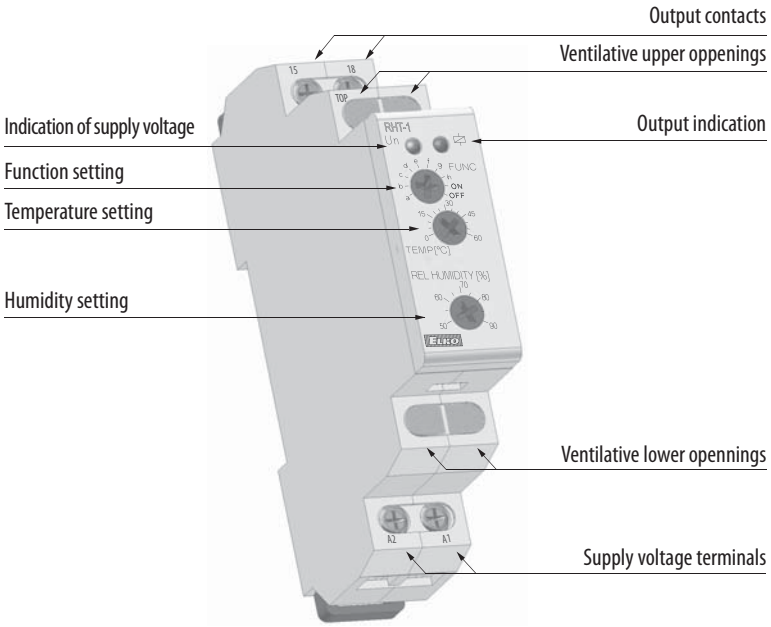
EAN code
RHT-1: 8595188137263

- Hygro-thermostat for temperature monitoring and regulation in range 0 °C to +60 °C (32 °F to 140 °F) 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 2.5 °C / 36.5 °F and humidity at 4%
- Output state is indicated by red LED
- Supply voltage AC/DC 24-240 V
- Output contact 1x NO/ SPDT 16A/250 V AC1
- 1-MODULE, DIN rail mounting

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:	0 °C to +60 °C (32 °F to 140 °F)
Humidity range:	50.. 90%
Temperature hysterisis:	2.5 °C / 36.5 °F
Humidity hysterisis:	4%
Sensor: internal	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/SPDT ($AgSnO_2$)
Current rating:	16A / AC1, 10A / 24V DC
Switched output:	4000 VA / AC1, 300W / DC
Switched voltage:	250V AC1 / 24V DC
Output indication:	red LED shines
Mechanical life:	$3x10^7$
Electrical life:	$0.7x10^5$
Other information	
Operational temperature:	-20 °C to +60 °C (-4 °F to 140 °F)
Storing temperature:	-30 °C to +70 °C (-22 °F to +158 °F)
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
Terminal wire capacity (mm^2):	max. 2x2:5, max. 1x4 with sleeve max. 1x2.5, max. 2x1.5 (AWG 12)
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)
Weight:	69 g (2.4 oz.)
Standards:	EN 60730-2-9, EN 61010-1

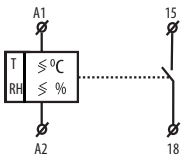
Device description:



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	a	RH < RHset
F	T > Tset	a	RH < RHset
G	T < Tset	a	RH > RHset
H	T > Tset	a	RH > RHset
ON	relay permanently ON		
OFF	relay permanently OFF		

Symbol



Connection

Description of funcion:

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 -30°C/ -22 °F and +80°C/ 176 °F; 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.

153x62x34
IP65

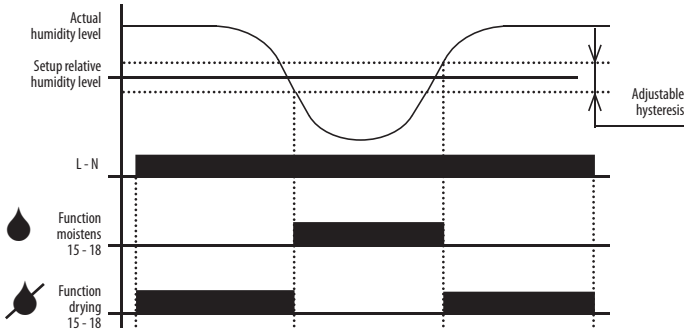
- Single hygrostat is used for regulation of humidity in harsh environments (washdown, greenhouse, refrigeration)
- External version in IP65, box for mounting on the wall
- Built-in hygro-sensor is integrated in the device
- Two functions adjustable by jumper: moisting and drying
- 3 adjustable (by jumper) levels of hysteresis
- Supply voltage 230V AC
- NO contact closure 12A/AC1

EAN code
RHV-1: 8595188140584

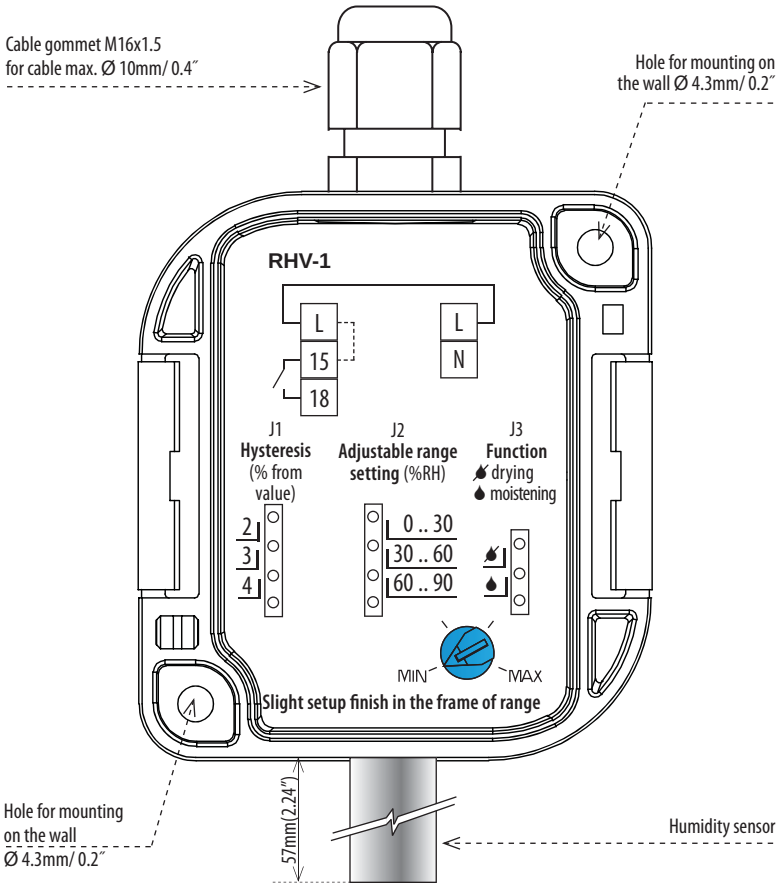
Technical parameters:

	RHV-1
Supply	
Supply terminals:	L - N
Voltage range:	AC 230V / 50 - 60Hz
Input voltage range:	- 15% .. +10%
Input (apparent/loss):	max. 6VA /0.7W
Setting function	Setting function Jumper J3
Function - :	moistening
Function - :	drying
Set. the scale of relative humidity:	Humidity setting Jumper J2
- range 1:	0 ... 30 % RH
- range 2:	30 ... 60 % RH
- range 3:	60 ... 90 % RH
Slight setting of relative humidity:	Relative Humidity Setting Potentiometer
Hysteresis	2, 3, 4 % from setup rate
Hysteresis setting:	Jumper J1
Output	
Output contact:	1 x NO-SPST ($AgSnO_2$)
Current rating:	12 A / AC1
Switching output:	3000 VA / AC1, 384 W / DC
Peak current:	30 A / < 3 s
Switched voltage:	250 V AC / 24 V DC
Min.switching output:	500 mW
Mechanical life:	3 x 10^7
Electrical life:	0.7 x 10^5
Other information	
Operation temperature:	-30 °C to +60 °C (-22 °F to 140 °F)
Storing temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
Electrical strengh:	4kV (supply-output)
Operation position:	sensor-side down
Protection degree:	IP65
Overvoltage cathegory:	III.
Pollution level:	2
Max. cable size (mm^2):	max.1x2.5, max. 2x1.5/ with sleeve max.1x2.5(AWG 12)
Suggested power-supply cable:	CYKY 3x2.5 (CYKY4x1.5)
Dimensions:	153 x 62 x 34 mm (6˝ x 2.4˝ x 1.3˝)
Weight:	148 g (5.2 oz.)
Standards:	EN 60730-2-9, 61010-1

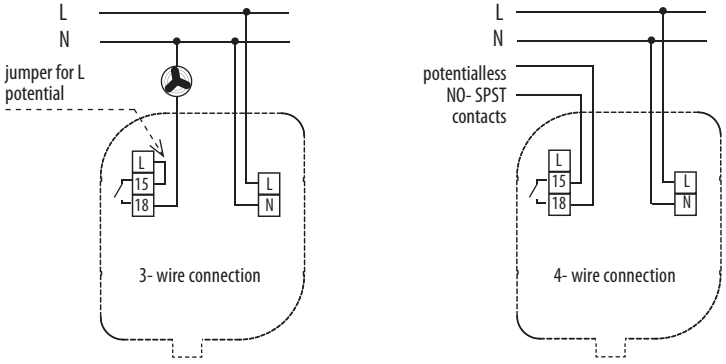
Function



Description (proportion is accordant to real size)



Connection



Device is supplied with a standard jumper.
For the device to operate correctly, it must be mounted with the sensor side down.

TC TZ PT100

EAN code

TC-0	8595188110075
TC-3	8595188110617
TC-6	8595188110082
TC-12	8595188110099
TZ-0	8595188140591
TZ-3	8595188110600
TZ-6	8595188110594
TZ-12	8595188110587
PT100-3	8595188136136
PT100-6	8595188136143
PT100-12	8595188136150

- 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 2Dx0.5 mm/ 0.02"
  Sensor TZ - cable VO3SS-F 2Dx0.5mm /0.02" with silicone insulation for use in high temperature applications
  - silicone insulation for use in high temperature applications
- Sensor PT100 - shielded silicon 2x0.22 mm ^{2} (AWG 21), shielding connected with a case
- Weight of sensors TC: Weight of sensors TZ: Weight of sensors PT100:

TC	TZ	PT100
- TC-0 - 5 g (0.2 oz.)	- TZ-0 - 4.5 g (0.16 oz.)	
- TC-3 - 108 g (3.8 oz.)	- TZ-3 - 106 g (3.74 oz.)	- PT100-3 - 68 g (2.4 oz.)
- TC-6 - 213 g (7.5 oz.)	- TZ-6 - 216 g (7.6 oz.)	- PT100-6 - 149 g (5.3 oz.)
- TC-12 - 466 g (16.4 oz.)	- TZ-12 - 418g (14.7 oz.)	- PT100-12 - 249 g (8.8 oz.)

Technical parameters

Technical parameters	TC	TZ	PT100
Range:	0 °C to +70 °C (32 °F to 158 °F)	-40 °C to +125 °C (-40 °F to 257 °F)	-30 °C to +200 °C (-22 °F to 392 °F)
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

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 25 °C/ 77 °F .
Long-term resistence stability by sensor PT100 is 0.05% (10 000 hours)

TC: Temperature sensors for range 0 °C to +70 °C (32 °F to 158 °F)

TC-0 Temperature sensor can be connected directly to terminal block (sensor length 110 mm/4.33")
TC-3 Temperature sensor 3 m (9.8´)
TC-6 Temperature sensor 6 m (19.7´)
TC-12 Temperature sensor 12 m (39.4´)

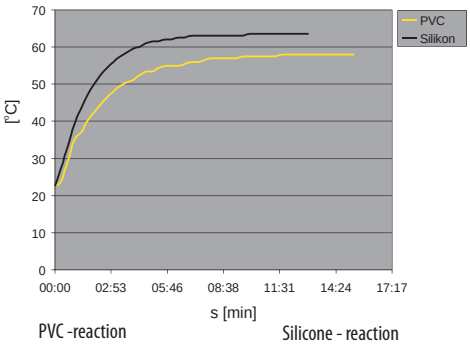
TZ: Temperature sensors for range -40 °C to +125 °C (-40 °F to 257 °F)

TZ-0 Temperature sensor can be connected directly to terminal block (lenght of sensor 110mm/ 4.33")
TZ-3 Temperature sensor 3 m (9.8´)
TZ-6 Temperature sensor 6 m (19.7´)
TZ-12 Temperature sensor 12 m (39.4´)

PT-100: Temperature sensor for range -30 °C to +200 °C (-22 °F to 392 °F)

PT100-3 -Temperature sensor 3 m (9.8´), double isolation silicone
PT100-6 -Temperature sensor 6 m (19.7´), double isolation silicone
PT100-12 -Temperature sensor 12 m (39.4´), double isolation silicone

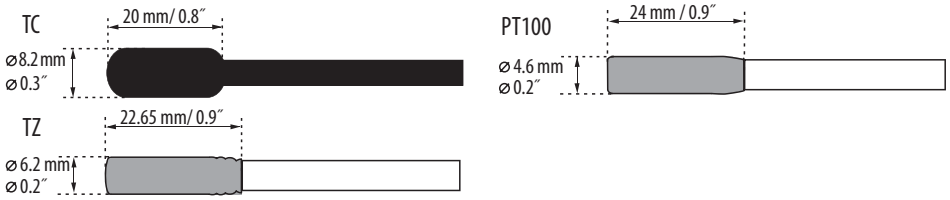
Diagramm of sensor warm up via air



PVC -reaction to water temperature from 22.5 °C to 58 °C (from 72.5 °F to 136.4 °F)

Silicone - reaction to water temperature from 22.5 °C to 63.5 °C (from 72.5 °F to 144.5 °F)

Sensor drawing



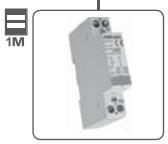
Sensor photo

Installation box LKM-45

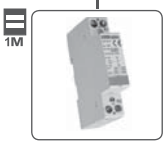
Recommended installation box for wall mounting of THERMO thermostats

Type LKM- 45, dimensions: 98x98x45 mm, color: white
EAN code: 8595188130806

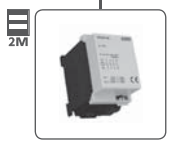
Installation contactors VS



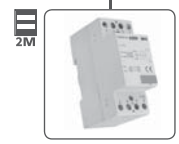
VS120
Number of contacts: 1x20 A
Configuration of switching and breaking contacts: 10, 01



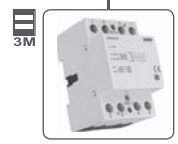
VS220
Number of contacts: 2x20 A
Configuration of switching and breaking contacts: 20, 11, 02



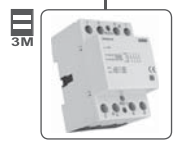
VS420
Number of contacts: 4x20 A
Configuration of switching and breaking contacts: 40, 31



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



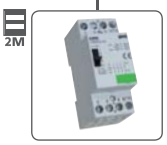
VS440
Number of contacts: 4x40 A
Configuration of switching and breaking contacts: 40, 31, 22, 04



VS463
Number of contacts: 4x63 A
Konfigurace spínacích a rozpínacích kontaktů: 40, 31, 22

Installation contactors with manual control VSM

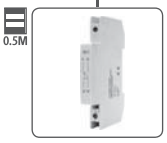
VSM220
Number of contacts: 2x20 A
Configuration of switching and breaking contacts: 20, 11, 02



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

Accessories

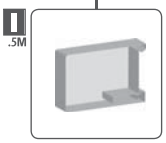
Auxiliary contacts VSK



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

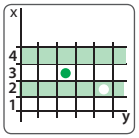
VSK-20
auxiliary contacts: 2x switching

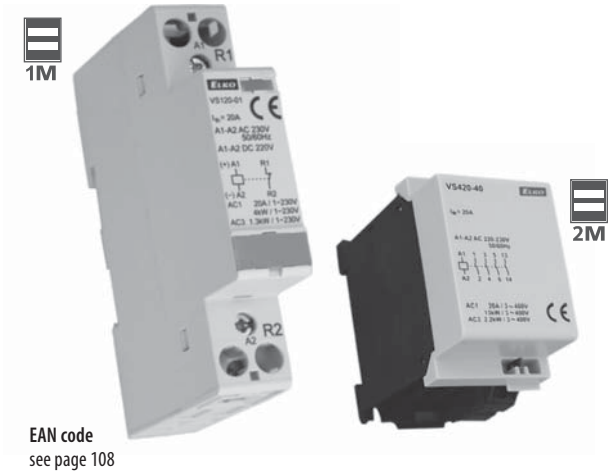
Installation spacer



IKV
Module spacer

Contactror's loadability and dimensions





EAN code
see page 108

- 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
  VS220: 20, 11, 02
  VS420: 40, 31
  VS425: 40, 31, 22, 04
  VS440: 40, 31, 22, 04
  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

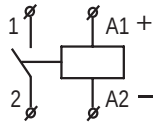
Technical parameters	VS120	VS220	VS420	VS425	VS440	VS463
Rated insulation voltage (Ui):	230 V	230 V	415 V	440 V	440 V	440 V
Rated thermo-current I_{th} (in AC):	20 A	20 A	20 A	25 A	40 A	63 A
Switched operation						
AC-1 for 400 V, 3 phase:	x	x	13 kW	16 kW	26 kW	40 kW
AC-1 for 230 V:	4 kW, 1 phase	4 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
Loadability of modular contactors see page143						
The max. number of switching for max. load:	600 switch/hr.	600switch/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, 48 V, 110 V, 230 V	AC/DC 24 V, 48 V, 110 V, 230 V	AC 24 V, 48 V 110 V, 230 V	AC/DC 24 V, 48 V, 110 V, 230 V	AC/DC 24 V, 48 V, 110 V, 230 V	AC/DC 24 V, 48 V, 110 V, 230 V
Coil permanent supply +/- 10%:	2.1 VA/2.1 W	2.1 VA/2.1 W	5 VA/1.5 W	2.6 VA/2.6 W *	5 VA/5 W	5 VA/5 W
Coil gear supply +/- 10%:	2.1 VA/2.1 W	2.1 VA/2.1 W	30 VA/25 W	2.6 VA/2.6 W *	5 VA/5 W	5 VA/5 W
Mounting side-by-side:	max. 2 contactors**	max. 2 contactors**	max. 2 contactors**	max. 2 contactors**	max. 2 contactors**	max. 2 contactors**
Weight:	120 g (4.2 oz.)	130 g(4.6 oz.)	170 g(6 oz.)	213 g(7.5 oz.)	400 g(14 oz.)	400 g (14 oz.)
Dimensions:	17.5x85x60 mm	17.5x85x60 mm	35x62.5x57 mm	35x85x60 mm	53.3x84x60 mm	53.3x84x60 mm
	(0.7˝x 3.35˝x 2.4˝)	(0.7˝x 3.35˝x 2.4˝)	(1.4˝x 2.7˝x 2.24˝)	(1.4˝x 3.35˝x 2.4˝)	(2.1˝x 3.31˝x 2.4˝)	(2.1˝x 3.31˝x 2.4˝)
Standards:	IEC 60947-4-1, IEC 60947-5-1, IEC 61095, EN 60947-4-1, EN 60947-5-1, EN 61095, 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. We offer installation spacer of type IKV.

VS120

VS120-10



VS120-01

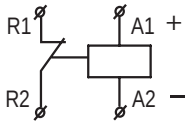
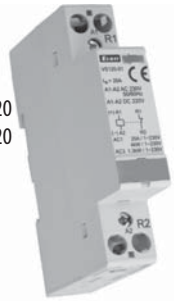
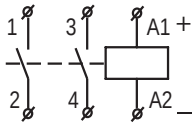


Photo VS120
Photo VS220

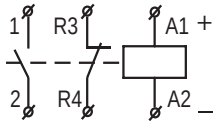


VS220

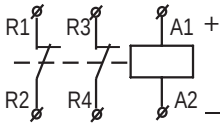
VS220-20



VS220-11

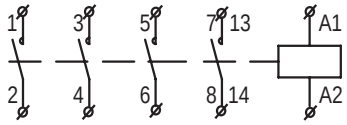


VS220-02



VS420

VS420-40



VS420-31

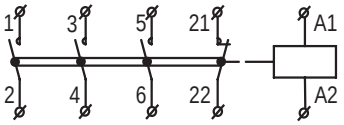
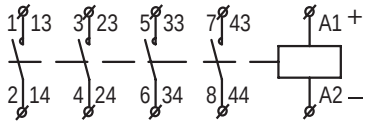


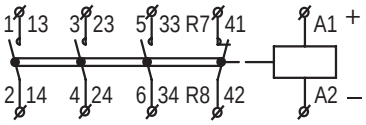
Photo VS420

VS425

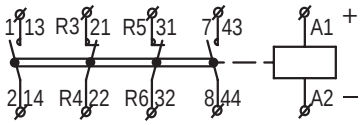
VS425-40



VS425-31



VS425-22



VS425-04

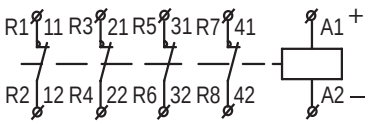
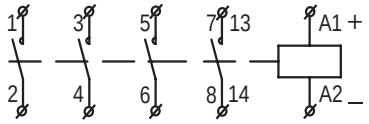


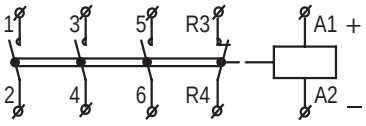
Photo VS425

VS440

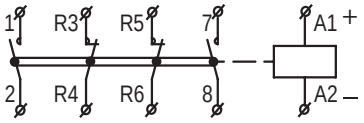
VS440-40



VS440-31



VS440-22



VS440-04

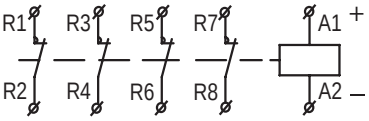
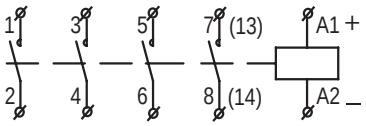


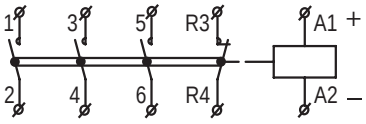
Photo VS440
Photo VS463

VS463

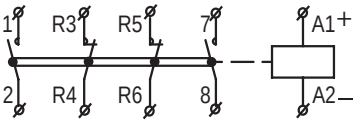
VS463-40



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:	-5 °C to +55 °C (23 °F to 131 °F)
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 mm² (AWG 10)/ 2.5 mm² (AWG 10)
Maximal torque:	0.8 Nm
Weight:	10 g (0.35 oz.)
Dimensions:	10x85x60 mm (0.4˝x 3.35˝x 2.4˝)

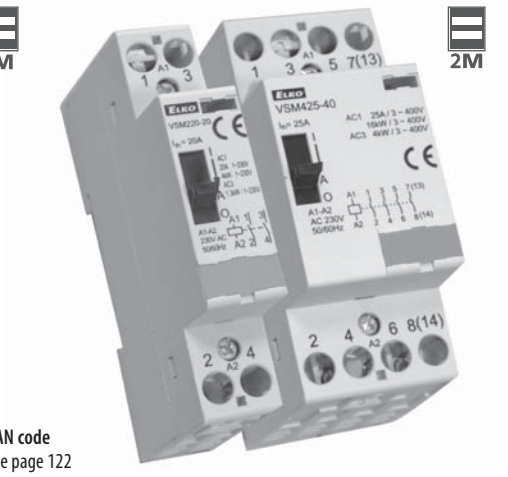
Connection of auxiliary contact VSK-11 and VSK-20

EAN code
see paga 108

VSK-11

VSK-20

1M



2M

EAN code
see page 122

- 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 manual control
  1 - shifting from AUTO to 1: operational contacts are closed and back contacts are open until there is another impulse to a contactor coil
  0 - contacts are open (operational contact) or closed (stand-by contact) regardless voltage
- Optical indicator: 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

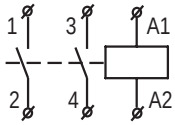
Technical parameters:	VSM220	VSM425
Rated insulation voltage (Ui):	230 V	440 V
Rated thermo-current I_{th} (in AC):	20 A	25 A
Switched operation		
AC-1 for 400 V:	X	16 kW, 3 phase
AC-1 for 230 V:	4 kW, 1 phase	9 kW, 3 phase
AC-3 for 400 V:	X	4 kW, 3 phase
AC-3 for 230 V:	1,3 kW only NO, 1 phase	2.2 kW, 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
Loadability of modular contactors see page 147		
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, 42 V, 48 V, 110 V, 127 V, 230 V	AC 12 V, 24 V, 42 V, 48 V, 110 V, 127 V, 230 V
Coil permanent supply +/- 10 %:	2.8 VA/1.2 W	5.5 VA/1.6 W
Coil gear supply +/- 10 %:	12 VA /10 W	33 VA/25 W
Mounting side-by-side:	max. 2 contactors*	max. 2 contactors*
Weight:	140 g (4.9 oz.)	260 g (9.17 oz.)
Dimensions:	17,5x85x60 mm	35x85x60 mm
	(0.7˝x 3.35˝x 2.4˝)	(1.4˝x 3.35˝x 2.4˝)
Standards:	IEC 60947-4-1, IEC 60947-5-1, IEC 61095, EN 60947-4-1, EN 61095, VDE 0660	

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

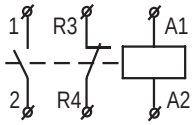
Connection VSM220

VSM220 - only AC supply voltage

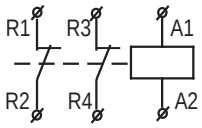
VSM220-20



VSM220-11



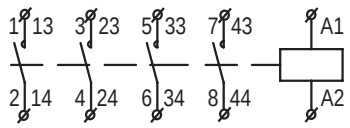
VSM220-02



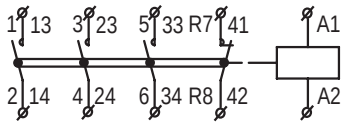
Connection VSM425

VSM425 - only AC supply voltage

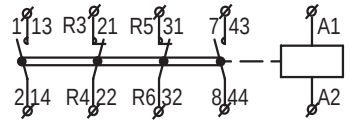
VSM425-40



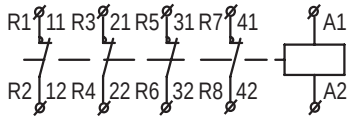
VS425-31



VSM425-22



VSM425-04



Auxiliary contacts VSK-11 and VSK-20

Datas of auxiliary contacts for VSK-11 and VSK-20 see page 108

TYPE OF LIGHT	OPERATION (W)	I (A)	Number of lights on one contactor's contact							
			VS120	VS220	VS420	VS425	VS440	VS463	VSM220	VSM425
Incandescent lamps	60	0.26	33	33	33	33	65	85	33	33
	100	0.43	20	20	20	20	40	50	20	20
	200	0.87	10	10	10	10	20	25	10	10
	500	2.17	3	3	3	3	8	10	3	3
	1000	4.35	1	1	1	1	4	5	1	1
Flourescent lamps	18	0.37	22	22	22	24	90	140	22	24
	24	0.35	22	22	22	24	90	140	22	24
	36	0.43	17	17	17	20	65	95	17	20
	58	0.67	14	14	14	17	45	70	14	17
Flourescent lamps lead-lag circuit	18	0.11	2 x 30	2 x 30	2 x 30	2 x 40	2 x 100	2 x 150	2 x 30	2 x 40
	24	0.14	2 x 24	2 x 24	2 x 24	2 x 31	2 x 78	2 x 118	2 x 24	2 x 31
	36	0.22	2 x 17	2 x 17	2 x 17	2 x 24	2 x 65	2 x 95	2 x 17	2 x 24
	58	0.35	2 x 10	2 x 10	2 x 10	2 x 14	2 x 40	2 x 60	2 x 10	2 x 14
Flourescent lamps parallel correction	18	0.12	7	7	7	8	48	73	7	8
	24	0.15	7	7	7	8	48	73	7	8
	36	0.2	7	7	7	8	48	73	7	8
	58	0.32	4	4	4	5	31	47	4	5
Flourescent lamps with electronic ballast units (EVG)	1 x 18	0.09	25	25	25	35	100	140	25	35
	1 x 36	0.16	15	15	15	20	52	75	15	20
	1 x 58	0.25	14	14	14	19	50	72	14	19
	2 x 18	0.17	12	12	12	17	50	70	12	17
	2 x 36	0.32	7	7	7	10	26	38	7	10
	2 x 58	0.49	7	7	7	9	25	36	7	9
High-pressure mercury-vapour lamps uncorrected	50	0.61	14	14	14	18	38	55	14	18
	80	0.8	10	10	10	13	29	42	10	13
	125	1.15	7	7	7	9	20	29	7	9
	250	2.15	4	4	4	5	10	15	4	5
	400	3.25	2	2	2	3	7	10	2	3
	700	5.4	1	1	1	2	4	6	1	2
	1000	7.5	1	1	1	1	3	4	1	1
High-pressure mercury-vapour lamps parallel correction	50	0.28	4	4	4	5	31	47	4	5
	80	0.41	4	4	4	5	27	41	4	5
	125	0.65	3	3	3	4	22	33	3	4
	250	1.22	1	1	1	2	12	18	1	2
	400	1.95	1	1	1	1	9	13	1	1
	700	3.45	-	-	-	-	5	7	-	-
	1000	4.8	-	-	-	-	4	5	-	-
Halogen metal vapour lamps uncorrected	35	0.53	18	18	18	22	43	60	18	22
	70	1	10	10	10	12	23	32	10	12
	150	1.8	5	5	5	7	12	18	5	7
	250	3	3	3	3	4	7	10	3	4
	400	3.5	3	3	3	3	6	9	3	3
	1000	9.5	1	1	1	1	2	3	1	1
	2000	16.5	-	-	-	-	1	1	-	-
Halogen metal-vapour lamps parallel correction	35	0.25	5	5	5	6	36	50	5	6
	70	0.45	2	2	2	3	18	25	2	3
	150	0.75	1	1	1	1	11	15	1	1
	250	1.5	-	-	-	1	6	9	-	1
	400	2.5	-	-	-	1	6	8	-	1
	1000	5.8	-	-	-	-	2	3	-	-
	2000	11.5	-	-	-	-	1	2	-	-
High-pressure sodium-vapour lamps uncorrected	150	1.8	5	5	5	6	17	22	5	6
	250	3	3	3	3	4	10	13	3	4
	400	4.7	2	2	2	2	6	8	2	2
	1000	10.3	-	-	-	1	3	3	-	1
High-pressure sodium-vapour lamps parallel correction	150	0.83	1	1	1	1	11	16	1	1
	250	1.5	-	-	-	1	6	10	-	1
	400	2.4	-	-	-	-	4	6	-	-
	1000	6.3	-	-	-	-	2	3	-	-
Low-pressure sodium-vapour lamps uncorrected	18	0.35	22	22	22	27	71	90	22	27
	35	1.5	7	7	7	9	23	30	7	9
	55	1.5	7	7	7	9	23	30	7	9
	90	2.4	4	4	4	5	14	19	4	5
	135	3.5	3	3	3	4	10	13	3	4
	180	3.3	3	3	3	4	10	13	3	4
Low-pressure sodium-vapour lamps parallel correction	18	0.35	6	6	6	7	44	66	6	7
	35	0.31	1	1	1	1	11	16	1	1
	55	0.42	1	1	1	1	11	16	1	1
	90	0.63	1	1	1	1	8	12	1	1
	135	0.94	-	-	-	-	4	7	-	-
	180	1.16	-	-	-	-	5	8	-	-

EAN codes for VS

VS120

VS120-01 24V AC/DC	8595188129848
VS120-01 230V AC/DC	8595188123105
VS120-10 24V AC/DC	8595188129367
VS120-10 230V AC/DC	8595188123112

VS220

VS220-02 24V AC/DC	8595188129381
VS220-02 110V AC/DC	8595188138628
VS220-02 230V AC/DC	8595188121422
VS220-11 24V AC/DC	8595188129374
VS220-11 48V AC/DC	8595188129398
VS220-11 110V AC/DC	8595188130790
VS220-11 230V AC/DC	8595188121408
VS220-20 24V AC/DC	8595188125253
VS220-20 48V AC/DC	8595188129411
VS220-20 110V AC/DC	8595188129428
VS220-20 230V AC/DC	8595188121392

VS420

VS420-31 24V AC	8595188129442
VS420-31 110V AC	8595188129466
VS420-31 230V AC	8595188121446
VS420-40 12V AC	8595188129459
VS420-40 24V AC	8595188129435
VS420-40 48V AC	8595188138581
VS420-40 230V AC	8595188121439

VS425

VS425-04 24V AC/DC	8595188129527
VS425-04 48V AC/DC	8595188129558
VS425-04 110V AC/DC	8595188143820
VS425-04 230V AC/DC	8595188121682
VS425-13 230V AC/DC	8595188129473
VS425-22 24V AC/DC	8595188129541
VS425-22 230V AC/DC	8595188121675
VS425-31 24V AC/DC	8595188129497
VS425-31 48V AC/DC	8595188137898
VS425-31 110V AC/DC	8595188129534
VS425-31 230V AC/DC	8595188121668
VS425-40 24V AC/DC	8595188129480
VS425-40 48V AC/DC	8595188136174
VS425-40 230V AC/DC	8595188121651
VS425-40 400V AC/DC	8595188129503

VS440

VVS440-04 24V AC/DC	8595188129299
VS440-04 110V AC/DC	8595188129305
VS440-22 24V AC/DC	8595188129787
VS440-22 230V AC/DC	8595188121477
VS440-31 24V AC/DC	8595188129572
VS440-31 230V AC/DC	8595188121460
VS440-40 24V AC/DC	8595188129565
VS440-40 110V AC/DC	8595188138567
VS440-40 230V AC/DC	8595188121453

VS463

VS463-22 24V AC/DC	8595188129794
VS463-22 230V AC/DC	8595188121514
VS463-31 24V AC/DC	8595188129596
VS463-31 110V AC/DC	8595188137904
VS463-31 230V AC/DC	8595188121507
VS463-40 24V AC/DC	8595188129589
VS463-40 110V AC/DC	8595188140652
VS463-40 230V AC/DC	8595188121491

EAN codes for VSM

VSM220

VSM220-02 24V AC	8595188129817
VSM220-02 230V AC	8595188128100
VSM220-11 24V AC	8595188129800
VSM220-11 230V AC	8595188128094
VSM220-20 12V AC	8595188138369
VSM220-20 24V AC	8595188128117
VSM220-20 230V AC	8595188128087

VSM425

VSM425-04 24V AC	8595188129831
VSM425-04 230V AC	8595188128155
VSM425-22 24V AC	8595188129336
VSM425-22 230V AC	8595188128148
VSM425-31 24V AC	8595188129824
VSM425-31 42V AC	8595188160247
VSM425-31 230V AC	8595188128131
VSM425-40 12V AC	8595188143820
VSM425-40 24V AC	8595188128162
VSM425-40 230V AC	8595188128124

VSK-11	8595188121613
VSK-20	8595188121606

Technical information

Complementary information

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 while keep in mind max. current and min. voltage at rest, which can cause spontaneous switching of device (e.g. connected glow lamps)

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 to EU Directive 89/336/EEC. Notwithstanding it is necessary to pay attention by device connecting 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

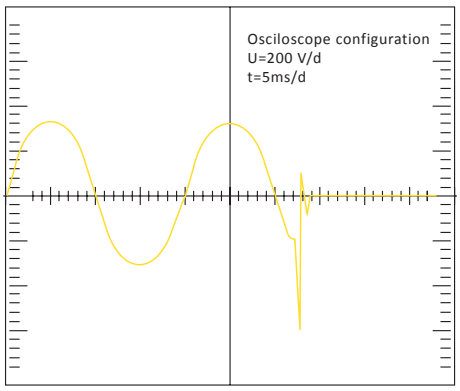
5.) Device handling and using
- input terminals do not fill-in with high power (for serial terminals max 0.5 N/m), do not give excessive pressure to carrier terminal parts to avoid demage of inner device construction
- protect the device before falls and excessive vibrations that could demage relays 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

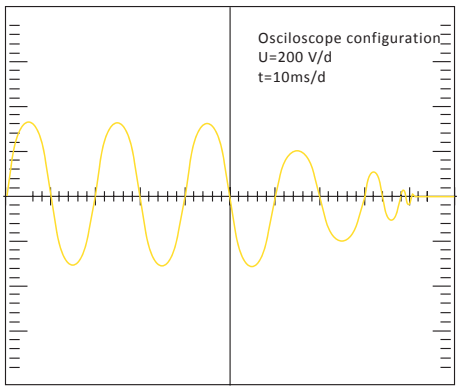
All time and monitoring relays from our assortment are equiped with protective elements (varistors) against possible overvoltage in supply main. Limit voltage of used varistors is 275 V. At short-time overvoltage in supply main varistor decrease its leak resistor and accumulate arosen overvoltage. When 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.

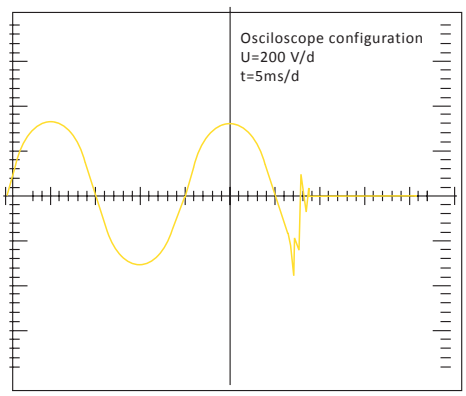
Process of disconnection of contactor with coil on 230V/AC without R-C member



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



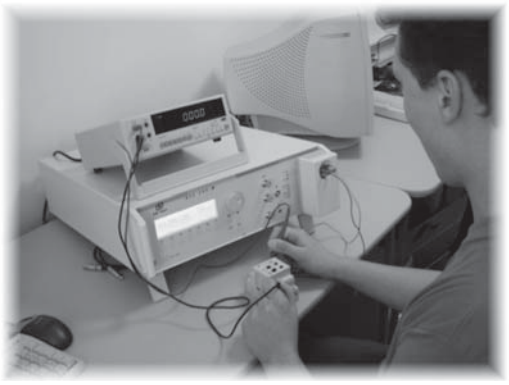
PRODUCT	SOU-2	RHV-1; SOU-3; TEV-4	CRM-4; CRM-42; MR-41; MR-42; SHT-1; SHT-1/2; SHT-3; SHT-3/2; SHT-4; SMR-B; SOU-1; RHT-1; TER-3A; TER-3B; TER-3C; TER-3D; TER-3E; TER-3F; TER-3G; TER-3H ; VS116K; VS116U; VS316/24V; VS316/230V	CRM-82TO; CRM-83J; CRM-93H; PRM-2H; PRM-92H; TER-7; VS308K; VS308U; CRM-61; HRH-5; HRN-54; HRN-54N; HRN-55; HRN-55N; HRN-56; HRN-57; HRN-57N; PRI-32; PRI-51; PRI-52; PRI-53; HRF-10; TER-9	HRH-6	ATC; ATF; ATR; DTC; DTF; DTR; COS-1; CRM-2H; CRM-2HE; CRM-2T; CRM-81J; CRM-91H; CRM-91HE; HRH-1; HRN-33; HRN-34; HRN-35; HRN-37; HRN-41; HRN-42; HRN-43; HRN-43N; HRN-63; HRN-64; HRN-67; PDR-2; PRI-41; PRI-42; PRM-91H; SJR-2; TER-4; TEV-1; TEV-2; TEV-3
CONTACT / TYPE OF LOAD	Material of contact $AgSnO_2$ contact 8A	Material of contact $AgSnO_2$ contact 12A	Material of contact $AgSnO_2$ contact 16A	Material of contact AgNi contact 8A	Material of contact AgNi contact 10A	Material of contact AgNi contact 16A
 AC1	250V / 8A	250V / 12A	250V / 16A	250V / 8A	250V / 10A	250V / 16A
 AC2	250V / 5A	250V / 3.7A	250V / 5A	250V / 3A	250V / 3A	250V / 5A
 AC3	250V /4A	250V /2.2A	250V / 3A	250V /2A	250V /2A	250V / 3A
AC5a uncompensated	X	230V / 2.2A (510VA)	230V / 3A (690VA)	230V / 1.5A (345VA)	230V / 2A (460VA)	230V / 3A (690VA)
 AC5a compensated	X	230V / 2.2A (510VA) till max output C=14UF	230V / 3A (690VA) till max output C=14UF	X	X	X
 AC5b	250W	1 120W	1000W	300W	500W	800W
 AC6a	250V /4A	X	X	X	X	X
AC7b	250V /1A	250V / 2.2A	250V / 3A	250V /1A	250V / 2A	250V / 3A
AC12	250V /1A	250V / 7.5A	X	250V /1A	250V / 6A	250V / 10A
 AC13	X	250V / 4.5A	X	X	250V / 3.8A	250V / 6A
 AC14	250V /4A	250V / 4.5A	250V / 6A	250V /3A	250V / 3.8A	250V / 6A
 AC15	250V /3A	250V / 4.5A	250V / 6A	250V /3A	250V / 3.8A	250V / 6A
 DC1	30V / 8A	24V / 12A	24V / 10A	24V / 8A	24V / 10A	24V / 16A
 DC3	30V / 3A	24V / 4.5A	24V / 3A	24V / 3A	24V / 3.8A	24V / 6A
 DC5	30V / 2A	24V / 3A	24V / 2A	24V / 2A	24V / 2.5A	24V / 4A
 DC12	30V / 8A	24V / 12A	24V / 6A	24V / 8A	24V / 10A	24V / 16A
 DC13	30V / 2A	24V / 1.5A	24V / 2A	24V / 2A	24V / 1.3A	24V / 2A
 DC14	X	24V / 1.5A	X	X	24V / 1.3A	24V / 2A

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

Category of use	Typical use	EN
AC current, cosφ = P/S (-)		
AC-1	Non-inductive or slightly inductive load, resistance furnace Includes all appliances supplied by AC current with power factor (cos .) 0.95. Examples of usage: resistance furnace, industrial loads	60947-4
AC-2	Motors with slip-ring armature, switching off	60947
AC-3	Motors with short-circuit armature, motor switching when in operation This category applies to switching off motors with short-circuit armature while in operation. While switching, contactor switches current which is 5 up to 7 times rated current of motor.	60947-4
AC-4	Electro-motors with short-circuit armature: start up, braking by backset, changeover	60947
AC-5a	Switching of electrical gas-filled lights, fluorescent lights	60947-4
AC-5b	El. bulb switching Enables low contact loading due to resistance of cold fiber is many times smaller that the one of hot fiber.	60947-4
AC-6a	Switching of transformers	60947-4
AC-6b	Switching of capacitors	60947-4
AC-7a	Switching low inductive loads of home appliances and similar applications	60947
AC-7b	Load of motors for home appliances	60947
AC-8a	Switching of hermetically sealed motors of cooling compressors with manual reset switches against overload Hermetically sealed cooling compressors have to be placed in one box without external shaft or shaft padding and motor must operate with cooling liquid	60947
AC-8b	Switching of hermetically sealed motors of cooling compressors with manual reset switches against overload Hermetically sealed cooling compressors have to be placed in one box without external shaft or shaft padding and motor must operate with cooling liquid	60947
AC-12	Switching of semiconductor loads with separation transformers	60947-5
AC-13	Switching of semiconductor loads with separation transformers	60947-5-1
AC-14	Switching of low electro-magnetic loads (max.72 VA)	60947-5-1
AC-15	Management of alternating electro-magnetic loads This category applies to switching inductive loads with input for closed electro-magnetic circuit higher than 72 VA Use: switching coils of contactors	60947-5
AC-20	Connecting and disconnecting in unloaded states	60947-3
AC-21	Switching resistive loads, including low loading	60947-3
AC-22	Switching of mixed resistive and inductive loads, including low overloading	60947-3
AC-23	Switching of motor loads or other high inductive loads	60947-3
AC-53a	Switching of motors with short-circuit armature with semiconductor contactors	60947
DC current, t = L/R (s)	Note: Category AC 15 replaces formerly used category AC 11	
DC-1	Non-inductive or low inductive load, resistive furnaces	60947-4
DC-3	Shunt motors: start-up, braking by backset, reversion, resistive braking	60947-4-1
DC-5	Series motor: start-up, braking by backset, reversion, resistive braking	60947-4-1
DC-6	Non-inductive or low inductive loads, resistive furnaces – el. bulbs	60947-4-1
DC-12	Management of resistive loads and fixed loads with insulation by opto-electric element	60947-5-1
DC-13	Switching of electromagnets	60947-5-1
DC-14	Switching of electromagnetic loads in circuits with limiting resistor	60947-5-1
DC-20a(b)	Switching and breaking without load(a: frequent switching ,b: occasional switching)	60947-3
DC-21a(b)	Switching ohmic loads including limiting overloading (a: frequent switching ,b: occasional switching)	60947-3
DC-22a(b)	Switching of compound ohmic and inductive loads including limited overloads (e.g. shunt motors) (a: frequent switching, b: random switching)	60947-3
DC-23	Switching of highly inductive loads (e.g. series motors)	60947-3

How can you distinguish for which load is our product (relay) designated?
Our company record this information on a products and also in our catalogue, instruction manual and other promotional and technical material (website etc.).
It is important to realize that it is not always possible to point out load because of lack of information about the device (user cannot measure cos) or it is not possible because of inconstancy of parameters of switched device.
Manufacturer of relays records always guaranteed parameters in ideal conditions which are done by a norm (temperature, pressure, humidity, etc.) and reality can be in a lot of cases different.
Category of use (classification) of a particular relay is done by material of output contacts.
Basic types of materials which are used for production of contacts for high-performance relay are:
a)AgCd – suitable for switching ohmic loads. Before of harmfulness of Cd, this type of contact is remitted.
b)AgNi –designated for switching resistive loads , good quality switching and conducting (contact doesn't oxidate) small currents/voltages ,it is not designated for surge currents and loads with inductive component
c)AgSn or AgSnO –suitable for switching loads with inductive component , not suitable for switching small currents/voltages, it is more resistive to surge currents, suitable for DC voltage switching, less suitable for switching loads of ohmic type
d)Wf (wolfram)-special contact designated for switching surge currents with inductive component
e)with gold (AgNi/Au)- Used for "improving" contacts for low currents/ voltages , prevents oxidation.

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 (technical and biological), basic is represented by 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, televisor...

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.

PRODUCT / STANDARD	levels according to ČSN EN 61000-4-4	according to norm ČSN EN 61000-4-5	EMC; EMISE according to norm ČSN EN
Time relays			
CRM-81J/230V	3	3	55022/A
CRM-81J/UNI	3	3	55022/A
CRM-83J/230V	3	3	55022/A
CRM-83J/UNI	3	3	55022/A
CRM-82TO	3	3	55022/A
SJR-2/230V	3	3	55022/B
SJR-2/UNI	3	3	55022/A
CRM-2T/230V	3	3	55022/B
CRM-2T/UNI	3	3	55022/A
CRM-2H/230V	3	3	55022/A
CRM-2H/UNI	3	3	55022/A
CRM-91HE/UNI	3	3	55022/A
CRM-2HE/UNI	3	3	55022/A
CRM-91H/230V	3	3	55022/B
CRM-91H/UNI	3	3	55022/A
CRM-93H/230V	3	3	55022/B
CRM-93H/UNI	3	3	55022/A
CRM-9S	-	3	61000-6-3
CRM-61	3	2	61000-6-3
SHT-1	3	3	55022/A
SHT-1/2	3	3	55022/A
SHT-3	3	3	55022/A
SHT-3/2	3	3	55022/A
PDR-2A/230V	2	3	61000-6-3
PDR-2A/UNI	3	3	61000-6-3
PDR-2B/230V	2	3	61000-6-3
PDR-2B/UNI	3	3	61000-6-3
PRM-91H/8	3	3	55022/B
PRM-91H/11	3	3	55022/B
PRM-92H	2	3	55022/A
PRM-2H	2	3	55022/A
SMR-T	2	2	61000-6-3
SMR-H	2	2	55022/A
SMR-B	2	2	61000-6-3
CRM-4	3	3	55022/B
CRM-42	3	3	55022/A
Power and auxiliary relays			
VS116K	3	3	55022/A
VS116U	3	2	55022/A
VS308K/230V	3	3	61000-6-3
VS308K/UNI	3	2	55022/B
VS308U	3	2	55022/A
VS316/24V	3	-	-
VS316/230V	3	3	55022/B
Dimmers			
DIM-2	2	2	61000-6-3
DIM-5	2	2	61000-6-3
DIM-14	2	2	55022/B
DIM-6	2	2	55014-1
DIM6-3M-P	2	2	55014-1
DIM-15	2	2	55014-1
SMR-S	2	2	55022/A
SMR-U	2	2	55022/B
DIM-10	2	2	55022/B

PRODUCT / STANDARD	levels according to ČSN EN 61000-4-4	according to norm ČSN EN 61000-4-5	EMC; EMISE according to norm ČSN EN
Power supplies			
PS-10-12; PS-10-24	3	3	55022/B
PS-30-12; PS-30-24	3	3	55022/B
PS-100-12; PS-100-24	3	3	55022/B
PS-30R	3	3	55022/A/B
ZSR-30	3	3	61000-6-3
ZNP-10-12V	-	3	55022/B
ZNP-10-24V	-	3	55022/B
Other modular devices			
SOU-1/230V	3	3	61000-6-3
SOU-1/UNI	3	2	55022/A
SOU-2	3	3	61000-6-3
SOU-3	3	3	55022/B
MR-41/230V	3	3	55022/A
MR-41/UNI	3	3	55022/A
MR-42/230V	3	3	55022/A
MR-42/UNI	3	3	55022/A
Monitoring relays			
HRN-41	3	3	61000-6-3
HRN-42	3	3	61000-6-3
HRN-33	3	3	55022/A
HRN-34	3	-	-
HRN-35	3	3	55022/A
HRN-37	3	3	55022/A
HRN-63	3	3	55022/A
HRN-64	3	-	-
HRN-67	-	-	-
HRN-55	3	3	55022/B
HRN-55N	3	3	55022/B
HRN-57	3	3	55022/B
HRN-57N	3	3	55022/B
HRN-54	3	3	55022/B
HRN-54N	3	3	55022/B
HRN-56/120	3	3	55022/B
HRN-56/208	3	3	55022/B
HRN-56/240	3	3	55022/B
HRN-56/400	3	3	55022/B
HRN-56/480	3	3	55022/A
HRN-56/575	3	3	55022/A
HRN-43	3	3	55022/A
HRN-43N	3	3	55022/A
PRI-32	3	3	61000-6-3
PRI-51/1	3	3	61000-6-3
PRI-51/2	3	3	61000-6-3
PRI-51/5	3	3	61000-6-3
PRI-51/8	3	3	61000-6-3
PRI-51/16	3	3	61000-6-3
PRI-51/0.5	3	-	-
PRI-52	3	3	55022/A
PRI-41	3	3	61000-6-3
PRI-42	3	3	61000-6-3
HRH-1/230V	3	3	55022/A
HRH-1/24V	3	3	55022/A
HRH-1/110V	3	3	55022/A
HRH-5	3	3	61000-6-3

PRODUCT / STANDARD	levels according to ČSN EN 61000-4-4	according to norm ČSN EN 61000-4-5	EMC; EMISE according to norm ČSN EN
HRH-4/230V	3	3	55022/B
HRH-4/24V	3	3	55022/B
HRH-6/AC	3	3	61000-6-3
HRH-6/DC	3	-	-
COS-1	3	3	55022/A
Thermostats			
TER-3A	3	3	55022/B
TER-3B	3	3	61000-6-3
TER-3C	3	3	55022/B
TER-3D	3	3	61000-6-3
TER-3E	3	3	55022/B
TER-3F	3	3	55022/B
TER-3G	3	3	55022/B
TER-3H	3	3	55022/B
TER-4/230V	3	3	55022/B
TER-4/24V	3	3	-
TER-9/230V	3	3	55022/B
TER-9/24V	3	3	-
TER-7	3	3	55022/B
ATR; ATC; ATF	2	2	55022/B
DTR; DTC; DTF	2	2	55022/B
TEV-1	3	3	55022/B
TEV-2	3	3	55022/B
TEV-3	3	3	55022/B
TEV-4	3	3	55022/B
RHT-1	3	3	55022/B
RHV-1	3	3	55022/B

As is our good tradition, we have always been seeking for a maximum universality of our products. We have successfully developed a dimmer DIM-15 and SMR-M, and because the LED lighting dimming - as well as dimming of energy saving lamps - is a relatively new area and there are not so many manufacturers who produce dimmable energy saving resources, we will gradually test and expand the chart below. We welcome your feedback and cooperation in addressing us your comments and new types.

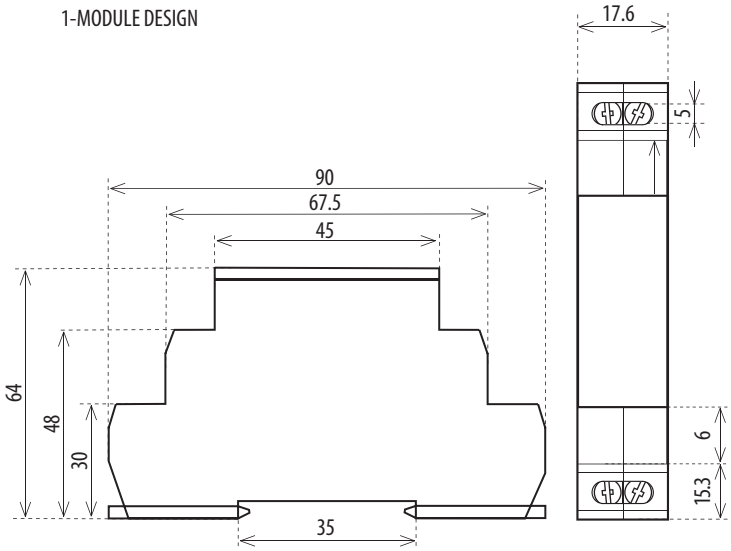
Type	Light sources ELKO Lighting	Socket	Dimmable	DIM 15	SMR-M	LIC-1	RFDSC-11 RFDSC-71	RFDEL-71B
	ELKO Lighting DLB-E27-806-2K7	E27	Yes	30 pc	16 pc	30 pc	30 pc	16 pc
	ELKO Lighting LED DLSL-GU10-250-3K	GU-10	Yes	50 pc	26 pc	50 pc	50 pc	26 pc

The maximum number of units can be connected to dimmers

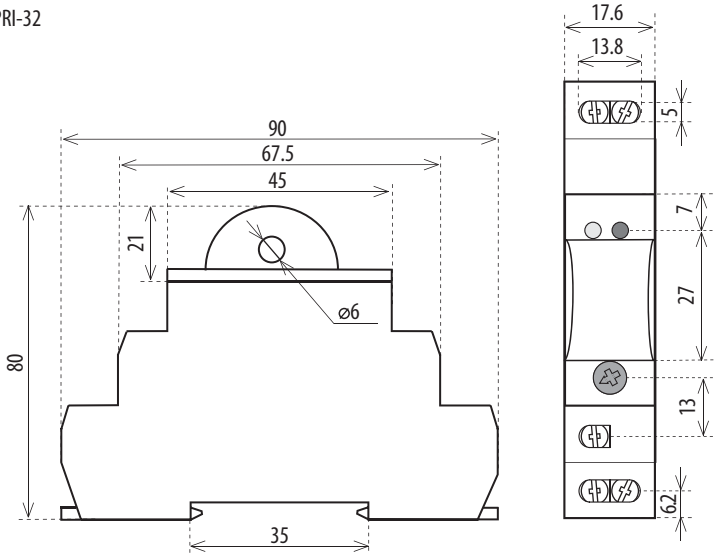
Type	Light sources from manufacturers	Socket	Dimmable
	Brilum LED line 18led	GU-10D	Yes
	Brilum LED line	GU-10P	Yes
	Brilum LED line JCR-27D 48Led	E27	Yes
	Elim SMD-W12	GU-10	Yes
	Elim SDW21	GU-10	Yes
	Elim SMD-W20	GU-10	No
	Panlux E27L1-81120/T	E27	No
	LED LAMPJDRE27	E27	Yes
	Brilum Led line white 21led	GU10D	Yes
	Osram dulux el.dimmable lumilux warm white 1230lm	E27	Yes
	Megaman dimmerable 2700K DEC01	E14	Yes
	Lumee GU 10-60-CW-120	GU-10	Yes
	Lumee GU 10-P-60-CW-120	GU-10	Yes
	Lumee JDRE 14-60-CW-120	E14	Yes
	Lumee Ball-80-CW	E14	Yes
	Philips Master 20W	E27	No
	Led Osram Decospot 0,75W	GU-10	No
	Led Philips Master 7W	GU-10	No
	Philips LEDspot MV 4W GU10 40D	GU-10	Yes
	Philips LEDspot MR 16 LV 4W GU5,3 24D	GU-5.3	No
	Philips LEDspot MV 3W GU10 25D	GU-10	No
	Energetic BULB Warm White 250 Lumen	E27	Yes
	Energetic BULB Clear Warm White 250 Lumen	E27	Yes
	Energetic Warm White Reflector GU10 600 CD	GU-10	Yes
	Energetic Cool White Reflector GU10 550 CD	GU-10	Yes
	Energetic Warm White Dimmer 1200 Lumen	E27	Yes
	Energetic Wram White 3 Step Dimmer 1300 Lumen	E27	No
	Energetic Wram White 3 Step Dimmer 520 Lumen	E27	No
	TR-0WGE-05	E27	No
	Paulmann reflector electrobnic 7W GU 10	GU-10	No
	Osram parathom classic A 40	E27	No
	Osram parathom classic B 25	E14	No
	Osram parathom PAR16	GU-10	No
	EMOS 48led 2W	E14	Yes
	EMOS dimmable saving fluorescent lamps 20W	E27	Yes

Products	Packing	Design
COS-1, HRH-1, HRN-41, HRN-42, HRN-43, PDR-2, PRI-41, PRI-42, PS-12, PS-24, PS-R, ZSR-30, ZNP-10, ZTR-10, HRN-56/480, 575	Packing of 3-MODULE relay - 1 pc	
SHT-1, SHT-3, SHT-1/2, SHT-4, SOU-2, TER-9,	Packing of 2-MODULE relay - 1 pc	
PRM-91H/11, PRM-92H, PRM-2H	Packing of plug - in relay - 2 pc	
SMR-K, SMR-T, SMR-H, SMR-S, SMR-U, SMR-M	Packing of SMR-14 pc	
SOU-1, SOU-2, CRM-91HE , CRM-2HE	Packing of 1-MODULE relay with accessories	
VS116K, VS116U, VS308K, VS316/24, VS316/230, USS, VS	Packing of 1-MODULE relay - 12 pc	
CRM-81J, CRM-83J, CRM-82TO, CRM-61, CRM-9S, CRM-2H, CRM-2T, CRM-4, CRM-42, SOU-1, DIM-2, DIM-5, DIM-14, HRH-5, HRN-33, HRN-34, HRN-35, HRN-51, HRN-52, HRN-54, MR-41, MR-42, PRI-31, SJR-2, TER-3, TER-7, HRN-56, HRN-63, HRN-64, HRN-67	Packing of 1-MODULE relay - 10 pc	

1-MODULE DESIGN



PRI-32



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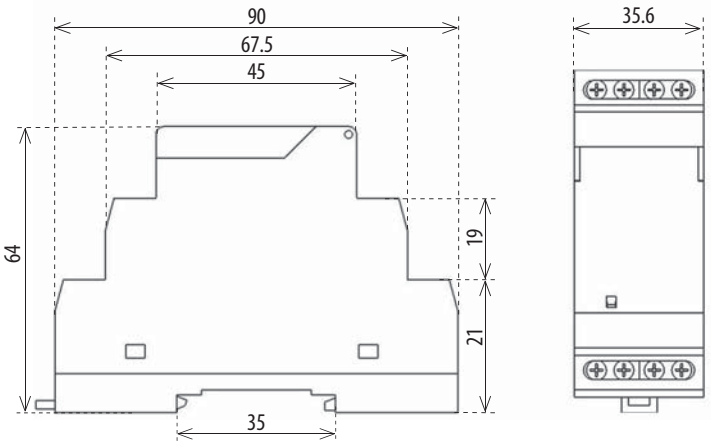

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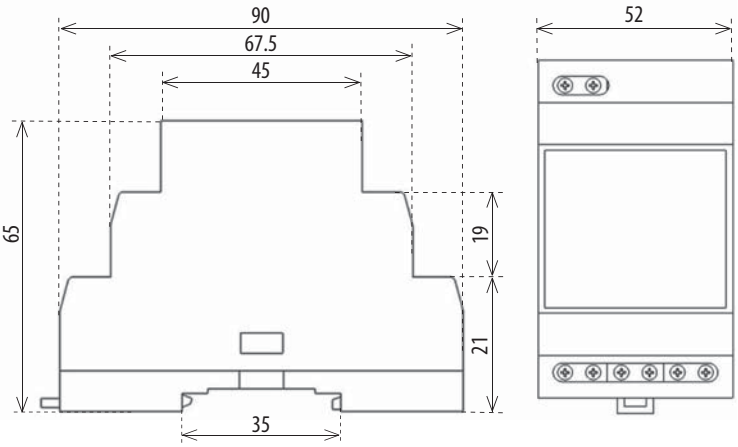
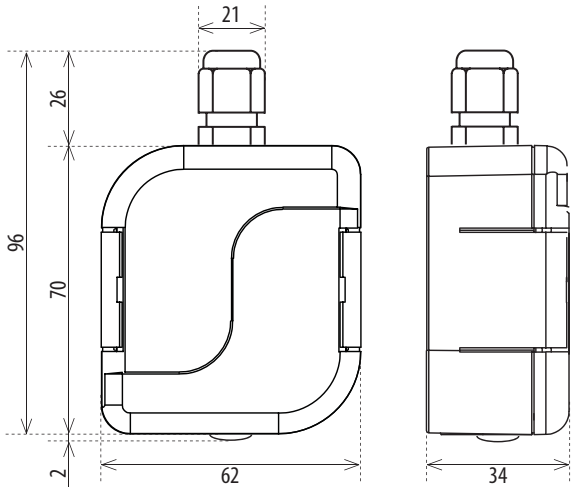
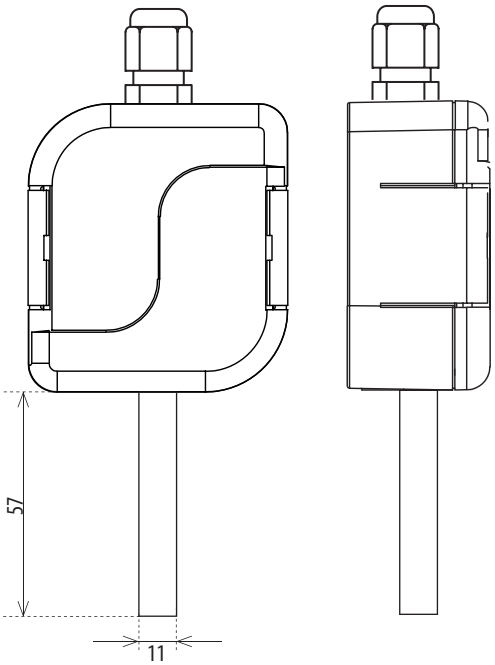


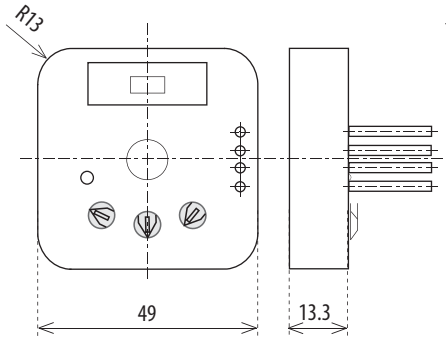
SOU-3



RHV-1, TEV-4



MINI
SMR-T, SMR-H, SMT-K



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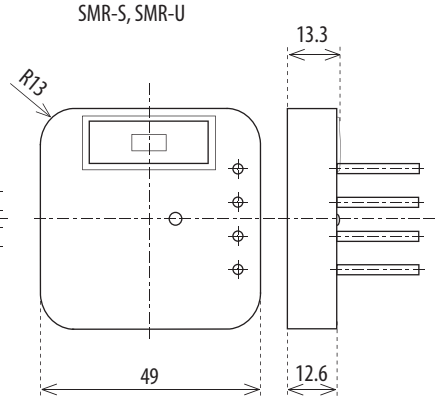
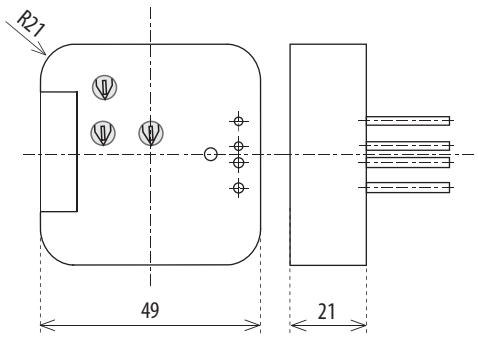
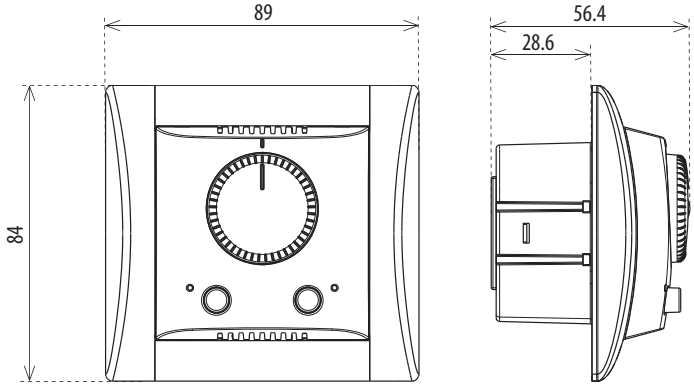
SMR-S, SMR-U



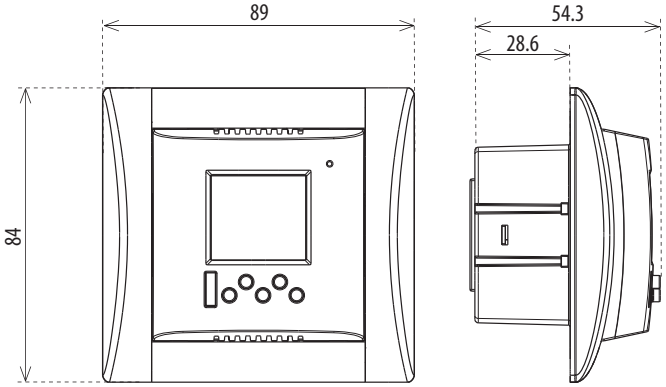
MINI
SMR-B



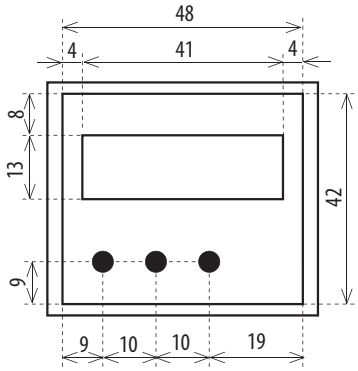
ATR, ATF, ATC



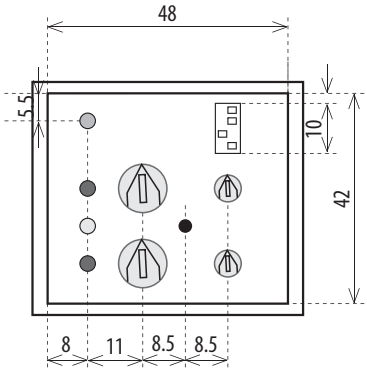
DTR, DTF, DTC



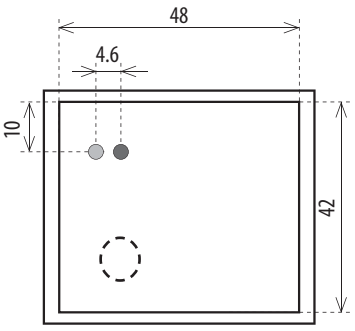
PANEL PDR-2/A, PDR-2/B



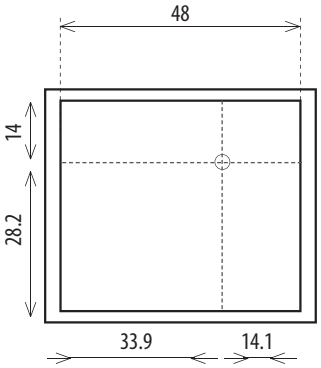
HRN-41, HRN-42, HRN-43,HRN-43N,
PRI-41, PRI-42, COS-1, HRH-1, TER-4



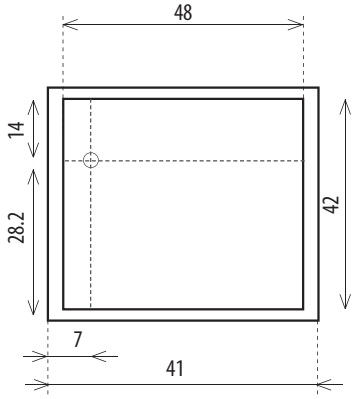
PANEL ZSR-30, PS-30-R, ZNP-10



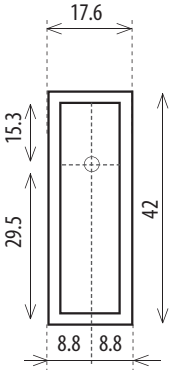
PS-100-12, PS-100-24



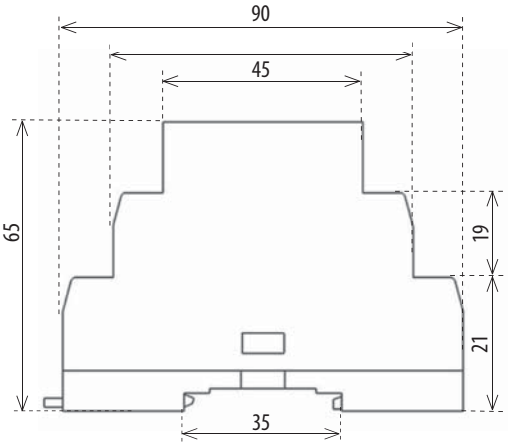
PS-30-12, PS-30-24

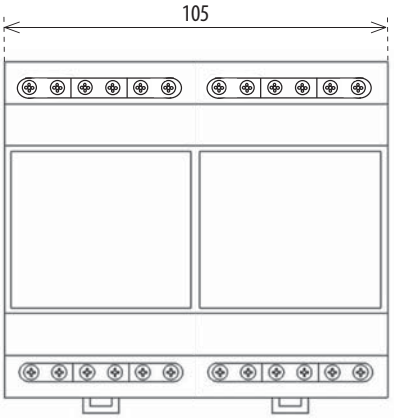


PS-10-12, PS-10-24

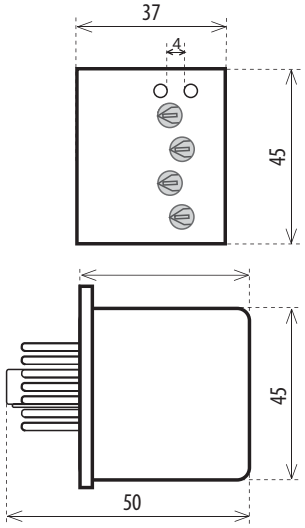


6-MODULE DESIGN



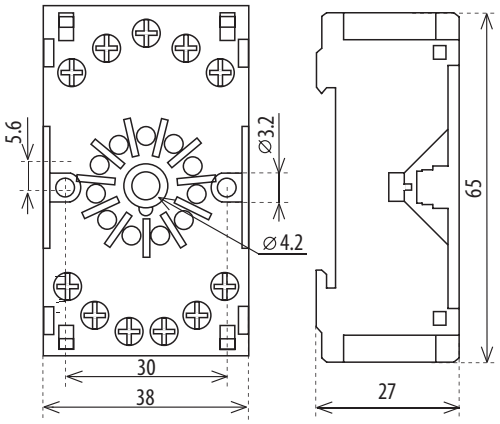


PRM-91H/11. PRM-91H/8 PRM-92H, PRM-2H



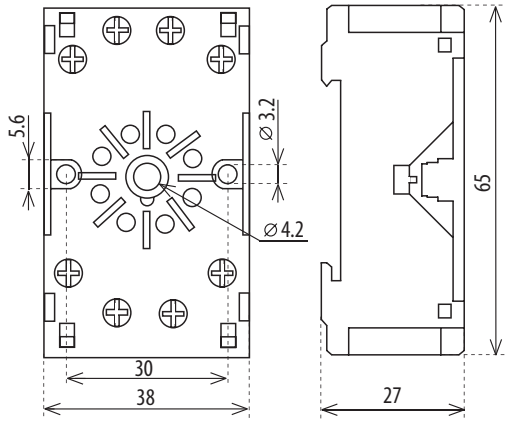
Socket for PRM-91H/ 11, PRM-92H, PRM-2H, 750

ES-11

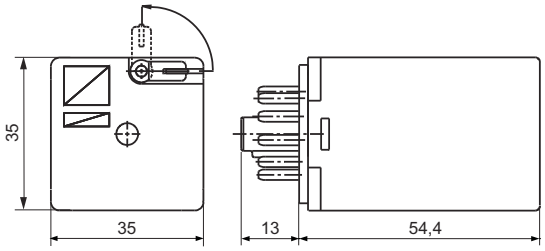


Socket for PRM-91/8

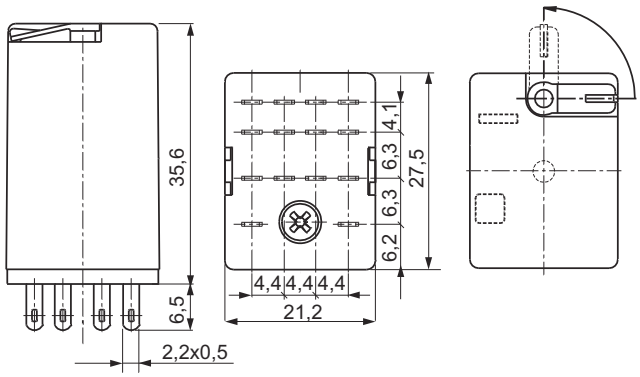
ES-8



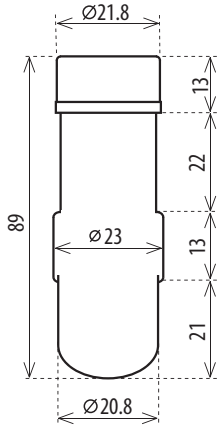
750L



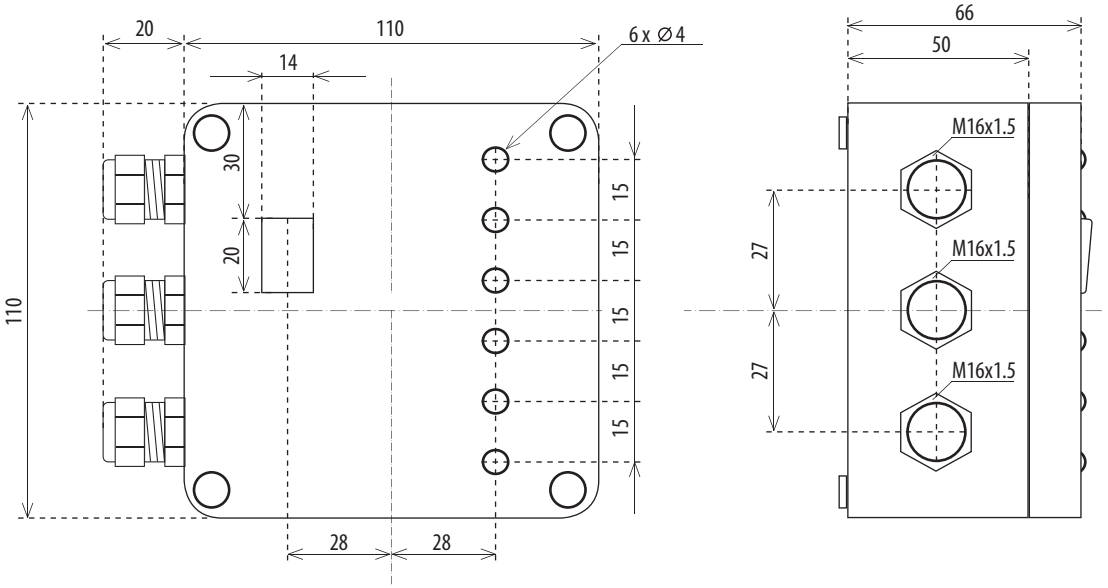
782L



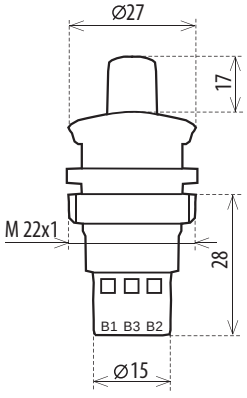
photosensor SKS

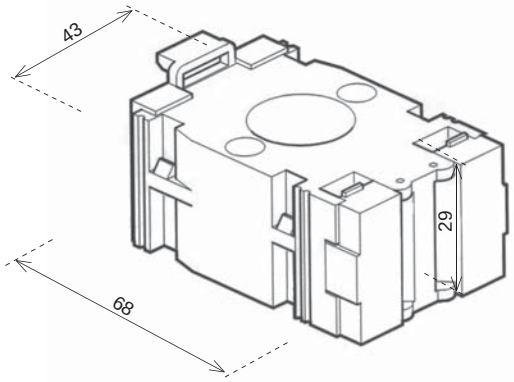


HRH-6

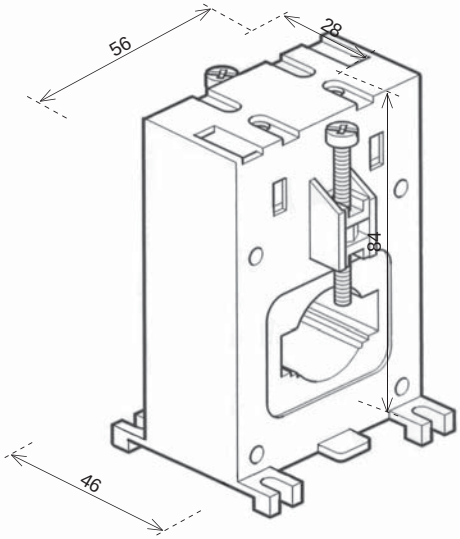


external potentiometer
for CRM-2HE, CRM-91HE

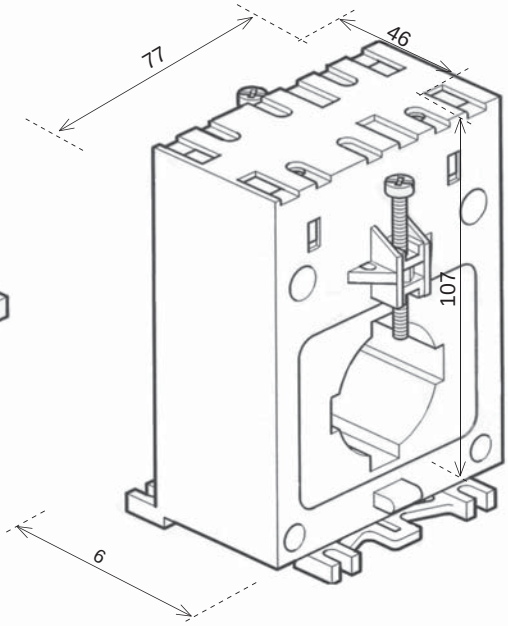




SR051; SR101; SR151

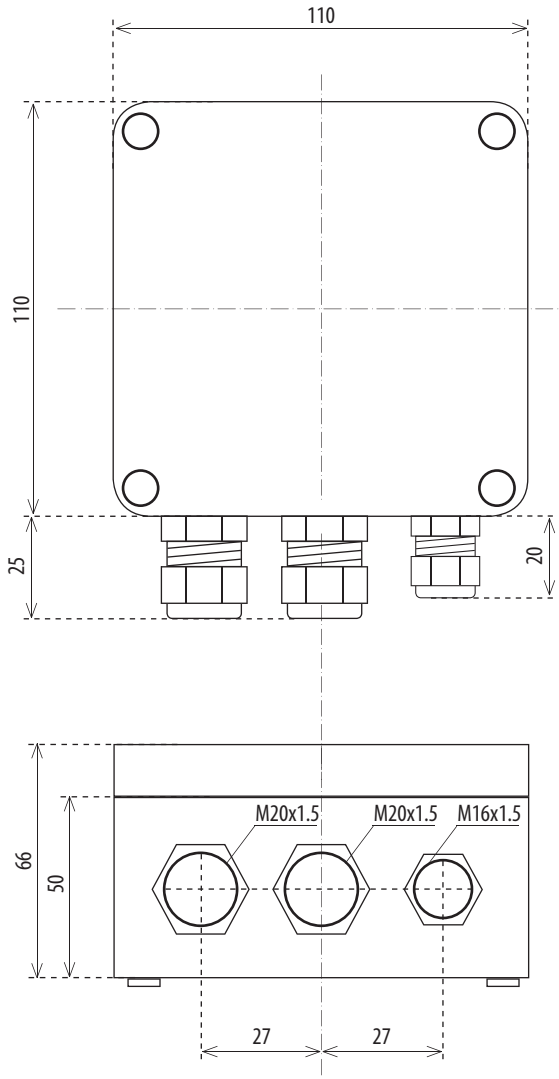


SR200; SR250

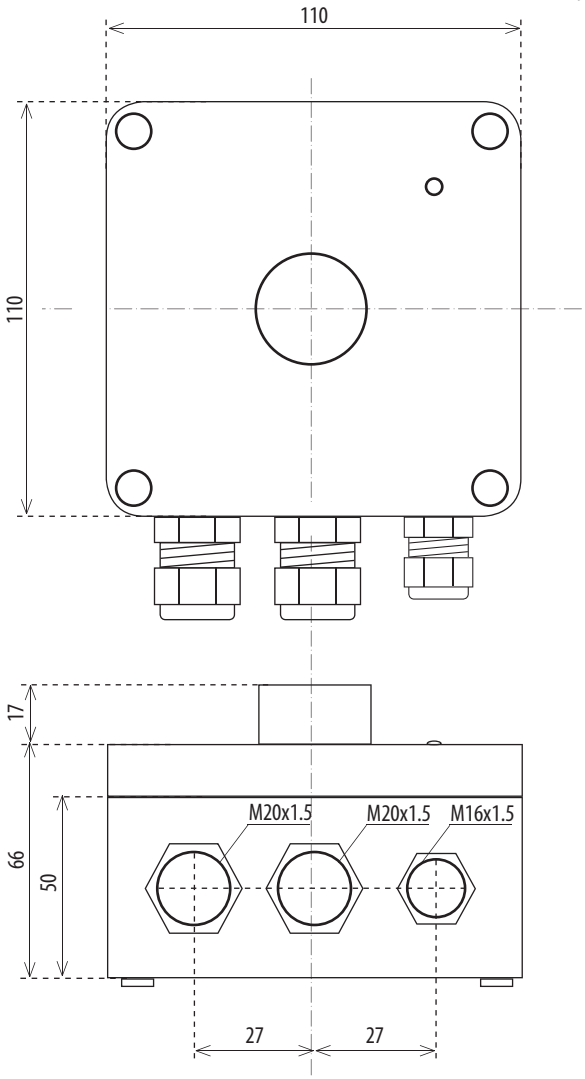


SR300; SR400; SR600

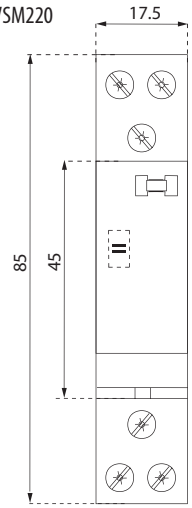
box IP66 for TEV1,2



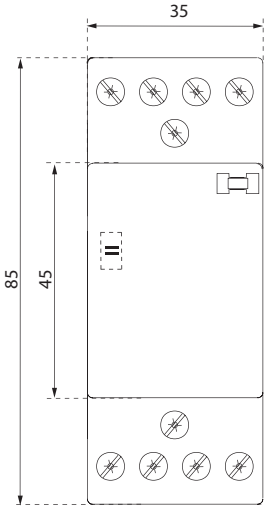
box IP66 for TEV3



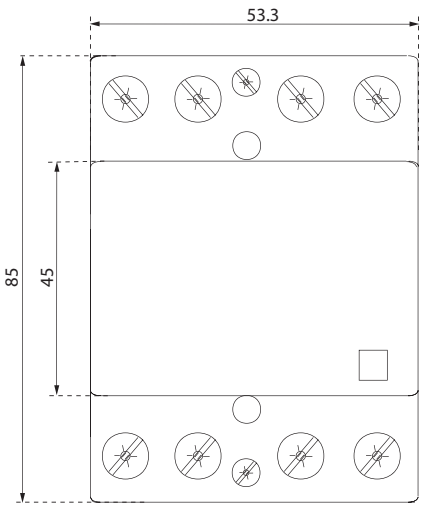
VS120
VS220
VSM220

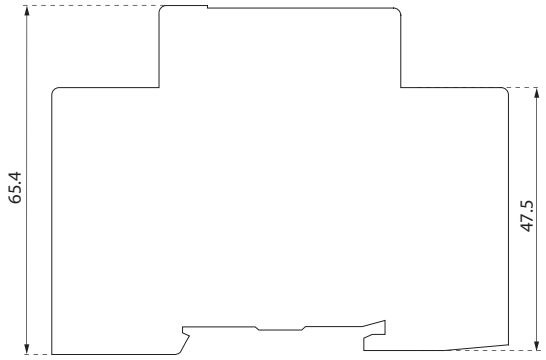


VS425
VSM425

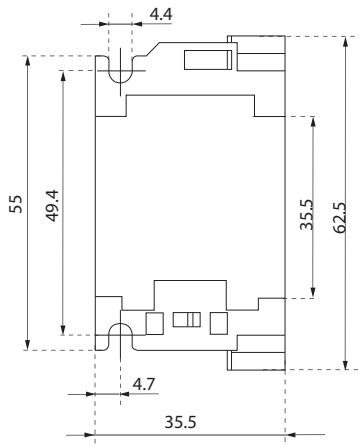


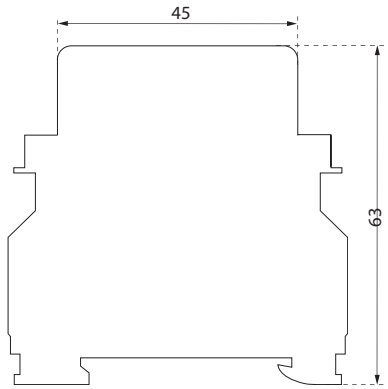
VS440
VS463



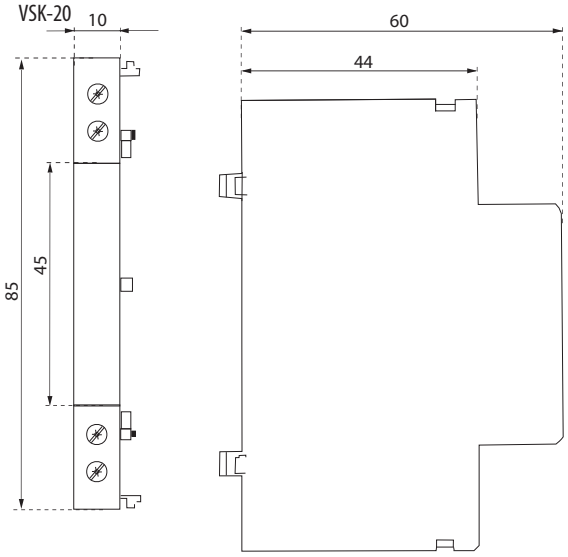


VS420

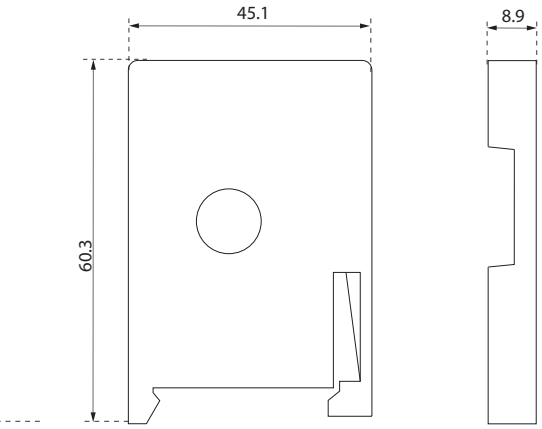




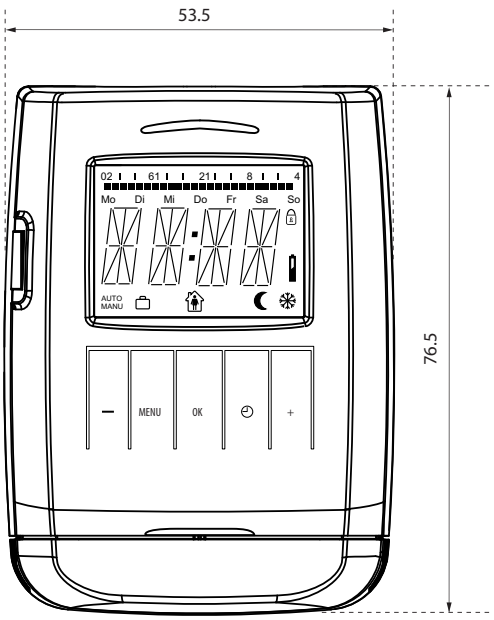
VSK-20



IKV

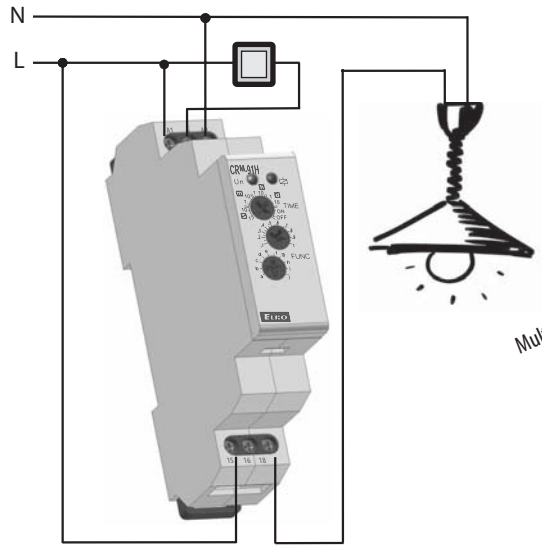


ATV-1

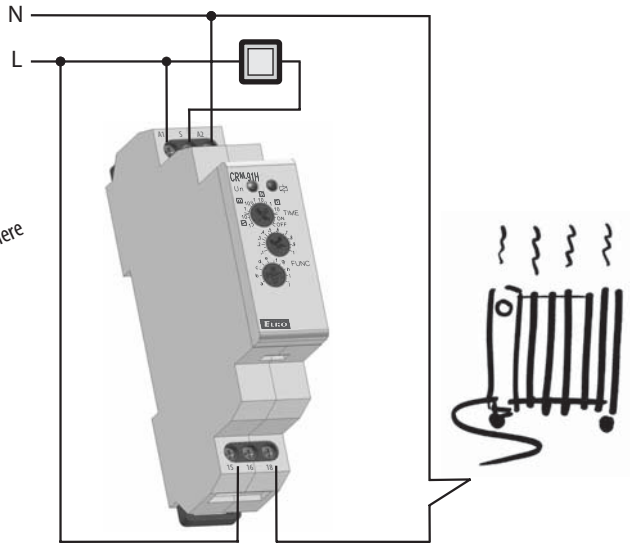


Multifunction time relay CRM-91H,CRM-93H

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

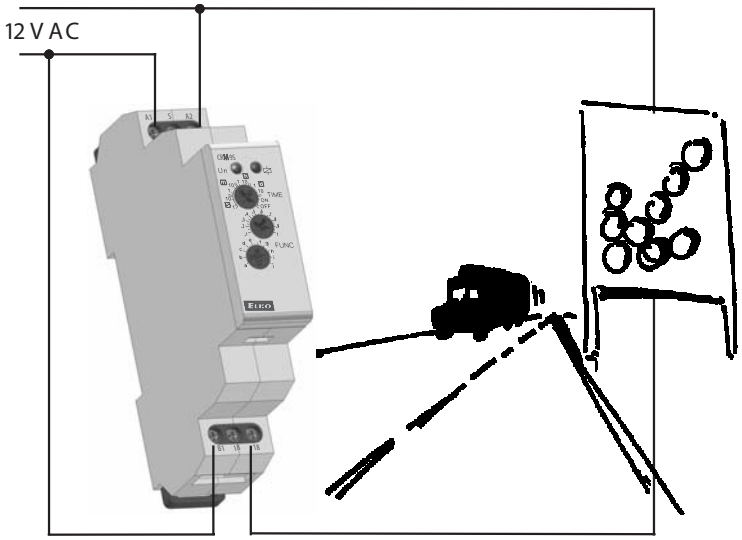


Multifunctionality always and everywhere



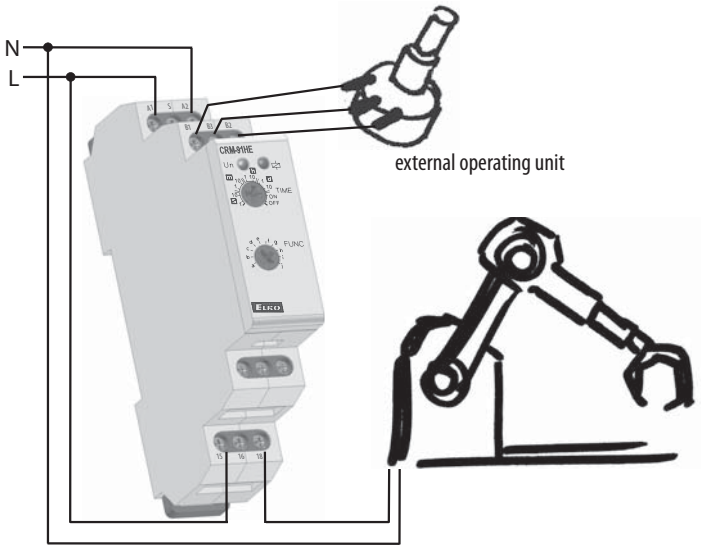
Multifunction time relay with contactless output CRM-9S

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



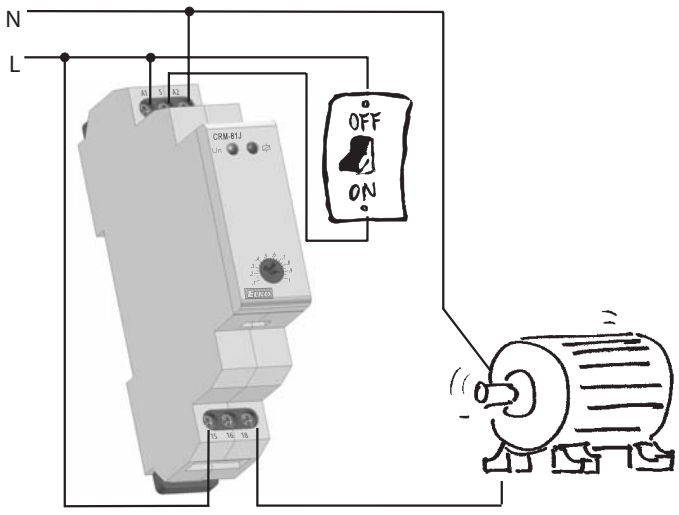
Multifunction time relay with external potentiometer CRM-91HE

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



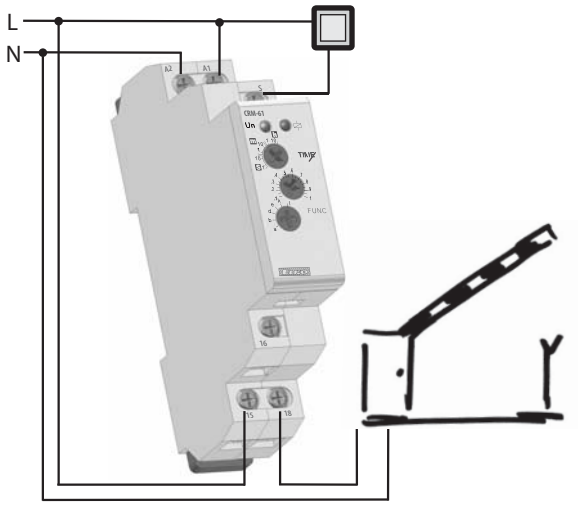
Singlefunction time relay CRM-81J

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

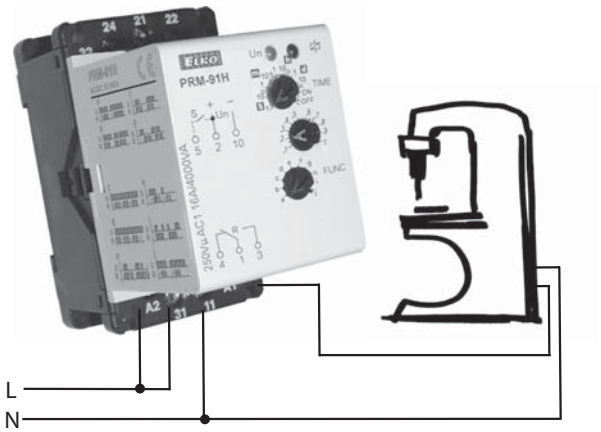


Multifunction time relay CRM-61

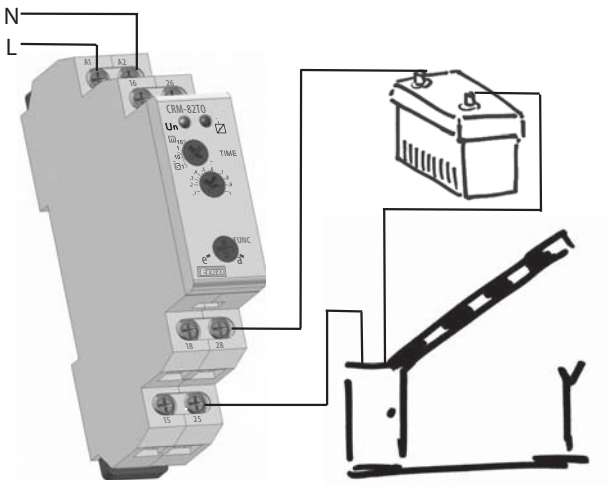
- for electronic appliances, light control, heating, motors, fans.....



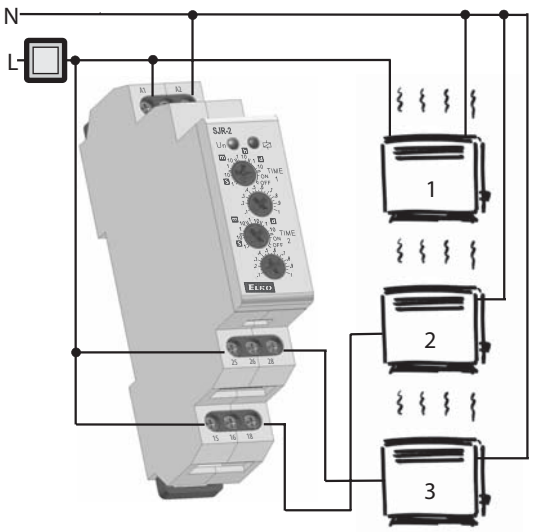
Time relay plug-in type PRM-91H, PRM-92H
- serves to control light signallization, heating, motor and fan control... etc.



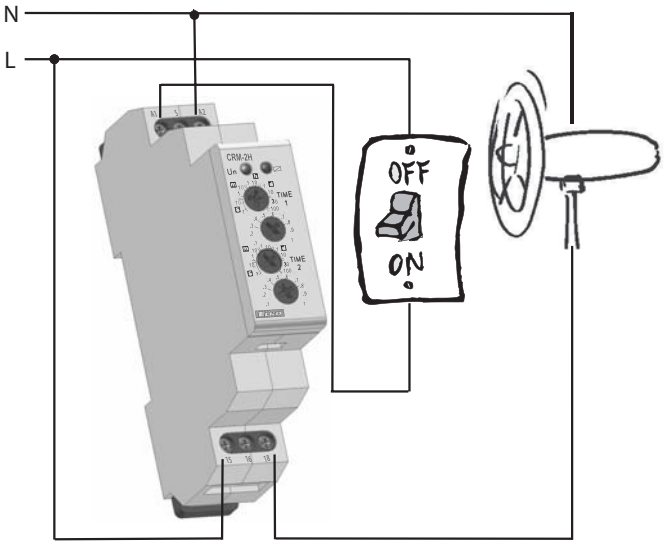
Delay OFF without supply voltage CRM-82TO
- delayed back-up switch off at current failure (emergency illumination, emergency respirator)



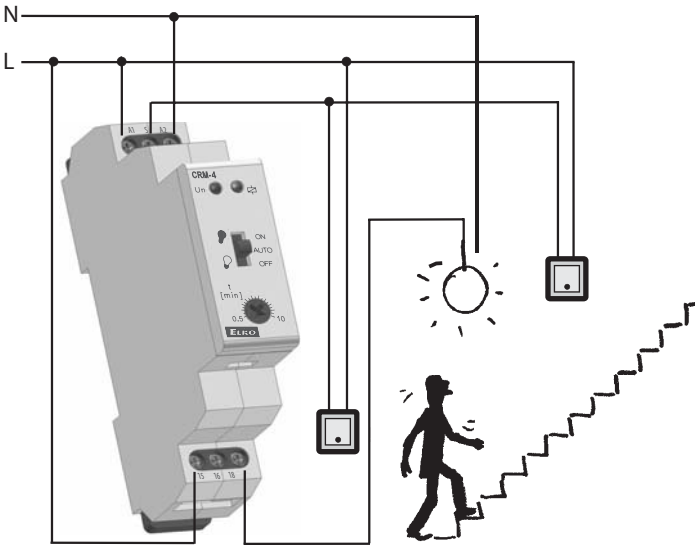
Doublestage delay unit SJR-2
- for sequential load switching, electric furnaces, heaters....



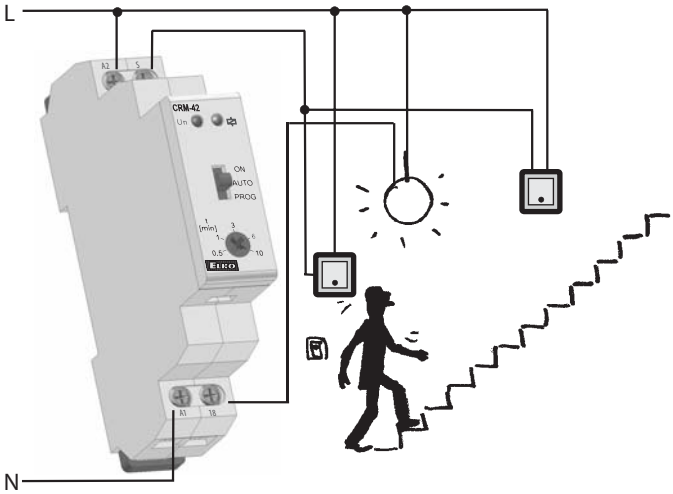
Asymmetric cycler CRM-2H
- regular rooms ventilation, cyclic humidity exhaustion, illumination controlling, circulation pump, flash, warning appliances, regular pump down, regular irrigation via electromagnetic valve



Staircase switch CRM-4
- staircase automatic systems, ventilators switching, for multiplace operating illumination on the staircases and halls...

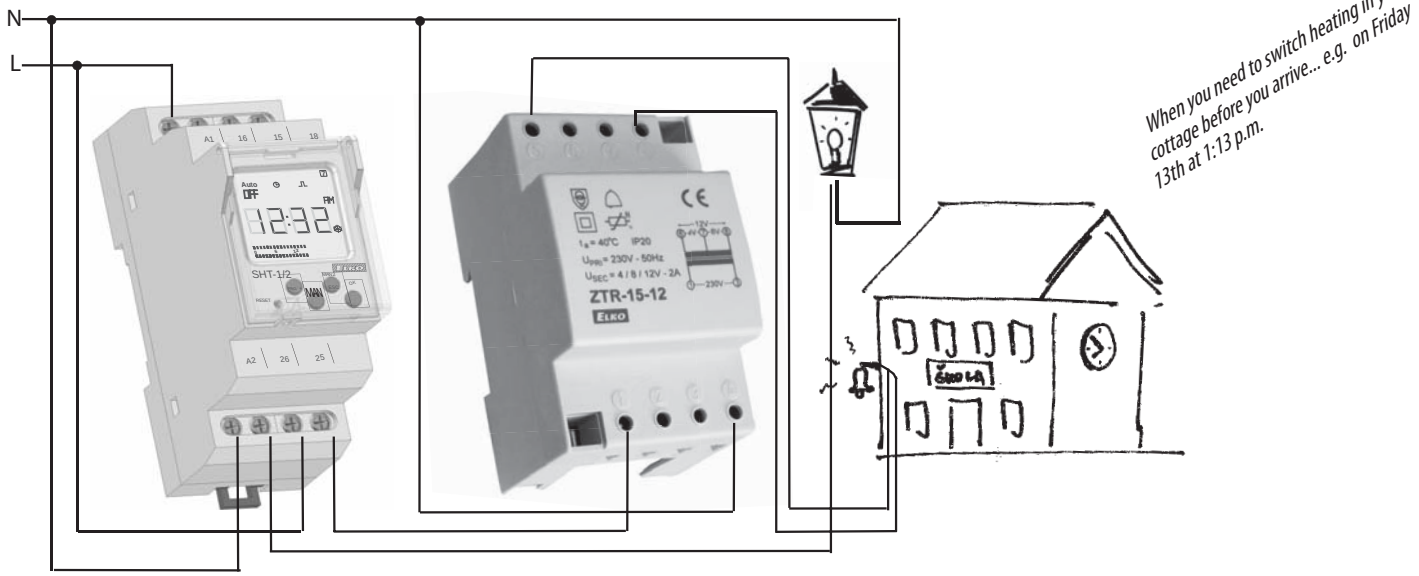


Progammable staircase automat with signalling before switch off CRM-42
- starcaise illumination operation
- on-coming switch off signalling (flash = comfort + safety together)



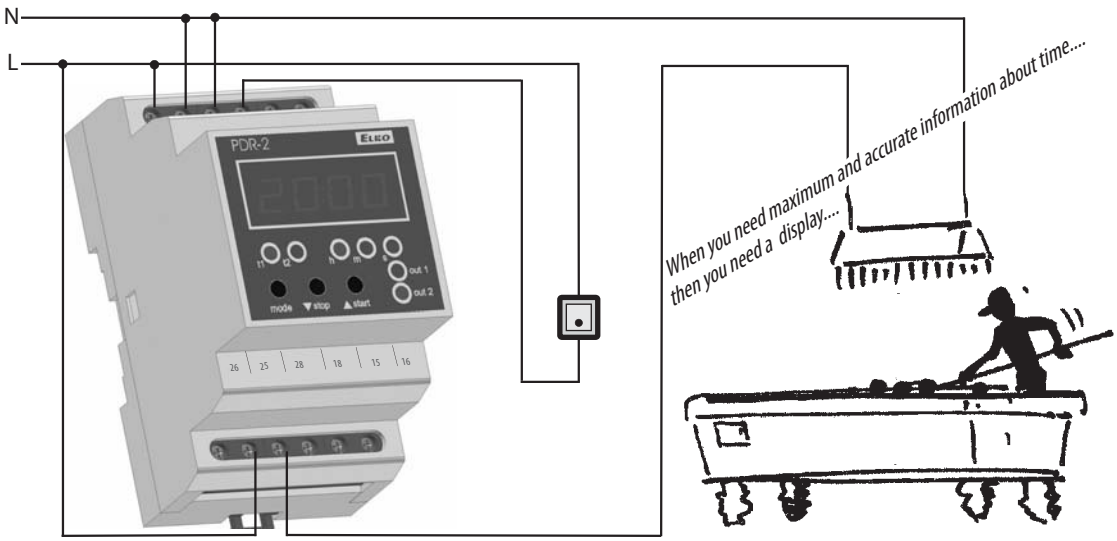
Digital time switch SHT-1/2

- 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 could be controlling combinated (rooms ventilation, irrigation controlling, bell at school or in church...)



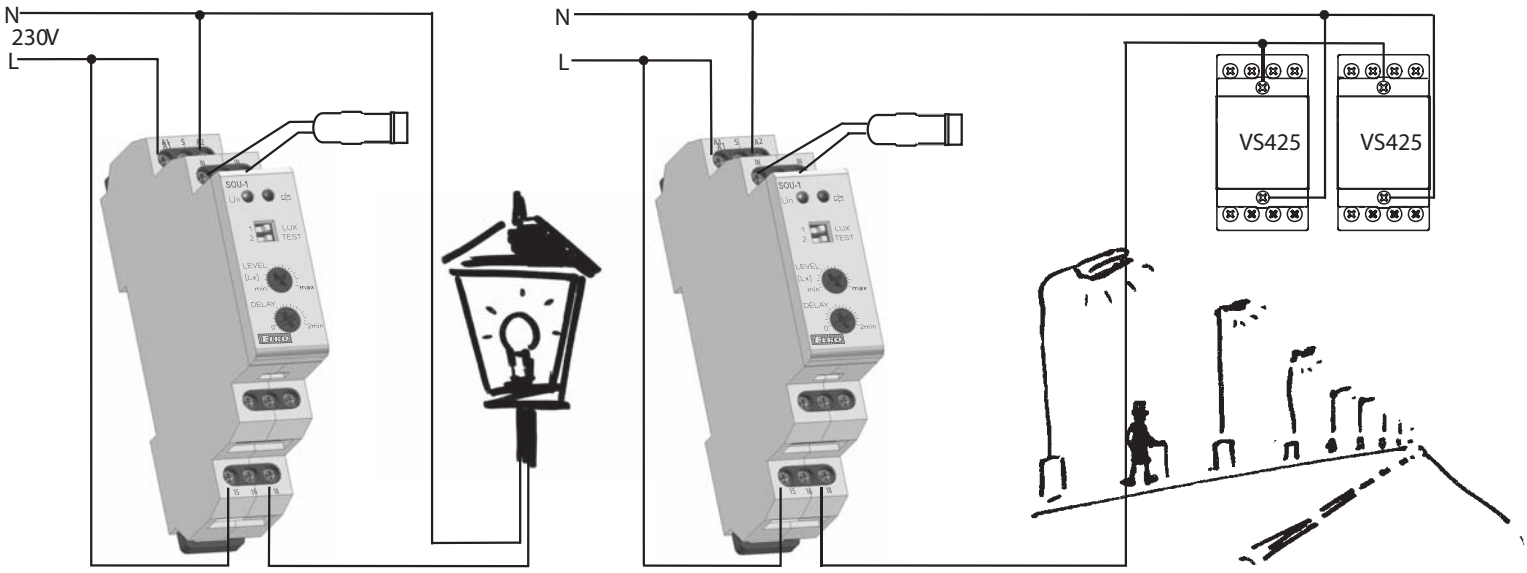
Programmable digital relay PDR-2

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



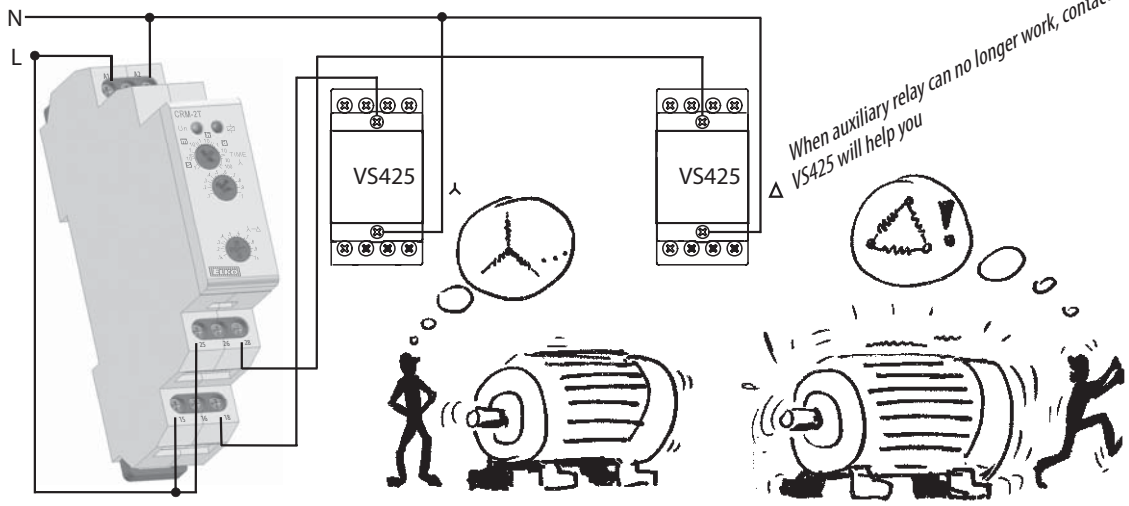
Twilight switch SOU-1

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



Delay on star/delta CRM-2T

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

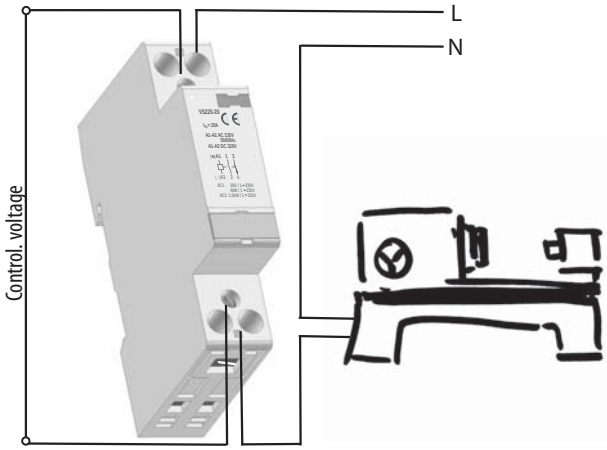


Mini contactor VS425

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

Modular contactor VS120. VS220. VS420. VS425

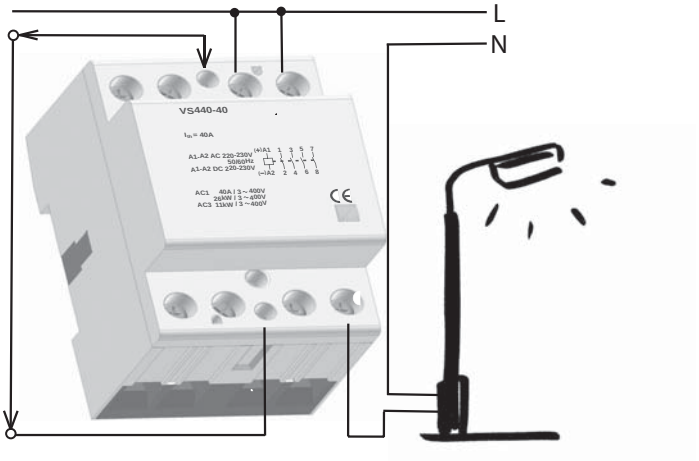
- to switch circuits for supply and control of heating, lights, air-conditioning and other el. devices. Switches loads AC-1, AC-3, AC-7a, AC-7b, AC-15



Modular contactors VS440. VS463

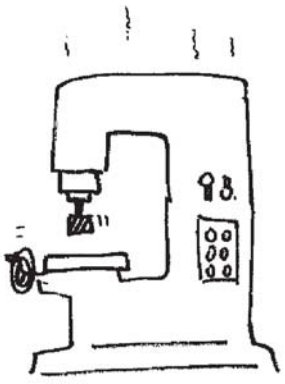
- to switch supply and control circuits for heating, air-conditioning and other el. devices, switching 3-phase motors

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



Auxiliary plug-in relays 750. 782

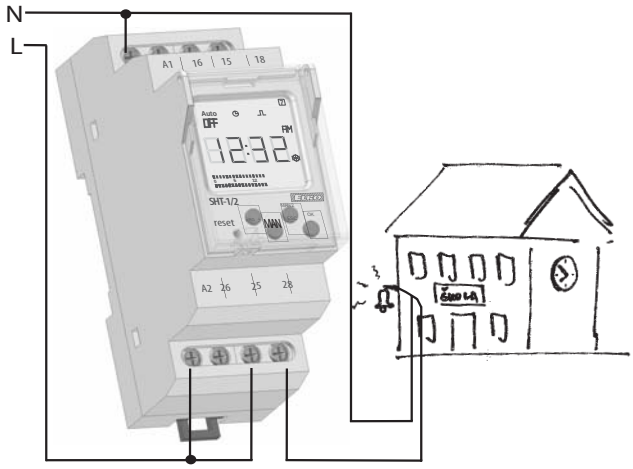
- to switch bigger output (load)



replacement of current plug-in relays when servicing...

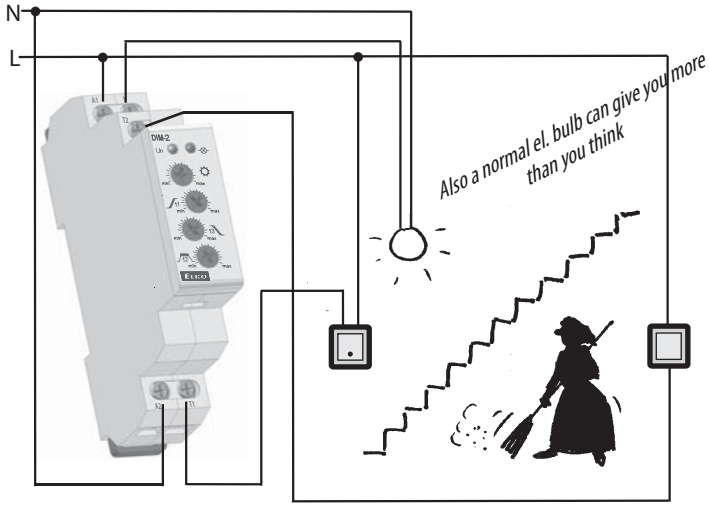
Digital time switch SHT-1, SHT-1/2

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



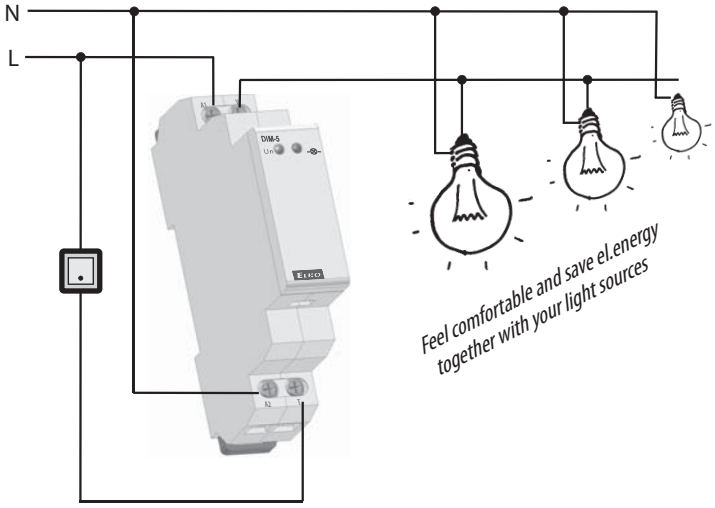
Staircase automat with dimming DIM-2

- step by step (fluent) dim up, adjusted time is ON and fluent dim down (e.g. possible to adjust permanent shine to min. brightness everlasting light)
- block of flats (entry, halls, staircases), garden lighting



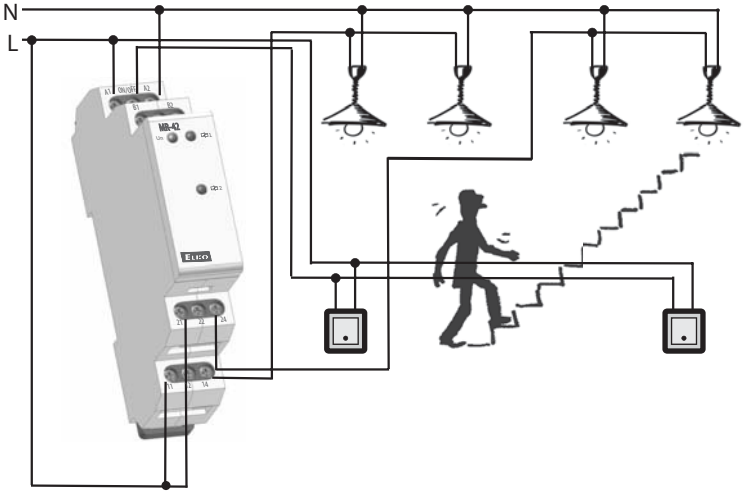
Controlled dimmer DIM-5

- short press ON/OFF, long press - brightness regulation, is in memory. Other presses activate memory
- switch on and dimming of hall, staircase ...



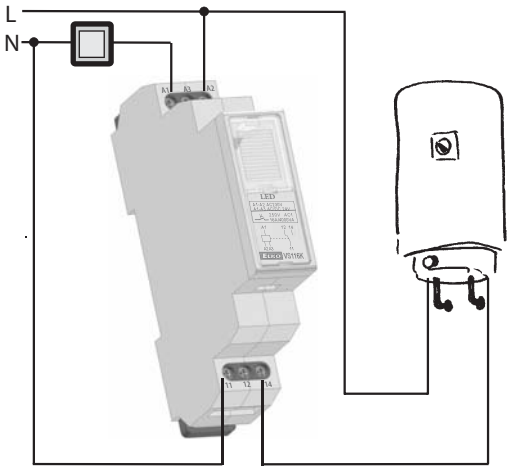
Memory relay MR-41, MR-42

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



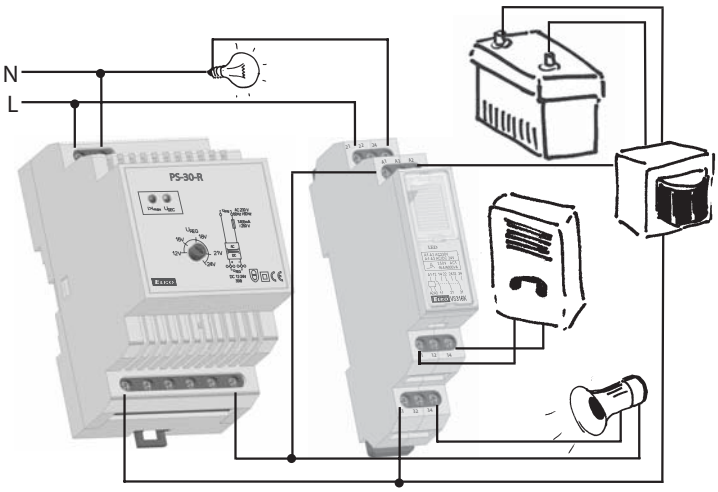
Power relays VS

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



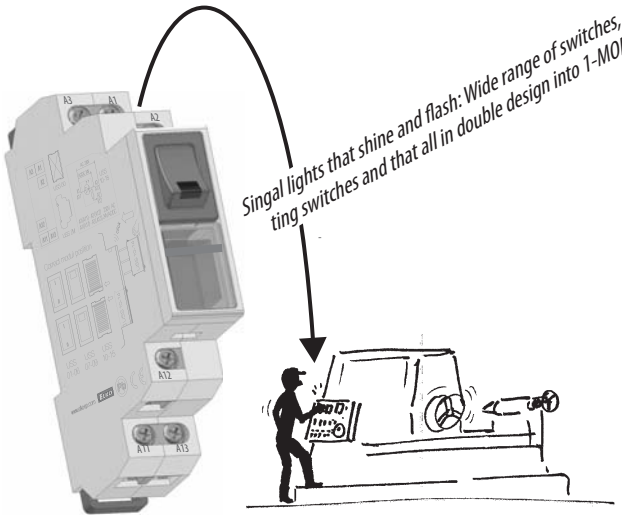
Switching power supply PS-R

- 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

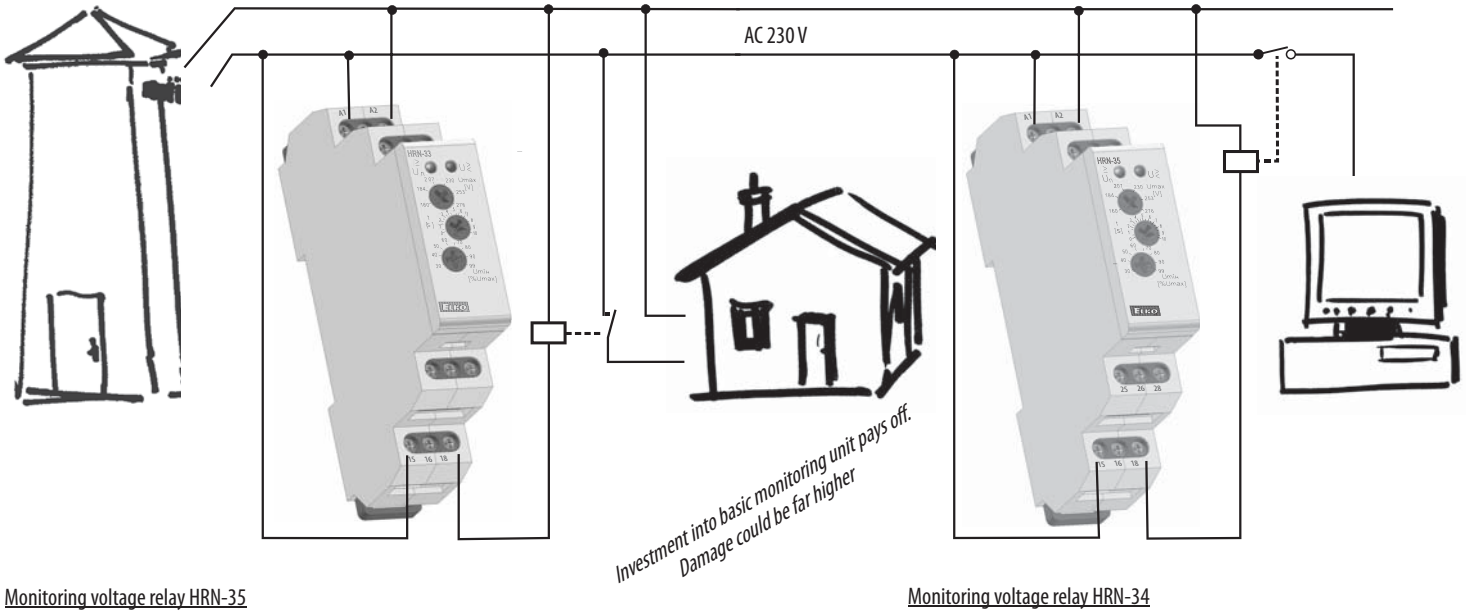


Controlling and signalling units USS

- compact dimensions, elegant design, wide range of use, configuration for request
- switching and signalling in switchboard, controlling centre, automation...

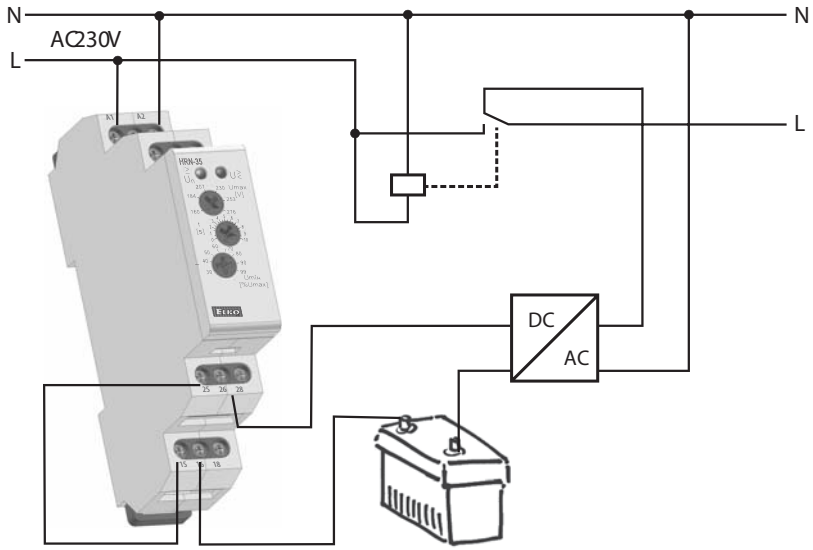


Monitoring voltage relay HRN-33 (35)
- monitoring of mains voltage for appliances inclinable to supply tolerance

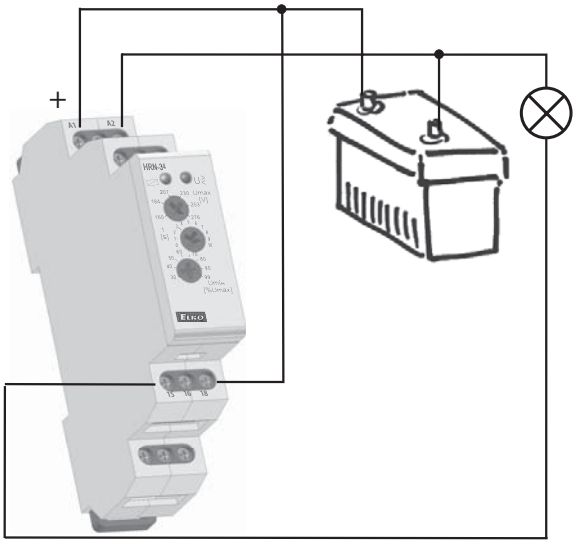


Monitoring voltage relay HRN-33 (35)
- protection of appliances against under-/overvoltage

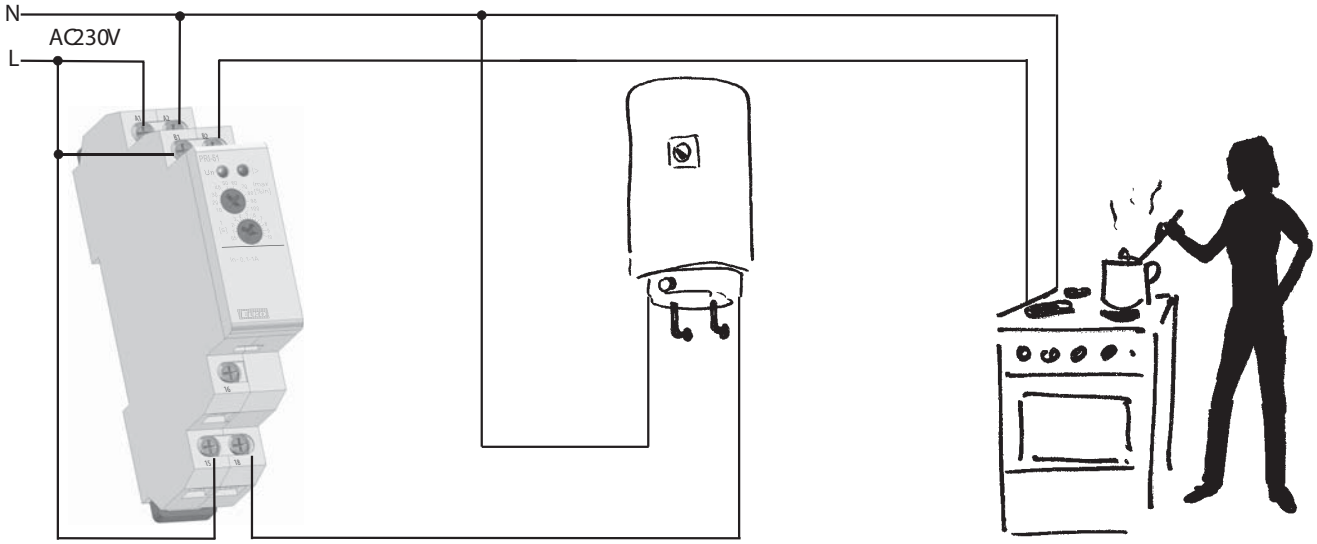
Monitoring voltage relay HRN-35
- start of back-up supply in case of failure



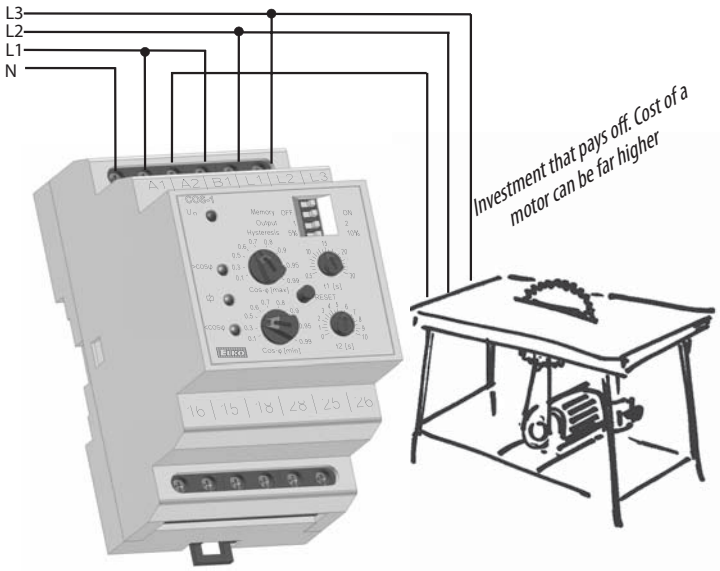
Monitoring voltage relay HRN-34
- load disconnected when voltage declines or battery is discharged



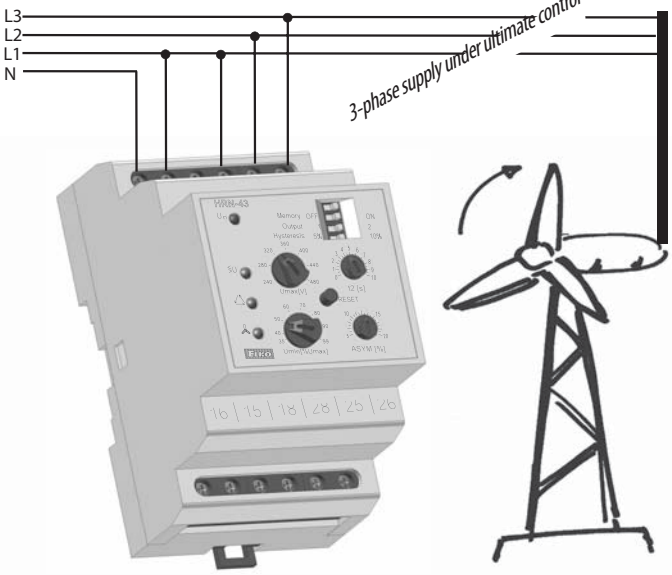
Monitoring current relay PRI-51, PRI-32
- current-limiting relay (on one branch two appliances, which never work together), controlling systems, motors, heating, current indication, controlling of 1-phase motor run down, during the installation of main housing switchboard could be controlled via eye,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



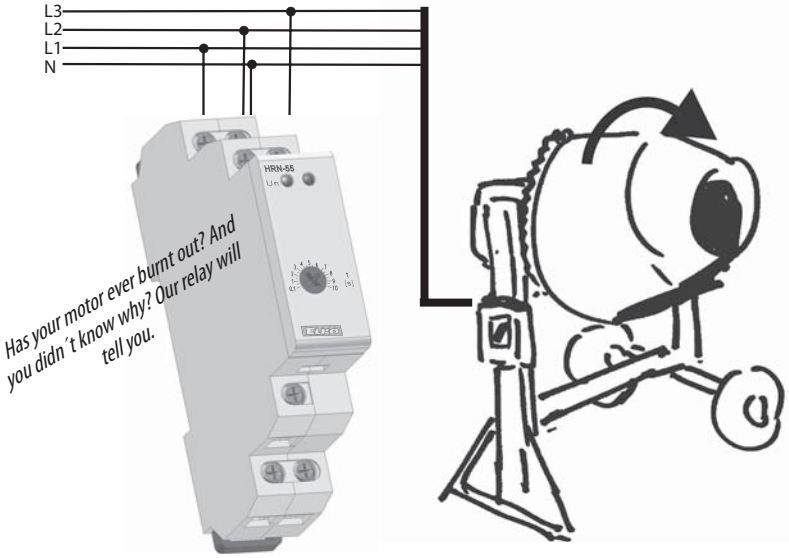
Relay monitoring power factor COS-1
- monitors power-factor in 3-phase mains / unloading of motors, pumps, lift systems



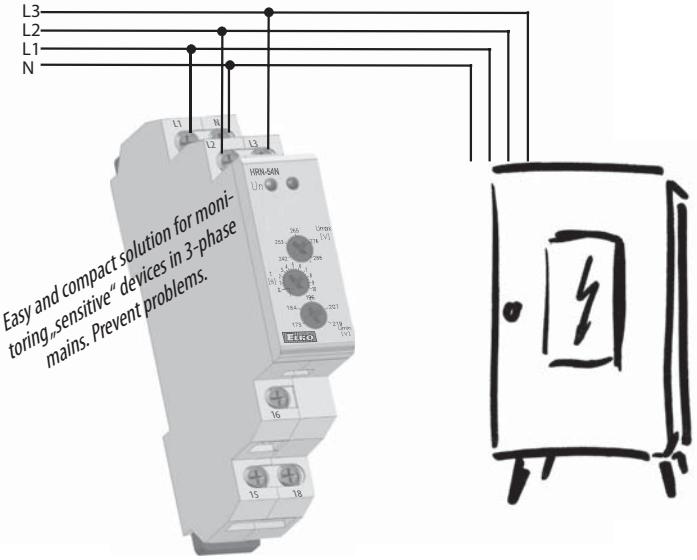
Monitoring voltage relay HRN-43
- regulation of voltage from generator, water el. plants, 3-phase control in the main
- monitors and protects main´s quality



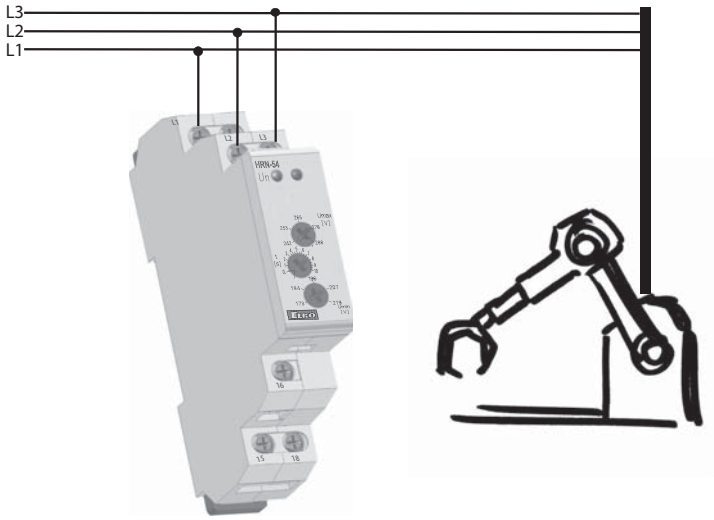
Relay monitoring sequence and failure of phases HRN-55, HRN-55N
- monitoring of proper motor rotation, electric drive, etc.



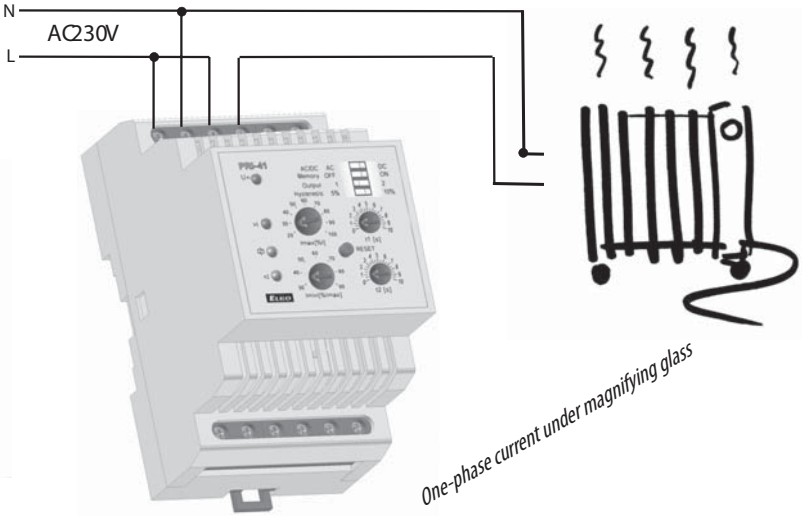
Relay monitoring over-/undervoltage in 3-phase mains HRN-54N
- monitoring voltage in switchboard, protection of appliances



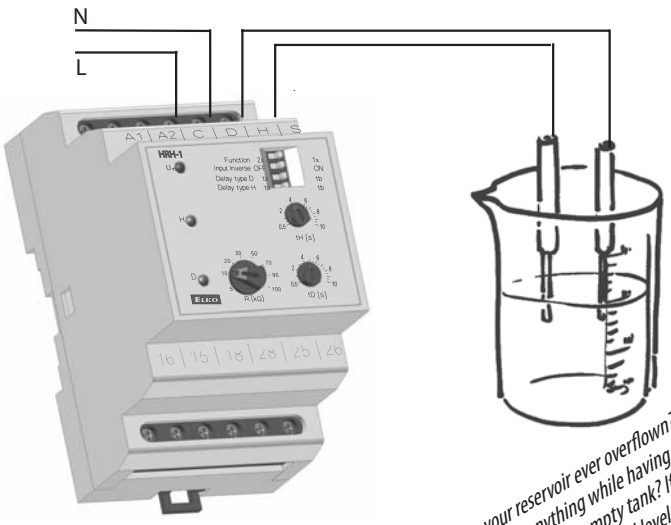
Monitoring voltage relay for under/vervoltage for 3-phase mains HRN-54
- confortable monitoring of 3-phase mains



Monitoring current relay PRI-41 (PRI-42)
- monitoring over-/-underload (machine, motor ...)
- monitoring consumption, diagnostics of distant appliance (short circuit, increased consump. ...)

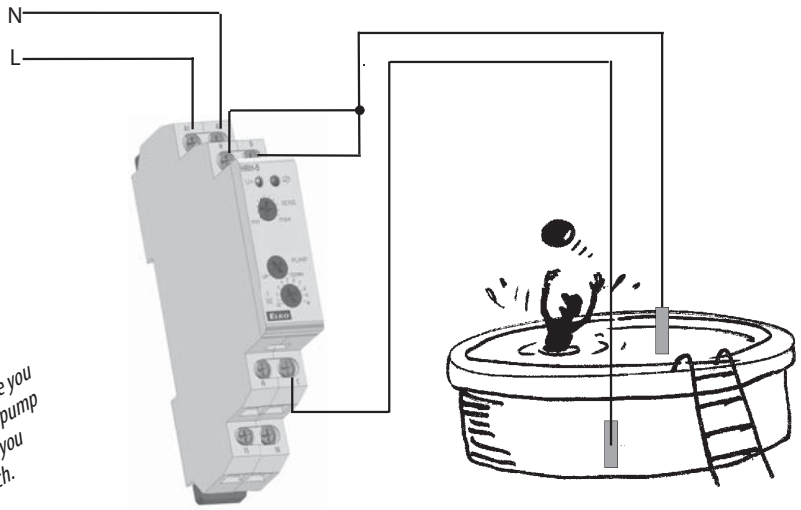


Level switch HRH-1
- monitoring level in wells, tanks, pools, etc.

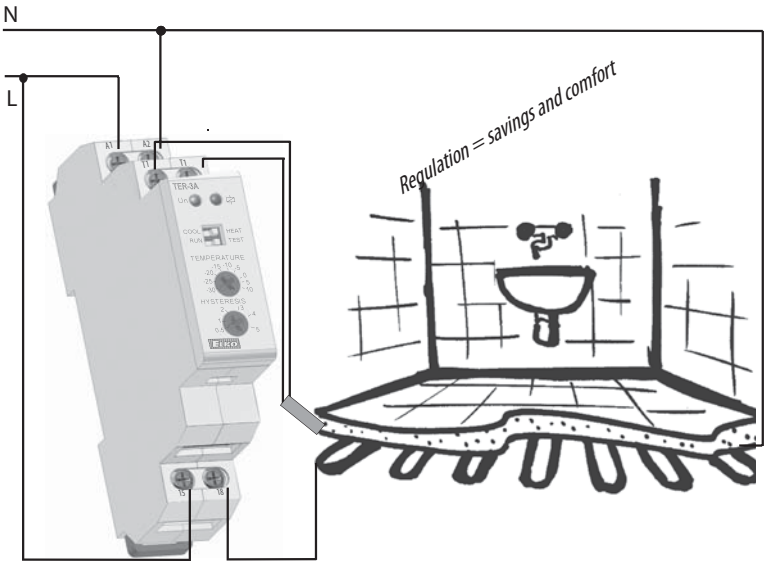


Has your reservoir ever overflown? Have you ever burnt enything while having your pump to operate with empty tank? If yes, you probaly have not used level switch.

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



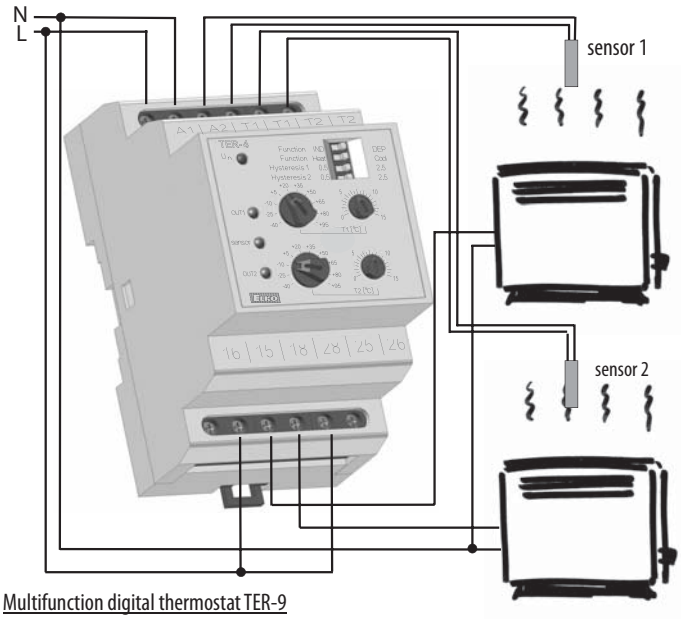
Thermostat TER-3 with external sensor
- control of temperature of floor heating



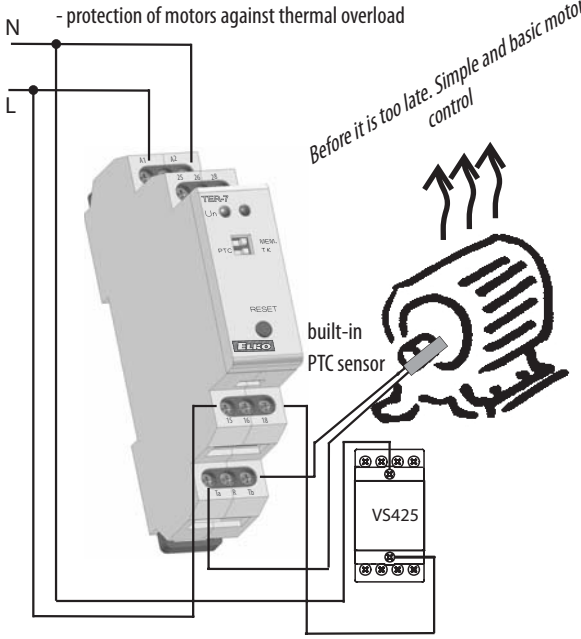
Regulation = savings and comfort

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

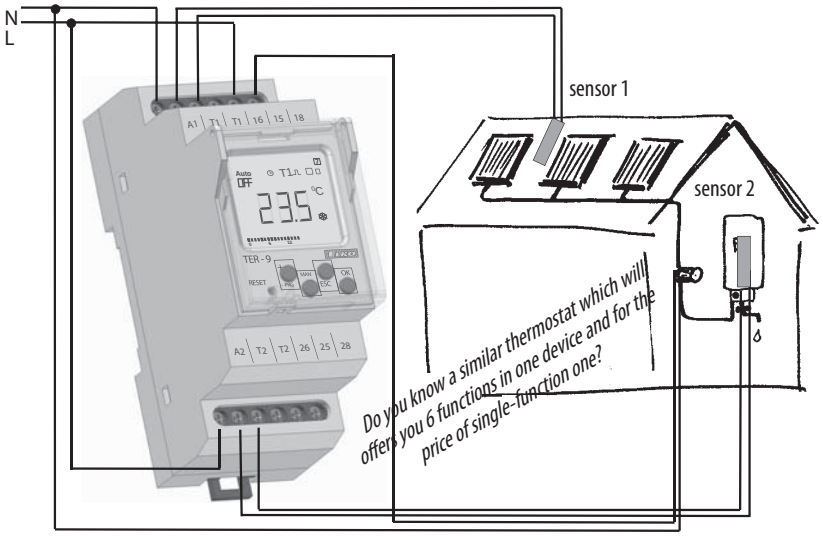


Thermostat for thermal protection of motors TER-7
- protection of motors against thermal overload



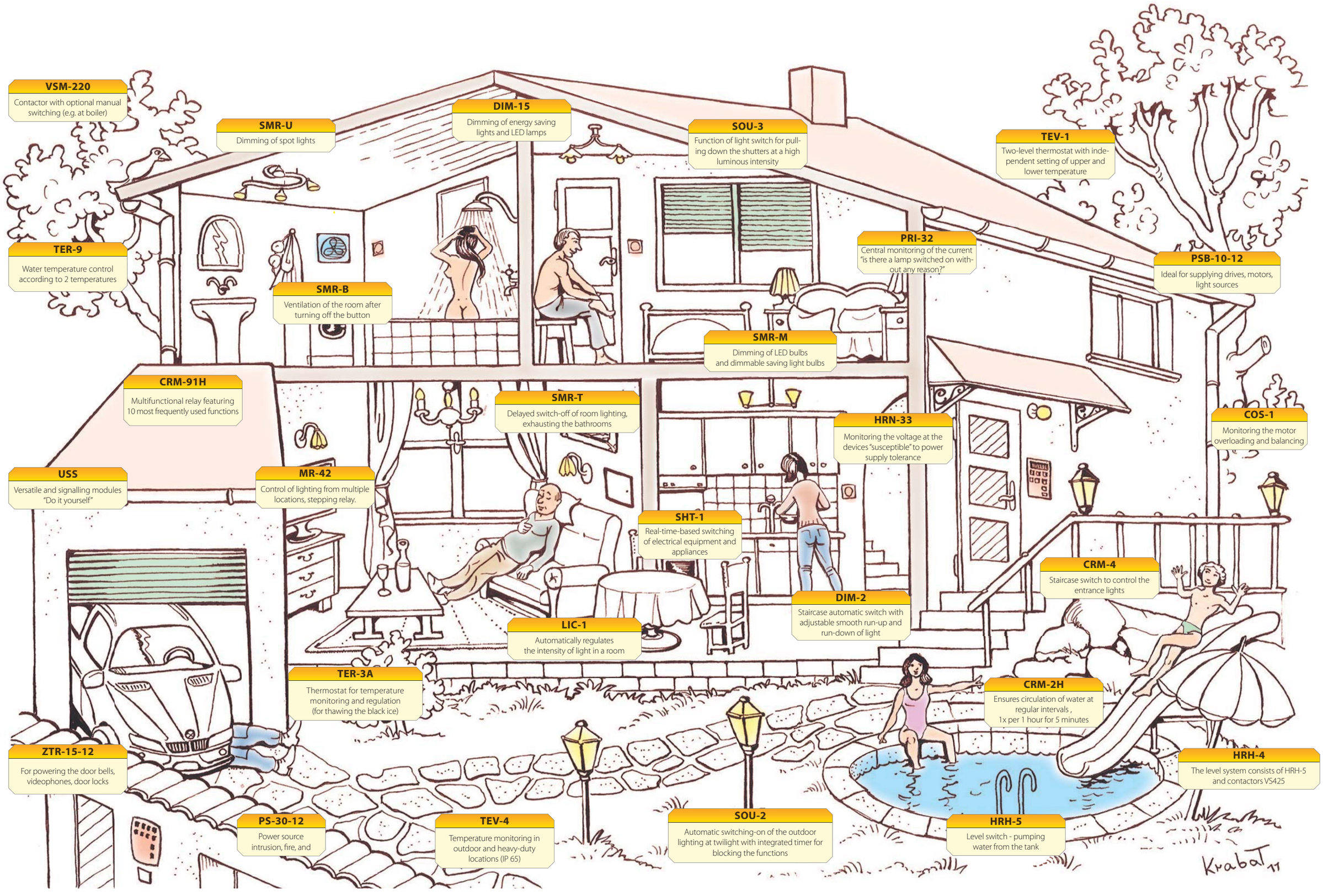
Before it is too late. Simple and basic motor control

Multifunction digital thermostat TER-9
- complex control of heating and water heating in a house



Do you know a similar thermostat which will offer you 6 functions in one device and for the price of single-function one?

Enjoy the complete household equipment by ELKO EP



VSM-220
Contactor with optional manual switching (e.g. at boiler)

SMR-U
Dimming of spot lights

DIM-15
Dimming of energy saving lights and LED lamps

SOU-3
Function of light switch for pulling down the shutters at a high luminous intensity

TEV-1
Two-level thermostat with independent setting of upper and lower temperature

TER-9
Water temperature control according to 2 temperatures

SMR-B
Ventilation of the room after turning off the button

PRI-32
Central monitoring of the current "is there a lamp switched on without any reason?"

PSB-10-12
Ideal for supplying drives, motors, light sources

SMR-M
Dimming of LED bulbs and dimmable saving light bulbs

CRM-91H
Multifunctional relay featuring 10 most frequently used functions

SMR-T
Delayed switch-off of room lighting, exhausting the bathrooms

HRN-33
Monitoring the voltage at the devices "susceptible" to power supply tolerance

COS-1
Monitoring the motor overloading and balancing

USS
Versatile and signalling modules "Do it yourself"

MR-42
Control of lighting from multiple locations, stepping relay.

SHT-1
Real-time-based switching of electrical equipment and appliances

CRM-4
Staircase switch to control the entrance lights

DIM-2
Staircase automatic switch with adjustable smooth run-up and run-down of light

LIC-1
Automatically regulates the intensity of light in a room

TER-3A
Thermostat for temperature monitoring and regulation (for thawing the black ice)

CRM-2H
Ensures circulation of water at regular intervals , 1x per 1 hour for 5 minutes

ZTR-15-12
For powering the door bells, videophones, door locks

HRH-4
The level system consists of HRH-5 and contactors VS425

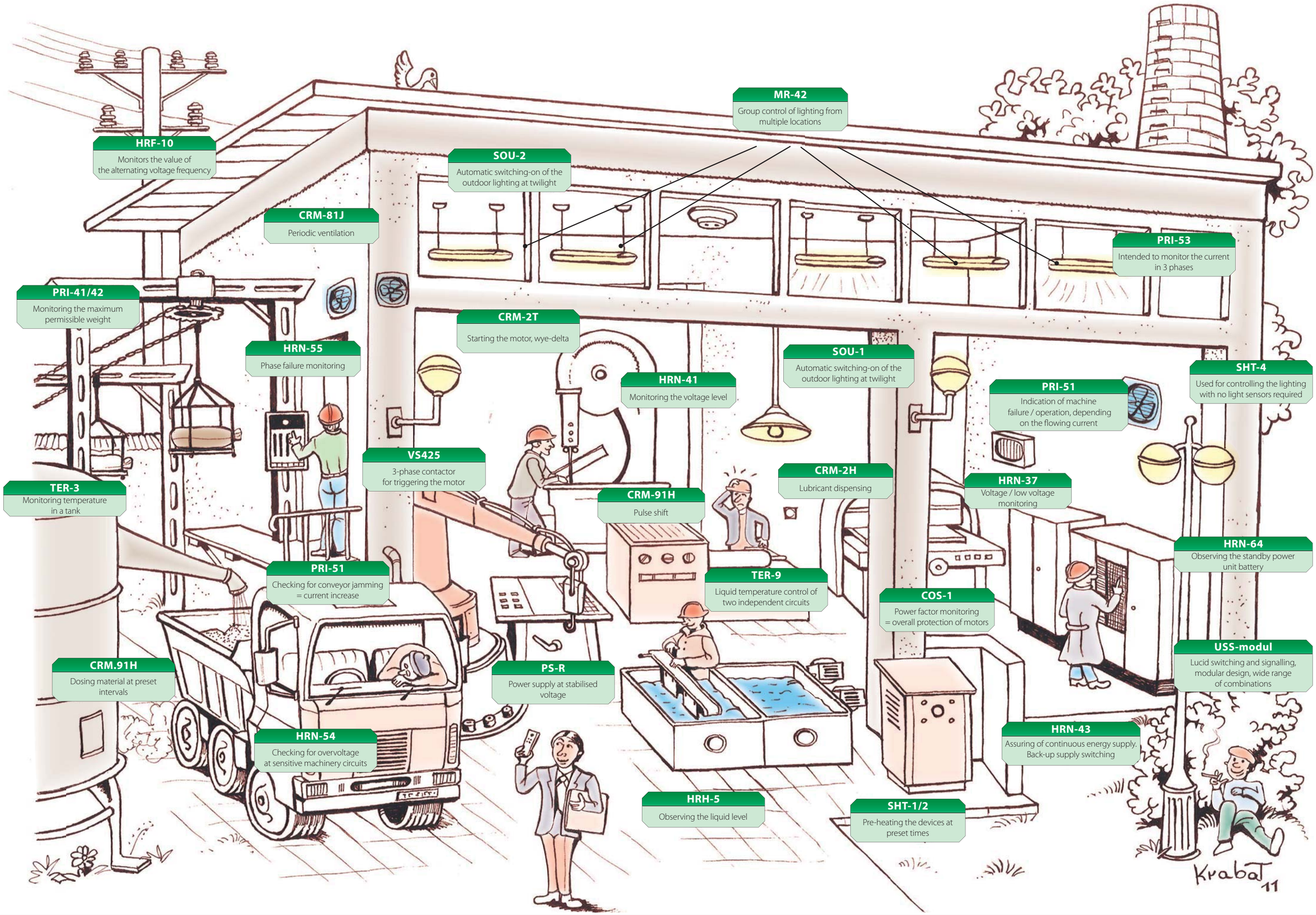
PS-30-12
Power source intrusion, fire, and

TEV-4
Temperature monitoring in outdoor and heavy-duty locations (IP 65)

SOU-2
Automatic switching-on of the outdoor lighting at twilight with integrated timer for blocking the functions

HRH-5
Level switch - pumping water from the tank

Industrial use of ELKO EP products



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

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The base of the production is a modern line disposing of SMD technology. SMD components compose of more than 80 % of all components. In the year 2004 the production line was modernized distinctly and it was completed by some new machines. Herewith the accurancy improved considerably and the capacity enhanced.

1)
Printed circuit boards are placed into a cartridge and then automatically delivered to SMD production line.

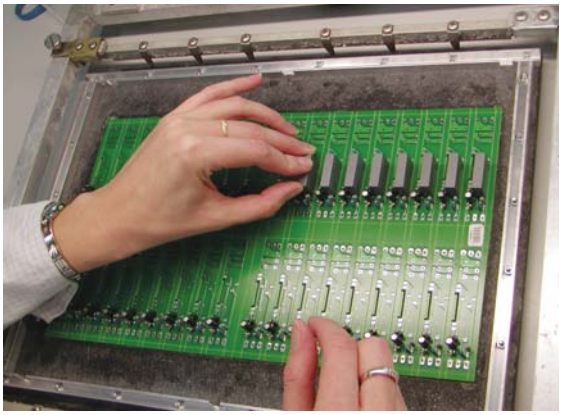
2)
Fully automatic adhesive and flux printer distributes adhesive or flux through profile form to the place where the SMD components are then mounted. Part of this process is also 3D optic inspection of the executed operation.

3)
SMD components are mounted by pick-up machines. Three heads with laser alignment can place up to 15,000 components an hour. This machine replaces approximately 100 workers.

4)
PCBs with mounted SMD components are inspected and forwarded to reflow.

5)
Hot-air furnace ERSA serves for glue hardening or to activation of soldering flux by re-melting. The furnace has 3 zones. temperature after curing on 3rd) output) zone approx. 1400C. For flux re-melting , the starting temperature is 130 ^{0}C, middle 180 ^{0}C and output is 280 ^{0}C.

6)
Fully automatic line is ended by a cartridge which distributes picked and cured PCBs into holders.



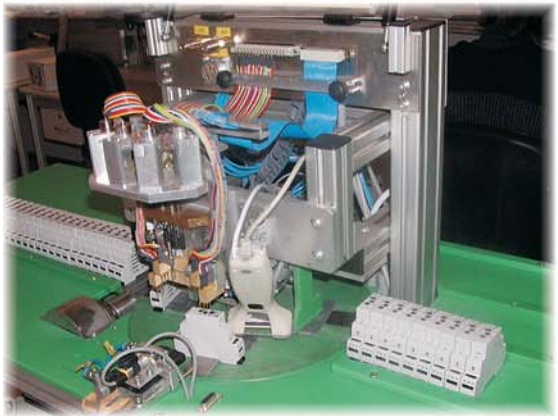
7)
After the classic components are manually mounted by experienced workers.

8)
Manual placing of classical components is followed by soldering in soldering unit SEHO 8135-PCS which already supports "lead free" soldering technology. Thanks to IR pre-heating, this soldering unit allows operations on PCB together with temperature sensitive components on the upper side of PCB. Soldering unit is equipped by LW soldering jet and Delta jet. These jets allow a good quality.

9)

10)

After necessary semi-product testing on pin-testers (Pic.9) final assembling into enclosures is executed. The actual state of completion is monitored by bar codes during the whole production process (Pic.10).



11)
Semi-finished PCBs are tested by this tester. It replaces visual control. By using weight board, particular pins on bottom part are in contact. Functionality of SMD components and classical components is checked. Testing one PCB set takes about 20 s.

12)
In the end the products are fully printed by laser technology. Laser can burn from upper part) side of the product) and side part (front panel and terminals) printing one piece takes about 30 s.

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