ELKO ep®

2010
MODULAR ELECTRONIC DEVICES

TECHNICAL CATALOGUE

relay



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We have been developing and producing modular electronic devices over 16 years. We have experienced dynamic progress: from a family manufacturer to a successful company with 230 employes, with our own development facility and modern production technologies. Thanks to this tradition and wide range of experiences, we started to produce our own system of intelligent electro-installation, iNELS as well as wireless system, RF Control. Presently, we have in our assortment also a wide range of electrotechnical products ETI (circuit breakers, residual current devices, fuses etc.). In general, we can provide you all devices that you need for your electro-installation – from simple, through advance up to sophisticated. All products are designed and produced according to ISO and European standards. We offer our customers complex solutions, technical advice, support, consulting service at optimal prices. We bring those solutions, which will save your time and money, provide you a higher level of security, through comfortable operation satisfying your expectations. Due to our strong development centre, we are continuously inovating and developing new devices, so they maximally suit to you – our customers and users of our products. We can implement your needs into functionality of our devices - basically many new products have been developed this way. Product adjusting according to customers needs is namely visible on our system iNELS. With our product range, we have been expanded to foreign markets (branch offices in Russia, Poland, Hungary, Slovakia, Romania, Ukraine and worldwide export in tens more countries) so as supplier and partner to leaders in electro-technical business or individually. In March 2010 we have established a brand new branch office: ELKO EP USA, Inc. branch office is located in the fastest growing region of the US and has a high concentration of communication and IT services and construction industry in state North Carolina. We believe, that even on the huge American market, we can offer an interesting products and comparing to European standards, we can meet the different demands of this continent.

Modular electronic devices

- TIME RELAYS
- POWER AND AUXILIARY RELAYS
- DIMMERS
- POWER SUPPLIES
- MONITORING VOLTAGE RELAYS
- MONITORING CURRENT RELAYS
- LEVEL MONITORING RELAYS
- THERMOSTATS

GSM control and alarm GD-04 „David“

EAN code

GD-04	8594052535266
GD-04R	8594052535617
GD-04A	8594052535310
GD-04D	8594052535341
GD-04P	8594052535327

Relay controlled by mobile phone
- two output contacts(X and Y), which can be used as:

- Switch controlled by SMS. You can set up your own text (for example “turn on the lights“, “turn off the lights“ and “shut down shutters“) for turn on and off any contact. David knows how to confirm this order by SMS.
- Time switch, which can be turned on by mobile phone (time of switching can be set up from 1-10 hours)
- Relay controlled by phone ring. You can set up up to 50 phone numbers for each relay. When the selected number calls (rings), call is not connected, but the relay reacts (as a switch or time switch). Phone ring is free of charge. Usefull for example for opening a parking gates, door lockers, turning on lights etc..
- For the selected phone numbers can be set up amount of usage. For example you allow customer to open the gate 30x , after this is access for him restricted. Manager of device can allow next enters by SMS.

Report on your mobile phone
- four input terminals (A-D) can report closing or opening by SMS (for example: “freezer supply failure“ and “freezer supplyrestoring“)

- Each SMS report can have 30 symbols.
- It’s possible to assign up to 8 phone numbers, which are receiving reports.
- David can insist the SMS report, when he gives a short-ring, to each receiver, after he send the text.
- Message of the immediate status of David’s input terminals and output relay could be required by remote SMS order.
- Every day, David can confirm his function by short-ring, onto your mobile phone, at the particular time.
- If you are using a prepaid SIM card, David can control your credit balance and announce when is low.

Technical parameters:	GD-04
Supply:	11 ÷ 13 V DC
Consumption-no operation:	cca 20 mA
Cosumption-during communication:	500 mA
Operating zone GSM module:	E-GSM 850 / 900 / 1800 / 1900 MHz
Transmitter output breaking capacity	2 W for GSM 900, 1 W for GSM 1800
output terminals A,B,C and D:	activation by connection with GND
output terminals X1,X2,Y1,Y2	relay output with fuse
contacts load capability - resistance load	max. 1A / 250V AC
contacts load capability - inductive, bulb load	max. 0,5A / 250V AC
Comples operating conditions:	general licence ČTÚ No.VO-R/1/07.2005-14
Safety:	EN 60950-1
EMC	EN 301489-7, EN 55022, ETSI EN 301419-1 and EN 301511
Radio equipment:	ETSI EN 301419-1 and EN 301511
Designated for enviroment:	II. general internal (-10 °C to +40 °C /+14 °F to +104 °F)
Dimensions (without antenna)	76 x 110 x 33 mm (3”x 4.3” x 1.3”)
GSM antenna	connected to the SMA connector

Separately selling items, additional to David:

- Backup module GD-04A, which gives David ability to operate approx.12-24 hours. without external supply.
- With help of DTMF module GD-04D, you can control David’s output relay by calling and by inserting of numeral code on the mobile phone’s keypad.
- Connecting cabel GD-04P connects David with USB port, for GDLink program setting.
- Radio modul GD-04R allows to activate inputs (A-D) with the help of wireless buttons and detectors from serie OASIS. Module allows also transfer of David’s output relay status, onto wireless receivers UC and AC from serie OASIS. Relay X and Y in David can be localy controlled by wireless buttons serie RC-8x (it means that connected appliance can be controlled by mobile phone and remote control too) Heating can be controlled by cooperation with wireless thermostats from the serie TP-8x (local control or remote mobile phone control)

SIM card for David – can be any kind

- We suggest a card with tariff, because the prepaid cards take a risk of failure due to overdrawal credit.

Setting of David’s functions:

- By the form on Internet
- By the computer with program GD Link
- SMS message

Příslušenství:

- The power adapter is included

Usage example:

I want to turn on the watering system….and also turn on the air condition – it's tropical day.

How will I connect it?

What should I do:
Connect relay contact X onto a switching of watering system. Relay contact Y connect onto a switching of air condition in the house.

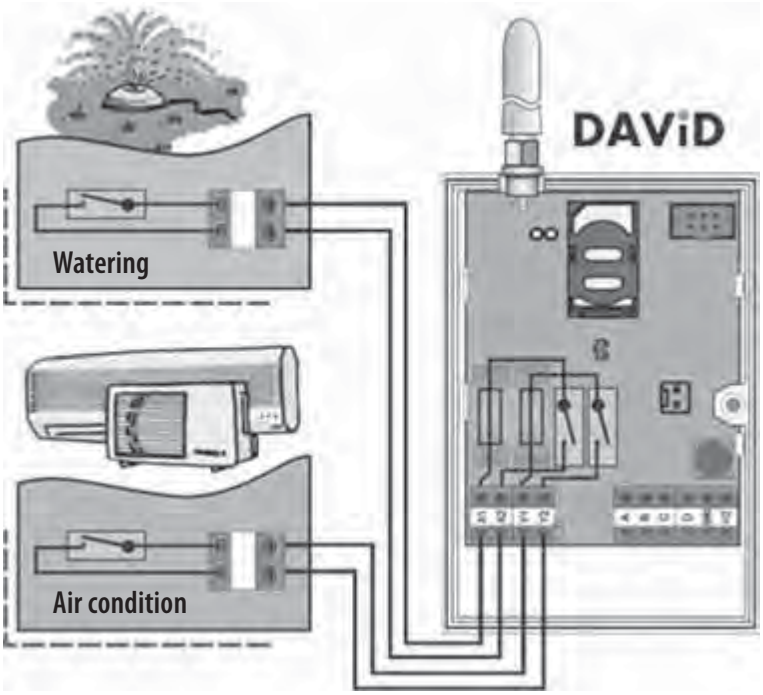
On David, in which is a working SIM card, send setting SMS for adjustment of text and phone numbers.

PC,ARX,Turn on watering,DRX,Turn off watering
PC,ARY,Turn on air condition, DRY, Turn off air condition

It could be profitable, to switch up watering for the advanced defined time (for example for one hour – 3600 sec). That's why we send a setting SMS.

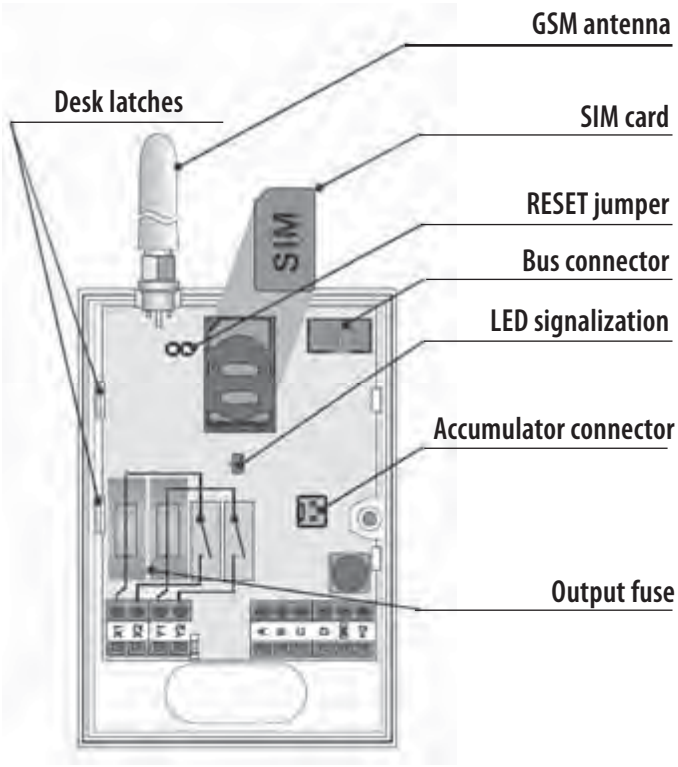
PC, TMX, 3600

By the order (SMS) Turn on watering, watering will be active for an hour. By the SMS Turn on air condition, we turn air condition on, while SMS Turn off air condition, will put it out of operation.



Advise:
After switching up the watering for preset time, we can stop it anytime, by order turn off watering.

Basic description:



MODULE

- Multifunction = 10 funktions.
- UNI supply voltage = ACIDC 12-240V.

PLUG-IN

- Plug-in type enables easy exchange.
- 16 A changeover.
- 11 and 8-pin socket.

DIGITAL

- Switching based on real-time.
- 1 or 2 channels
- Weekly, monthly, and yearly program
- Back lit display

Time relays

WIRING BOX INSTALLATION

- Under switch placement
- 4-wire connection (load 16 A)

Time relays

Single-function

CRM-81J
3 functions and 10 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 element 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
STAR/STOP inputs.

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

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

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

SHT-3
as SHT-1 but with daily, weekly, monthly, and yearly programming up to 2095.

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

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.

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.

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

MINI

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

SMR-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 - according to chart page153).

Staircase switch

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

CRM-42
programable staircase switch with warning before switchig 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-61	SJR-2	PDR-2/A	PDR-2/B	SHT-1 (SHT-1/2)	SHT-3 (SHT-3/2)	SOU-2	PRM-91H	PRM-92H	PRM-2H
Design	1-MODULE	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●								
	2-MODULE																					●	●	●			
	3-MODULE																			●	●						
	PLUG-IN																								●	●	●
	Under the switch																										
Adjusting	Rotapy switch	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●						●	●	●
	Button																			●	●	●	●	●			
	Sliding switch															●	●										
	External potenciometer										●	●															
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								●	●	●		●					●		●	●				●	●	
	Starcase 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														●					●							
	Switchin 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 (triak)												●														
	1x NO 16 A																●										

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

Type		SMR-T, SMR-H	SMR-B
Functions	A -delay off on entrering edge	●	●
	B - delay off on down-ward edge	●	●
	C - delay off on down-ward edge	●	●
	D - cycler - flasher impulsem	●	●
	E - puls shift	●	●
	F - delay on	●	●
	G - pulse relay	●	●
	H - impulse relay with delay	●	●
	I - delay on after swit-ched off	●	●
	j* - cycler starting with gap. * = Function j is valid only for SMR-B		●
	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 $AgSnO_2$		●

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

1M

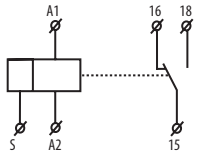
EAN code
CRM-81J by type
CRM-83J by type

- Single-function and single-time relay with possibility of fi ne 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

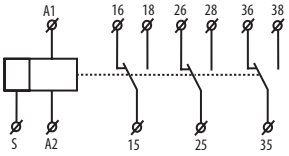
Technical parameters		CRM-81J	CRM-83J
Functions:		ZR - delay ON / ZN - delay OFF/ BL- cycler 1:1	
Supply terminals:		A1 - A2	
Voltage range:	UNI	AC/DC 12 - 240 V (AC 50 - 60 Hz)	
Burden:	UNI	AC 0.7 - 3 VA / DC 0.5 - 1.7 W	
Voltage range:	230	AC 230 V / 50 - 60 Hz	
Consumption (apparent/loss):	230	AC 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	
Max. capacity of cable control:			
-without connected glow-lamps:		0.1µF (UNI), 1.36µF (230V / 50-60Hz)	
- with connected glow-lamps:		(UNI), glow lamps cannot connected/NO 9 nF (AC 230 V), max.20pcs(1pc-1mA)	(UNI), glow lamps cannot connected/NO 9 nF (AC 230 V), max.20pcs(1pc-1mA)
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 (2.2 oz.), (230) - 60 g (2.1 oz.)	(UNI) - 86 g (3 oz.), (230) - 82 g (2.9 oz.)
Standarts:		EN 61812-1, EN 61010-1	

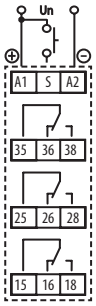
Symbol — Connection

CRM-81J

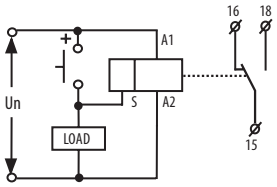


CRM-83J





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.)



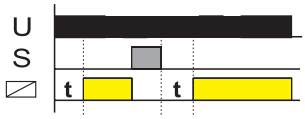
Example of an order

CRM-81J/230, ZR10s
1x changeover contact, voltage AC 230 V, function: delay ON, time 1 - 10 s

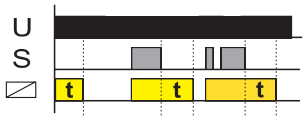
CRM-83J/UNI, BL1h
3x changeover contact, voltage AC/DC 12 - 240 V, function: cycler begin. with impulse, time 6 - 60 min

Functions

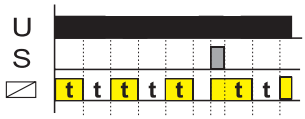
ZR - Delay ON



ZN - Delay OFF



BL - Cycler 1:1

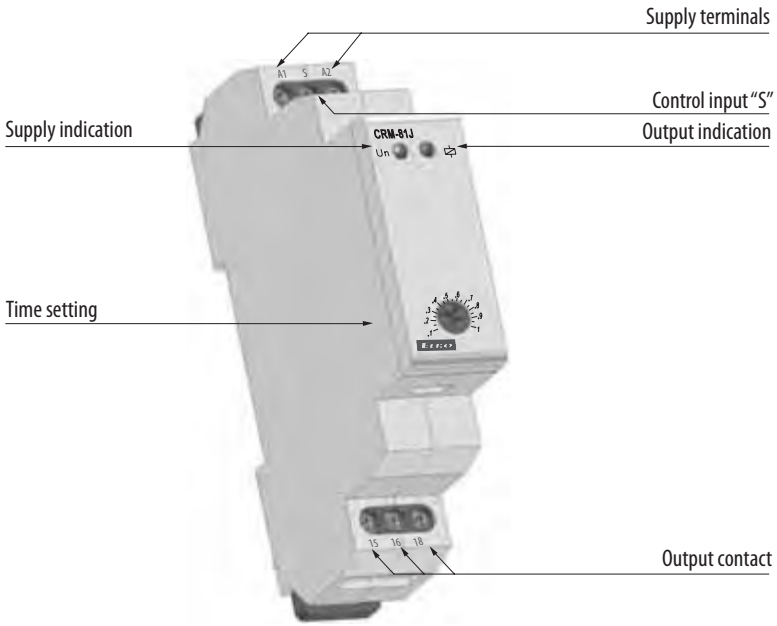


Note: the function ZR and ZN is controlled by supply voltage and control input t.m. when it comes to failure and refreshing the supply voltage, the relay automatically makes one cycle

Time range

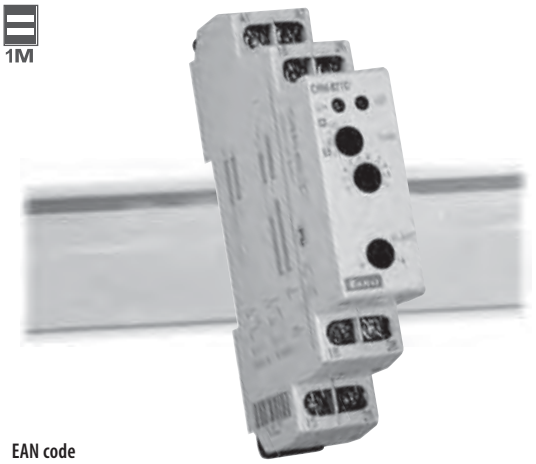
	1 s	10 s	1 min	10 min	1 h	10 h
min	0.1 s	1 s	6 s	1 min	6 min	1 h
max	1 s	10 s	60 s	10 min	60 min	10 h

Description



Delay OFF without supply voltage CRM-82TO

1M

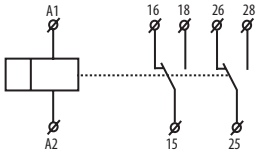


- „True OFF“ relay - relay timing without supply voltage
- Sample of use: back-up source for Delay OFF in case of voltage failure (emergency lighting, emergency respirator, or protection of el. controlled doors - in case of fi re)
- 2 time functions adjustable by rotary switch:
  a - On Delay (Power On) - after supply failure relay times for time t and switches off
  e - Off Delay (S Break)
- 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 LED (only in case of supply voltage connection)
- Clamp terminals
- 1-MODULE, DIN rail mounting

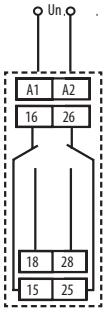
EAN code
CRM-82TO /UNI: 8595188137614

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.)
Standarts:	EN 61812-1, EN 61010-1

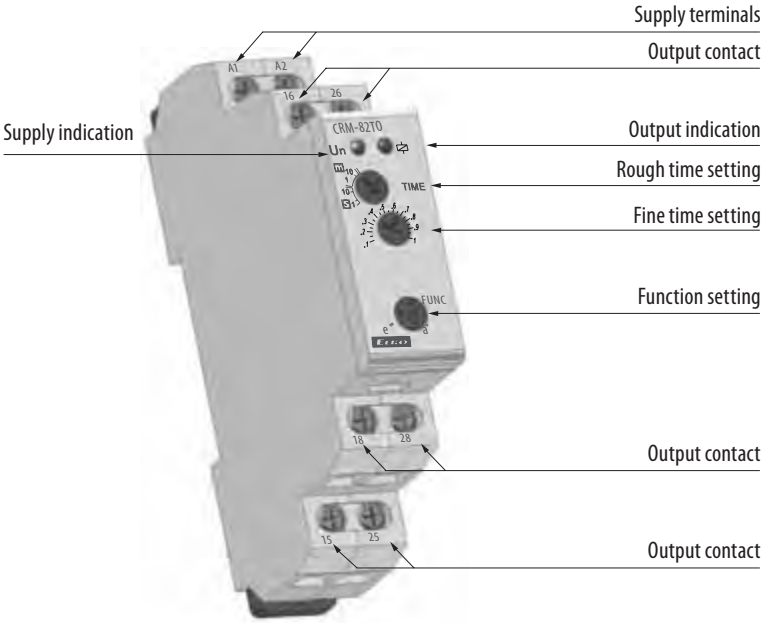
Symbol



Connection

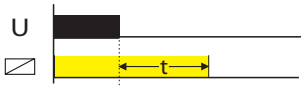


Description

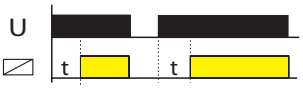


Function

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



e - Off Delay (S Break)



Doublestage delay unit SJR-2

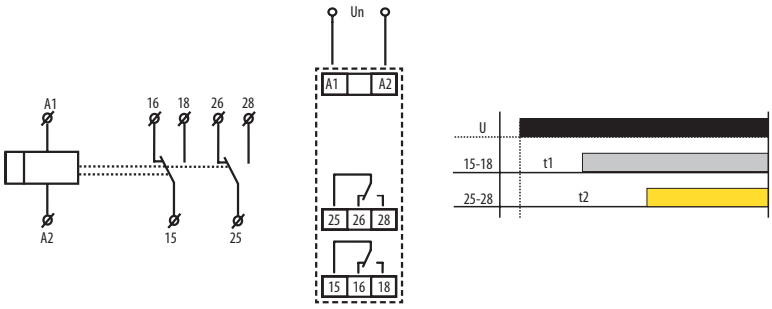
1M

- For gradual switching of heavy wads (for example electrical 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

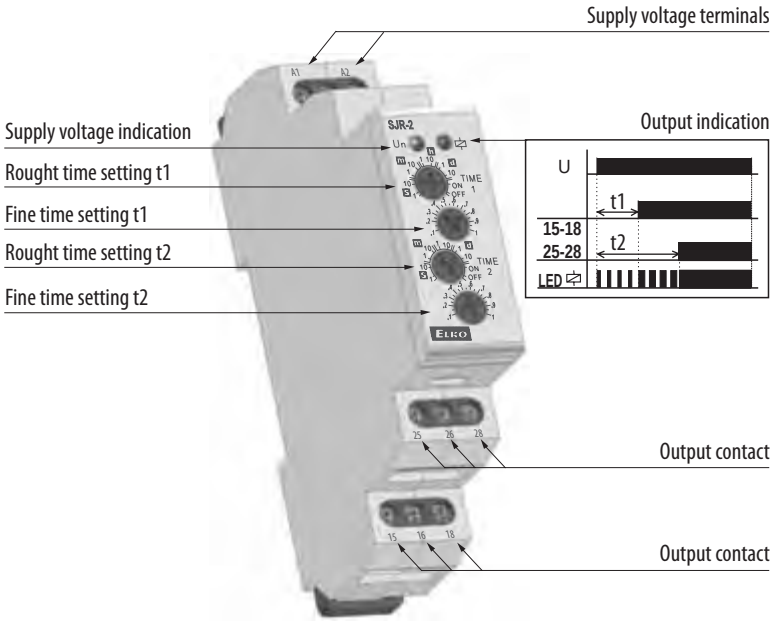
EAN code
SJR-2 /230V: 8595188116015
SJR-2 /UNI: 8595188117401

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

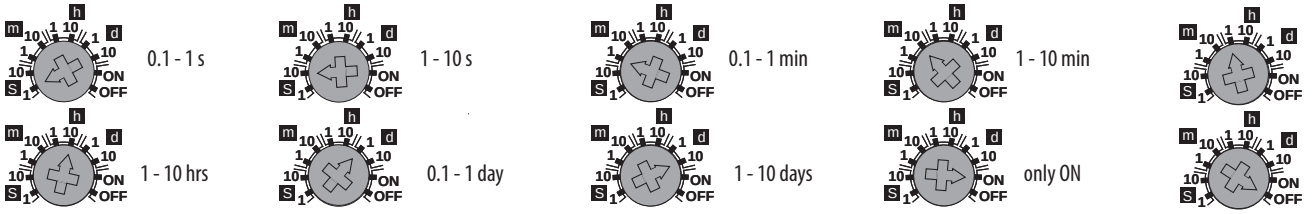
Symbol Connection Function



Description

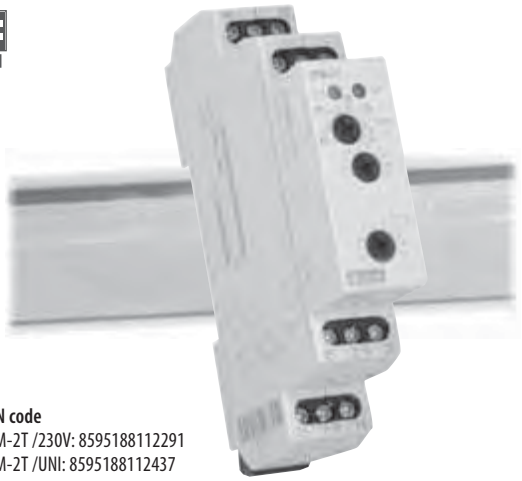


Time ranges



Delay ON star/delta CRM-2T

1M



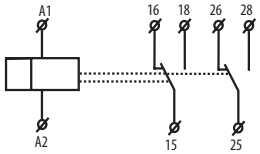
EAN code
CRM-2T /230V: 8595188112291
CRM-2T /UNI: 8595188112437

- Designated of delay On of motors star/delta
- Time t1 (delta) - time scale 0.1 s - 100 days devided into 10 time ranges
  - rough time setting by rotary switch
- Time t2 (delay) between ⅄/ △:
  - time scale 0.1 s - 1 s
  - fine time setting by potentiometer
- Voltage range: AC 230 V, AC/DC 12 - 240 V
- Output contact: 2x changeover/ DPDT 16 A
- Output indication: multifunction red LED
- 1-MODULE, DIN rail mounting

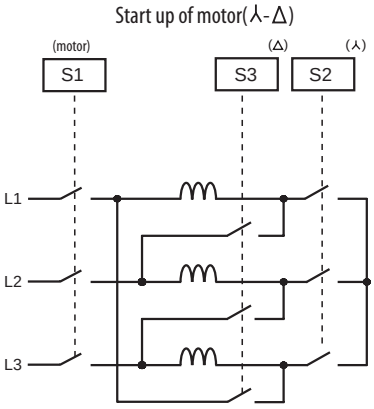
Technical parameters

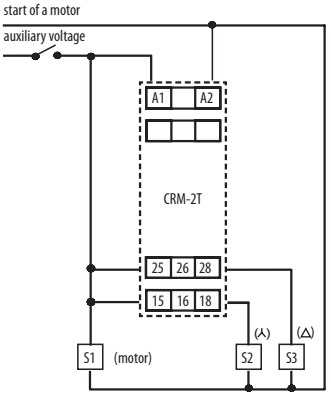
		CRM-2T
Number of functions:		1
Supply terminals:		A1 - A2
Voltage range:	UNI	AC/DC 12 - 240 V/AC 50 - 60 Hz
Burden:	UNI	AC 0.7 - 3 VA / DC 0.5 - 1.7 W
Voltage range:	230	AC 230 V / 50 - 60 Hz
Burden:	230	AC max. 12 VA / 1.9 W
Operating range:		-15 %; +10 %
Supply indication:		green LED
Time scale:		t1: 0.1 s - 100 dní, 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

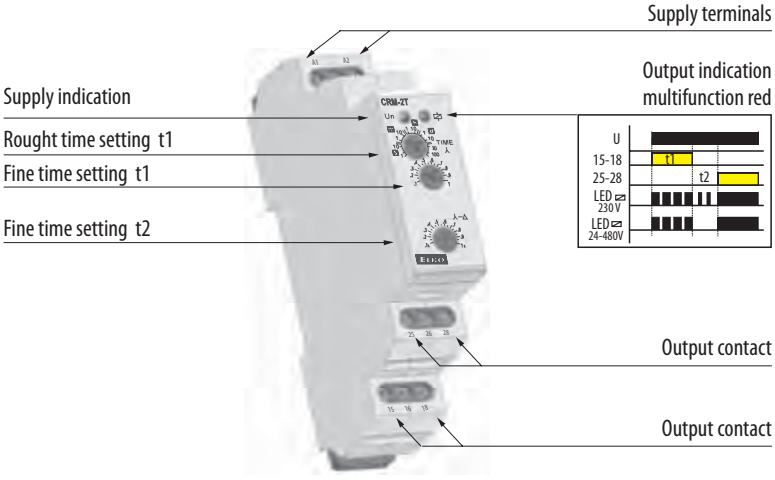


Connection CRM-2T



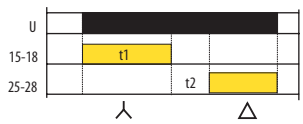


Description

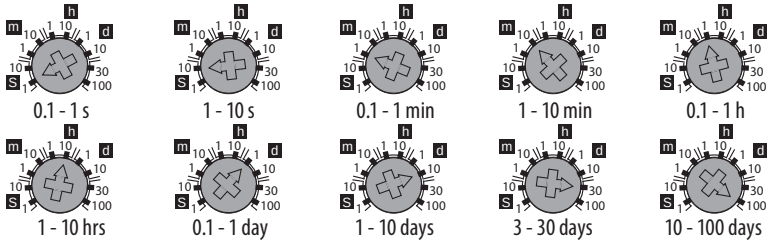


Function

Delay ON star / delta



Time ranges t1:



Asymmetric cycler CRM-2H

1M

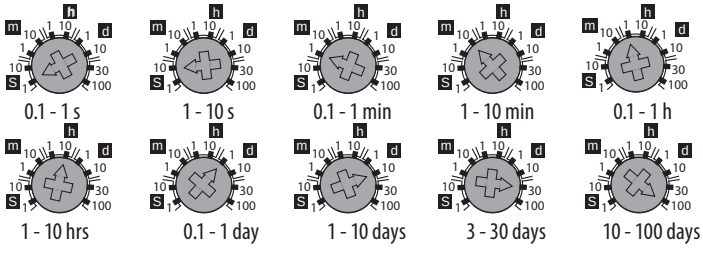
EAN code
CRM-2H /230V: 8595188124201
CRM-2H /UNI: 8595188113007

- Cycler with independent adjustable switch ON/OFF
- It is 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

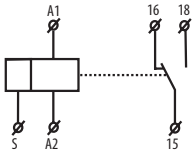
Technical parameters

Technical parameters		CRM-2H
Number of functions:		2 (second 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:		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)
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



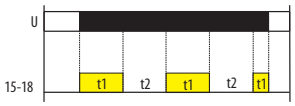
Connection

Cycler beginning with pulse

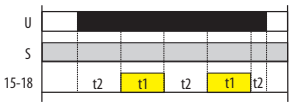
Cycler beginning with pause (jumper S-A1)

Function

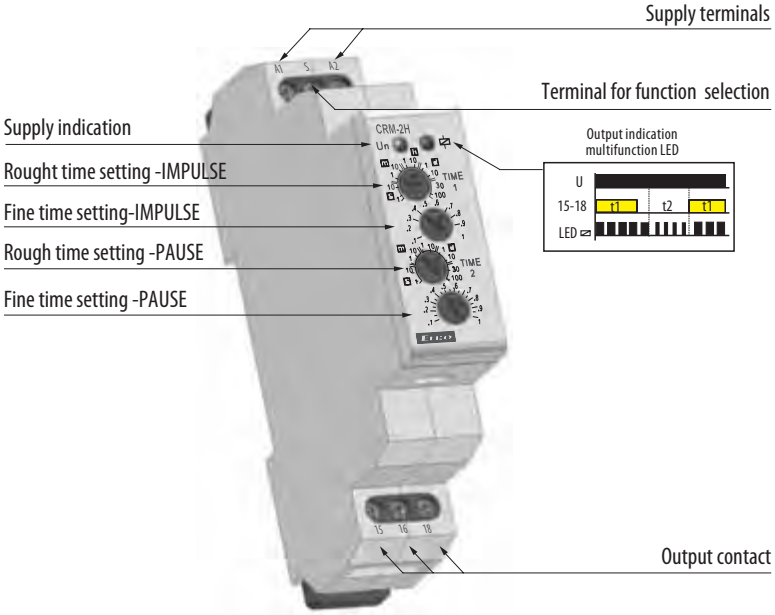
Cycler beginning with pulse



Cycler beginning with pause



Description



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

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 function - 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 function - 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/SPDT 16 A
- 1-MODULE, DIN rail mounting
- Possible to connect external potentiometer - max. distance 10m (32.8 ft.) from relay

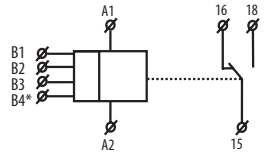
Technical parameters	CRM-91HE	CRM-2HE
Number of functions:	10	2
Supply terminals:	A1 - A2	
Voltage range:	AC/DC 12 - 240 V (AC 50 - 60 Hz)	
Burden:	AC 0.7 - 3 VA / DC 0.5 - 1.7 W	
Supply voltage tolerance:	-15 %; +10 %	
Supply indication:	green LED	
Time ranges:	0.1 s - 10 days	0.1 s - 100 days
Time setting:	rotary switch, external potentiometer	
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:	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	

Function

Function CRM-91HE identical with CRM-91H, CRM-2HE identical with CRM-2H.

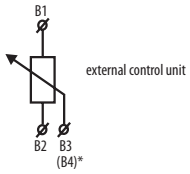
Symbol

CRM-91HE, CRM-2HE



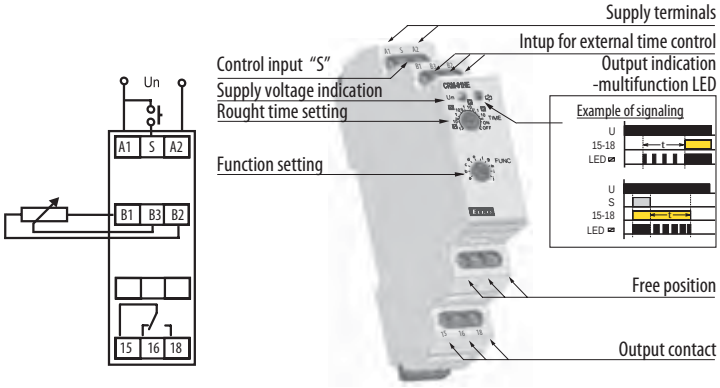
*B4 only for CRM-2HE

Potentiometer at CRM-91HE, CRM-2HE

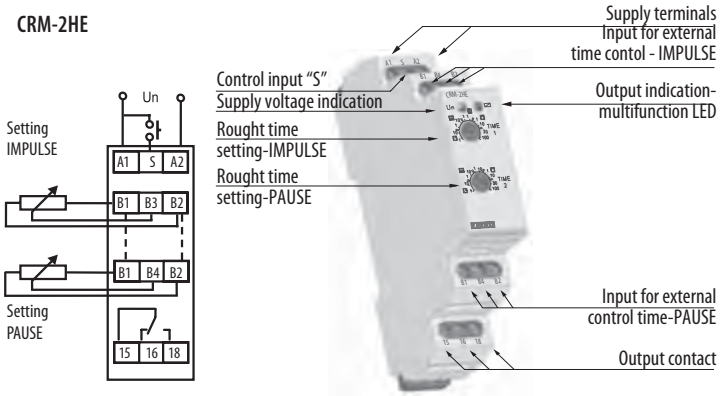


Connection Description

CRM-91HE



CRM-2HE



Potentiometer

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

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

1M

EAN code

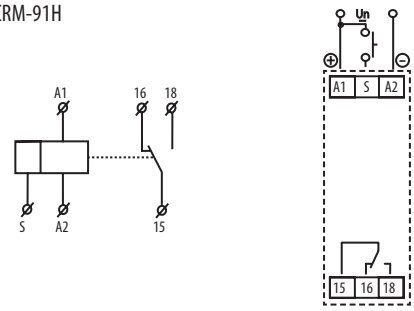
CRM-91 /230V:	8595188112444
CRM-91 /UNI:	8595188112420
CRM-93H /230V:	8595188112789
CRM-93H /UNI:	8595188112468
CRM-9S /UNI:	8595188116008

- Multifunction time relay can to 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

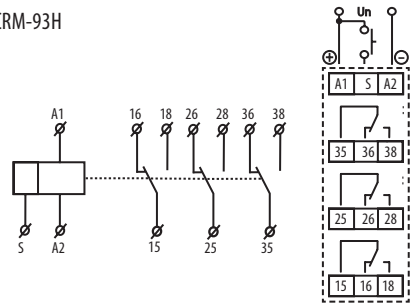
Technical parameters		CRM-91H	CRM-93H	CRM-9S
Number of functions:		10		
Supply terminals:		A1 - A2		
Voltage range:	UNI	AC/DC 12 - 240 V (AC 50 - 60 Hz)		AC 12-240V (50-60Hz)
Burden:	UNI	AC 0.7 - 3 VA / DC 0.5 - 1.7 W		AC max. 0.35VA
Voltage range:	230	AC 230 V / 50 - 60 Hz		x
Consumption (apparent/loss):	230	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:		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)	3x changeover/ SPDT (AgNI / Silver Alloy)	1x static 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		
Max. capacity of cable control:				
-without connected glow-lamps		0.1µF (UNI), 1.36µF (230V / 50-60Hz)		0.1µF (UNI)
- with connected glow-lamps		(UNI) - glow lamps cannot connected/NO 9 nF (AC 230 V), max.20pcs(1pc-1mA)		glow lamps cannot connected/NO
Impulse length:		min. 25 ms / max. unlimited		
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.)
Standarts:		EN 61812-1, EN 61010-1		

Symbol — Connection

CRM-91H

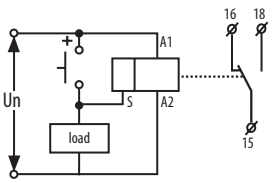


CRM-93H

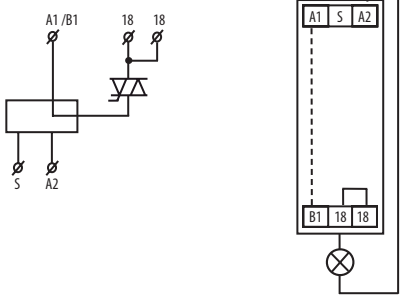


Load with control input possible

Load between S-A2 possible in parallel without disturbing proper operation of relay.
Load is energized for a period of time when a button is pressed.

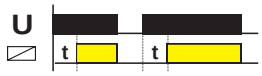


CRM-9S



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 

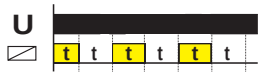
Interval (Power On)
When input voltage U is applied, relay contacts R change state immediately and timing cycle begins. When time delay is complete, contacts return to shelf state. When input voltage U is removed, contacts will also return to their shelfstate. Trigger switch is not used in this function.

b 

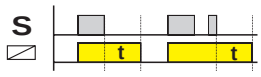
Repeat Cycle (Starting Off)
When input voltage U is applied, time delay t begins. When time delay t is complete, relay contacts R change state for time delay t. This cycle will repeat until input voltage U is removed. Trigger switch is not used in this function.

c 

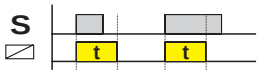
Repeat Cycle (Starting On)
When input voltage U is applied, relay contacts R change state immediately and time delay t begins. When time delay t is complete, contacts return to their shelf state for time delay t. This cycle will repeat until input voltage U is removed. Trigger switch is not used in this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

d 

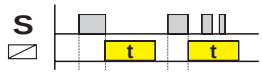
Off Delay (S Break)
Input voltage U must be applied continuously. When trigger switch S is closed, relay contacts R change state. When trigger switch S is opened, delay t begins. When delay t is complete, contacts R return to their shelf state. If trigger switch S is closed before time delay t is complete,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

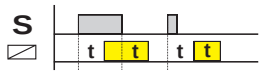
Single Shot
Upon application of input voltage U, the relay is ready to accept trigger signal S. Upon application of the trigger signal S, the relay contacts R transfer and the preset time t begins. During time-out, the trigger signal S is ignored. The relay resets by applying the trigger switch S when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

f 

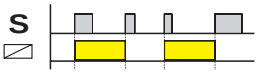
Single Shot Trailing Edge (Non-Retriggerable)
Upon application of input voltage U, the relay is ready to accept trigger signal S. Upon application of the trigger signal S, the relay contacts R transfer and the preset time t begins. At the end of the preset time t, the relay contacts R return to their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

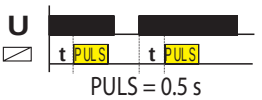
On/Off Delay
Input voltage U must be applied continuously. When trigger switch S is closed, time delay t begins. When time delay t is complete, relay contacts R change state and remain transferred until trigger switch S is opened. If input voltage U is removed, relay contacts R return to their shelf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

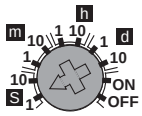
i 

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 reapplied to repeat pulse. Trigger switch is not used in this function.

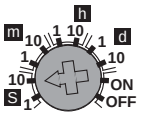
j 

PULS = 0.5 s

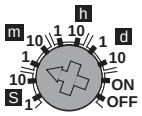
Time ranges



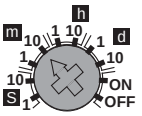
0.1 - 1s



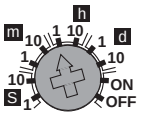
1 - 10 s



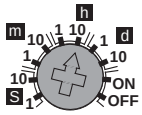
0.1 - 1 min



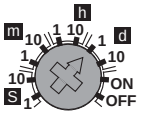
1 - 10 min



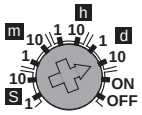
0.1 - 1 h



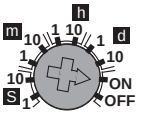
1 - 10 hrs



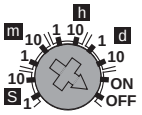
0.1 - 1 day



1 - 10 days

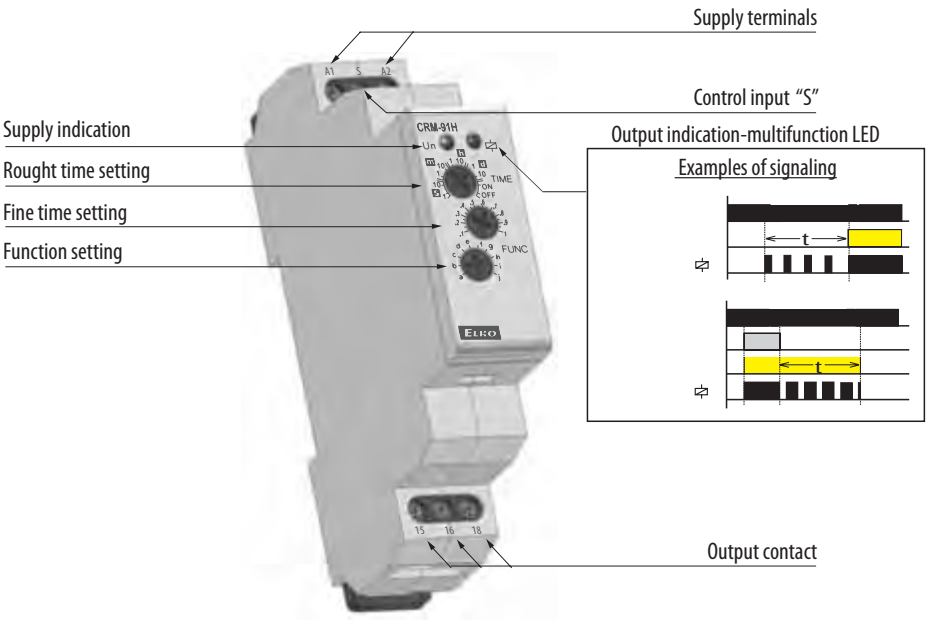


only ON



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.

Multifunction time relay CRM-61

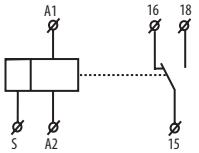
1M

- Multifunction time relay (6 functions and 6 time ranges), cost effective 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/ SPDT 8 A
- Multifunction red LED output indicator flashes or shines depending of status
- 1-MODULE, DIN rail mounting

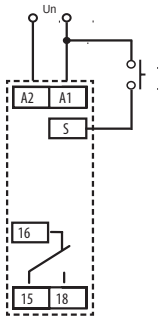
EAN code
CRM-61 /UNI: 8595188120210

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:	rotaty 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.)
Standarts:	EN 61812-1, EN 61010-1

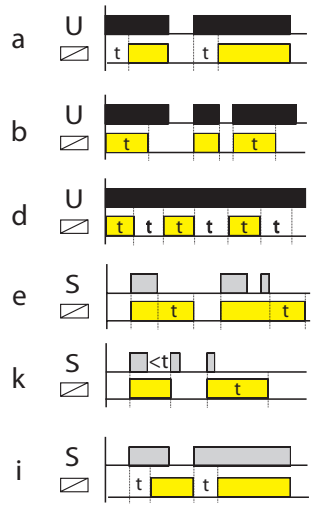
Symbol



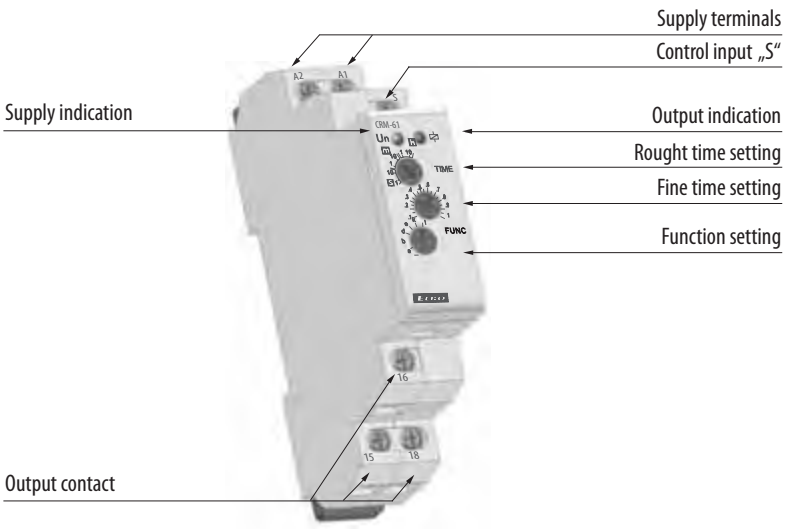
Connection



Function



Description



Digital time switch clock SHT

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

- Controls various appliances in real time; daily, weekly, monthly and yearly up to 2095
- Switching: according the program (AUTO)/constantly manually, manually to next program change/random (CUBE)
- "Holiday program" option will block the devices standard program
- 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

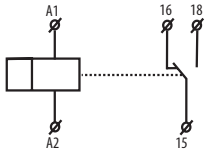
	Output		Time programm			
	1 channel	2 channel	day	week	month	year
SHT-1	●		●	●		
SHT-1/2		●	●	●		
SHT-3	●		●	●	●	●
SHT-3/2		●	●	●	●	●

Technical parameters

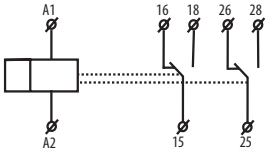
		SHT-1, SHT- 3	SHT-1/2, SHT-3/2
Supply terminals:		A1 - A2	
Voltage range:	UNI	AC/DC 12 - 240 V (AC 50 - 60 Hz)	
Burden:	UNI	AC 0.5 - 2 VA / DC 0.4 - 2 W	
Voltage range:	230	AC 230 V / 50 - 60 Hz	
Burden:	230	AC max. 14 VA / 2 W	
Supply voltage tolerance:		-15 %; +10 %	
Back-up supply:		yes	
Summer/winter time:		automatic	
Output			
Number of contacts:		1x changeover/SPDT ($AgSnO_2$)	2x changeove/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.)
Standarts:		EN 61812-1, EN 61010-1	

Symbol

SHT-1
SHT-3

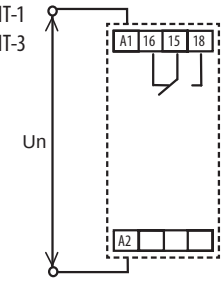


SHT-1/2
SHT-3/2

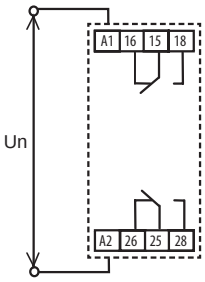


Connection

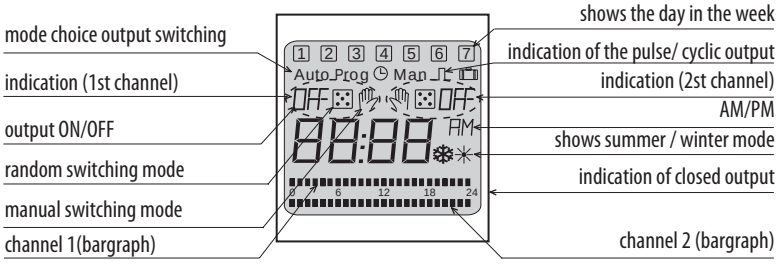
SHT-1
SHT-3



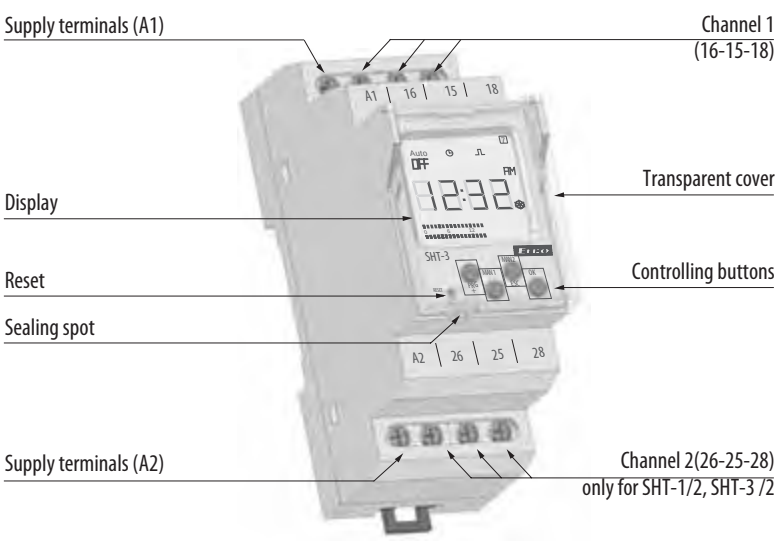
SHT-1/2
SHT-3/2



Description of visual elements on the display



Description



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

3M

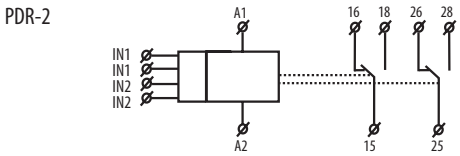
EAN code

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

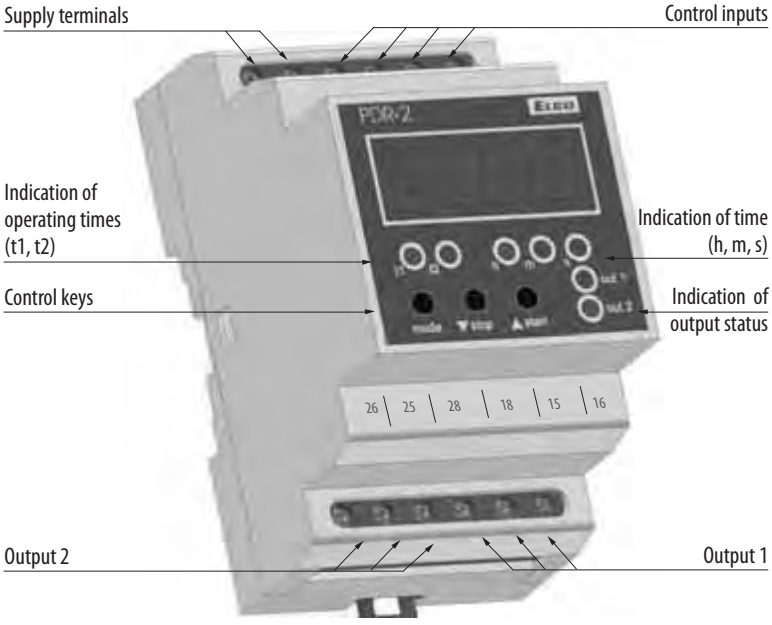
- multifunction programmable digital relay with 4 digit red LED display
- control and setting is done by 3 buttons, user-friendly menu, absolute accuracy in timer setting, time countdown on a display galvanically separated START and STOP control inputs with UNI supply
- thanks to its complexity it is 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

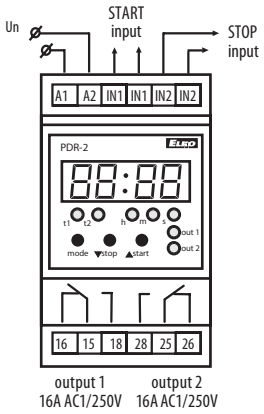


Time data

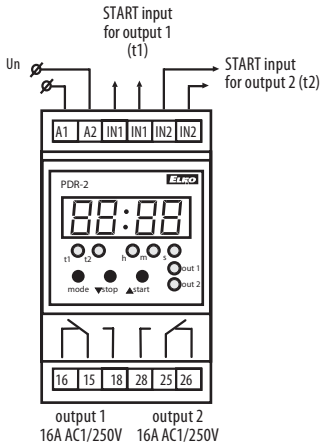
Time range:	0.01 s - 99 h 59 min 59 sec 99 ss
Minimal time step:	0.01 s
Time deviation:	0.01 % of set value
Setting error:	0 %
Setting, reset accuracy:	100 %
Digital places:	selected via program

Connectin

PDR-2/A



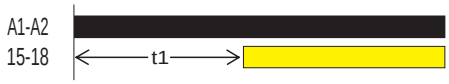
PDR-2/B



Function

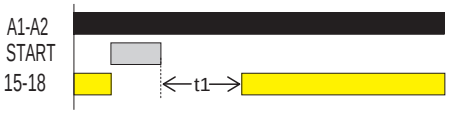
Functions for PDR-2/A and PDR-2/B

1. Delay on

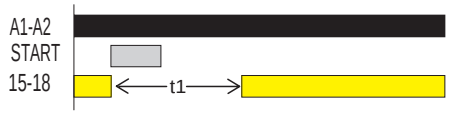


2. Delay off

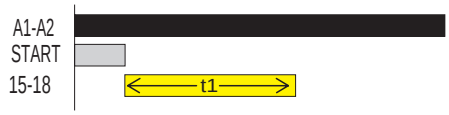
3. Delay on after break of control. contact



4. Delay on at make of control. contact

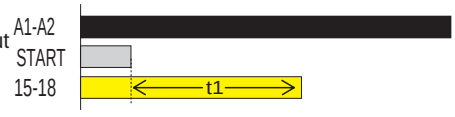


5. Delay off after break of output contact

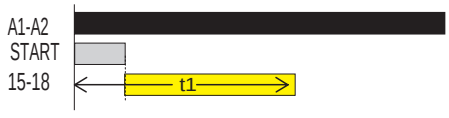


6. Delay off at make of output contact

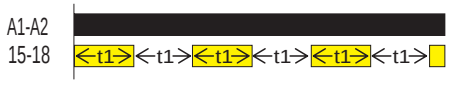
7. Delay off at break of control. contact with instant output



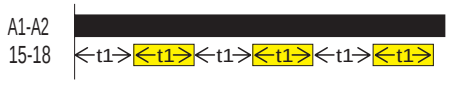
8. Delay off at make of control. contact with delayed output



9. Cycler beginning with impulse

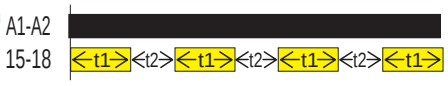


10. Cycler beginning with pause

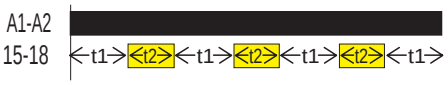


Functions for PDR-2/A

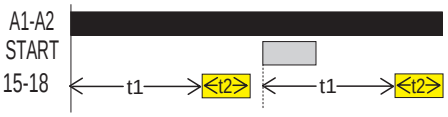
11. Cycler beginning with impulse with variable interval



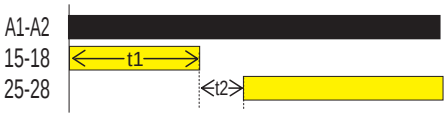
12. Cycler beginning with pause with variable interval



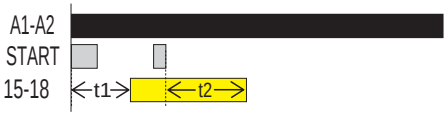
13. Generator of impulse



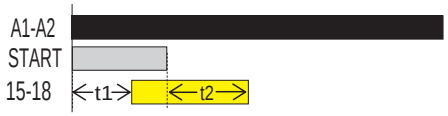
14. Changeover star/delta



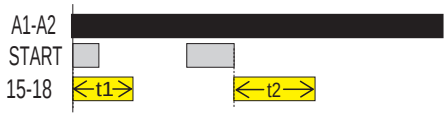
15A. Shift of pulse by 2 times



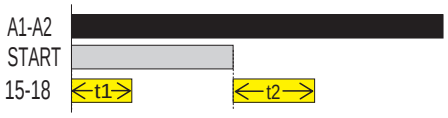
15B. Shift of impulse by 2 times



16A. Extended impulse by 2 times



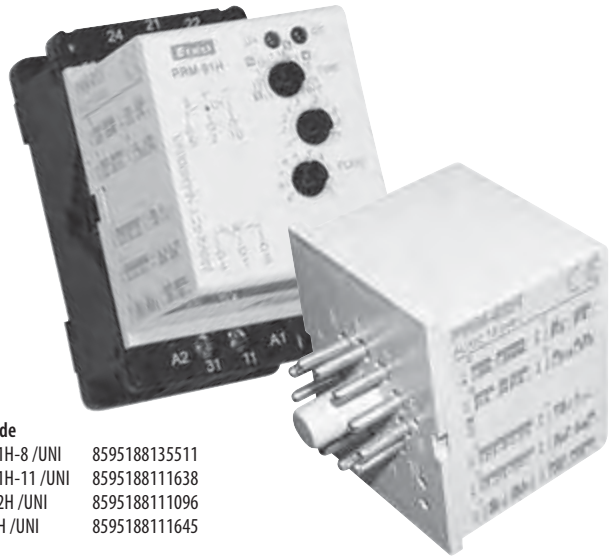
16B. Extended impulse by 2 times



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

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

11
8



EAN code

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

- Multifunction time relays in 11 or 8 pin standardized plug-in type socket enables easy exchange or replacement.
- Multifunction time relay PRM-91H
  11 and 8 pin type
  10 time functions, time scale 0.1 s - 10 days divided into 10 ranges
  output contact SPDT 1x 16 A / 4000VA, 250V AC1
- Multifunction time relay PRM-92H
  11 pin type
  10 time functions, time scale 0.1 s - 10 days divided into 10 ranges
  output contact DPDT 2x 8 A / 2000VA, 250V AC1
- Asymmetric cycler PRM-2H
  11 pin type
  2 time functions, time scale 0.1 s - 100 days divided into 10 ranges
  output contact DPDT 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

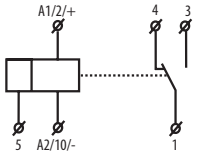
Technical Parameters	PRM-91H/ 8	PRM-91H/ 11	PRM-92H	PRM-2H
Number of functions:	10			2
Supply:	pins 2 and 7	pins 2 and 10	pins 2 and 10	pins 2 and 10
Voltage range:	AC/DC 12 - 240 V (AC 50 - 60 Hz)			
Burden:	AC 0.7 - 3 VA / DC 0.5 - 1.7 W			
Supply voltage tolerance:	-15 %; +10 %			
Supply indication:	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:	Ano			
Glow-tubes:	Ne			
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			

Symbol

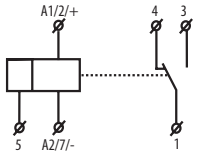
LEGEND TO DESCRIPTION
polarity- outputs/number on module/on socket

PRM-91H

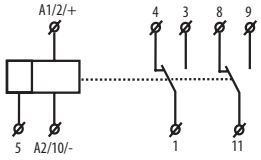
11 pin



8 pin

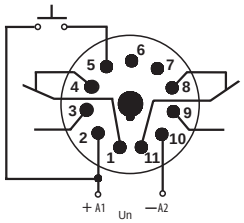


PRM-92H, PRM-2H

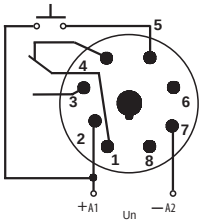


Connection PRM-91H/11, PRM-91H/8

PRM-92H/11



PRM-91H/8



Recommended socket

ES-11

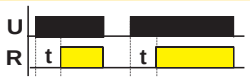
11 pin

ES-8

8 pin

Function PRM-91H, PRM-92H

Delay ON after energization — a

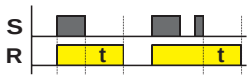


Delay OFF after energization — b

Cyclerbeginning with pause after energization — c

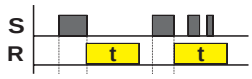
Cycler beginning with impulse after energization — d

Delay OFF after de-energization, instant switches of output — e

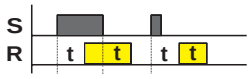


Delay OFF responding to make of control contact regardless its length — f

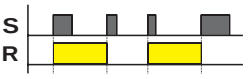
Delay OFF after break of control contact with instant output — g



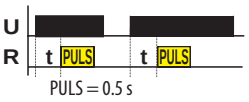
Delay OFF after make and break of control contact — h



Memory (latching) relay — i



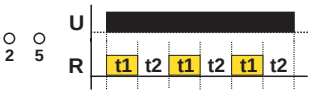
Pulse generator (PULSE=0.5s) — j



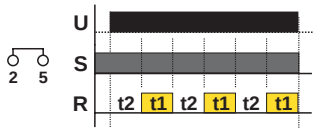
Function PRM-2H

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

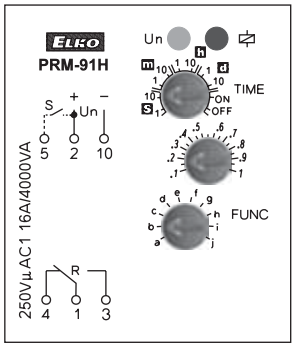
Cycler beginning with pulse

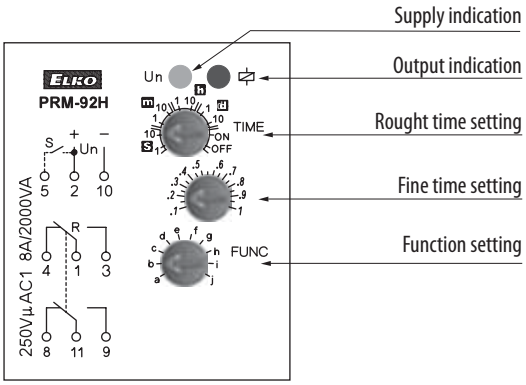


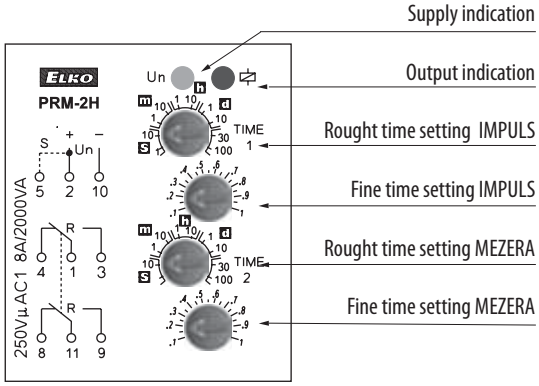
Cycler beginning with pause



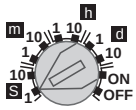
Description / Connection



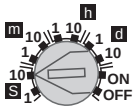




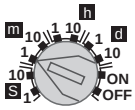
Time ranges PRM-91H , PRM-92H



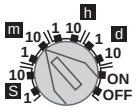
0.1 - 1 s



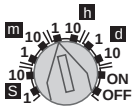
1 - 10 s



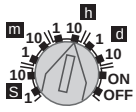
0.1 - 1 min



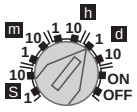
1 - 10 min



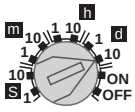
0.1 - 1 hrs



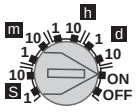
1 - 10 hrs



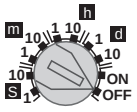
0.1 - 1 day



1 - 10 days

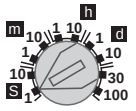


only ON

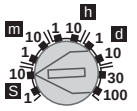


only OFF

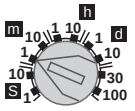
Time ranges PRM-2H



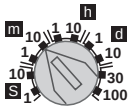
0.1 - 1 s



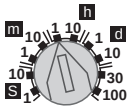
1 - 10 s



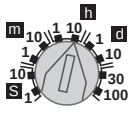
0.1 - 1 min



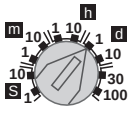
1 - 10 min



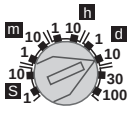
0.1 - 1 hrs



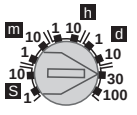
1 - 10 hrs



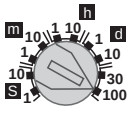
0.1 - 1 day



1 - 10 days



3 - 30 days



10 - 100 days

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

SMR-B
⌀60mm
↕21mm

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 154
- SMR-T
  - 3-wire connection, functional without neutral
  - output: 10 - 160 VA
  - it is not possible to be used for fluorescent lights and energy saving lights (loads of capacitive type)
- SMR-H
  - 4-wire connection
  - output: 0 - 200 VA
  - it is not possible to be used for fluorescent lights and energy saving lights (loads of capacitive type)
- SMR-B
  - 4-wire connection
  - 10 functions
  - output contact 1x16A / 4000 VA, 250V AC1
  - enables switching of fluorescent lights and also energy saving lights (see chart on page 154)
  - independent galvanically separated input AC/DC 5-250 V, for example for control from a security system

EAN code

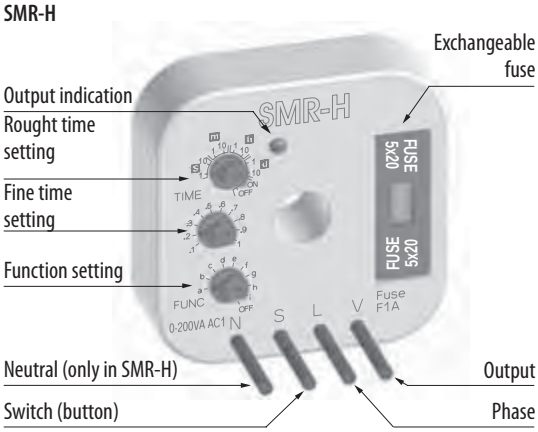
SMR-T /230V	8595188129107
SMR-H /230V	8595188129114
SMR-B /230V	8595188135566

Technical parameters	SMR-T	SMR-H	SMR-B
Number of functions:	9	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 (0.1 % / °F, at = 68 °F)		
Output			
Number of contacts:	1 x triac		1x NO ($AgSnO_2$)
Resistive load:	10 - 160VA	0 - 200VA	16A 125/250 V AC1
Inductive load:	10 - 100VA	0 - 100VA	8A 250 V AC (cos φ > 0.4)
Control:			
Control voltage:	AC 230 V		AC 230V, UNI - 5-250 V AC/DC
Control current:	3 mA		
Impulse length:	min. 50ms / max. unlimited		
Other information			
Operating temperature:	0 to +50°C (32 °F to 122 °F)		
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:	4x solid wires, Ø 0.75 mm² (AWG 18) lenght 90mm (3.5˝)		2xsol. wir., Ø0.75mm² (AWG 18); 2x sol.wir., Ø 2.5 mm² (AWG 10); lenght 90mm (3.5˝)
Glow-lamps in control button:	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.)	27 g (0.95 oz.)	53 g (1.9 oz.)
Standarts:	EN 61812-1, EN 61010-1		

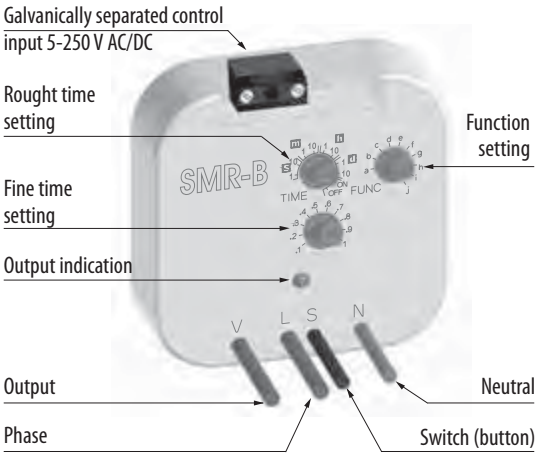
* for more information see chart on pg.154

Description

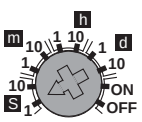
SMR-H



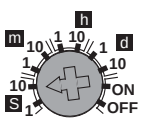
SMR-B



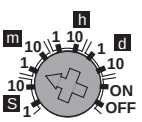
Time ranges



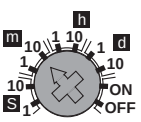
0.1 - 1 s



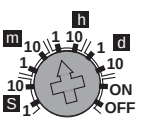
1 - 10 s



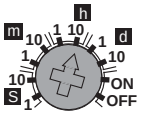
0.1 - 1 min



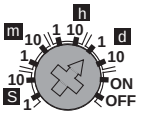
1 - 10 min



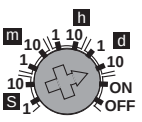
0.1 - 1 hrs



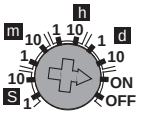
1 - 10 hrs



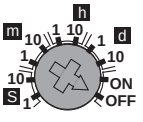
0.1 - 1 day



1 - 10 days



only ON

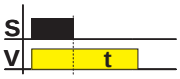


only OFF

Function

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

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



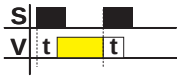
Function c - delay off on downward edge
after switching off output switches on and times.

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

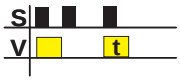
Function e - puls shift
delay on after the switch is switched on and delay on after it is switched off

Function f - delay on
delay on ater switch is switched on until it is switched off

Function g - pulse 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



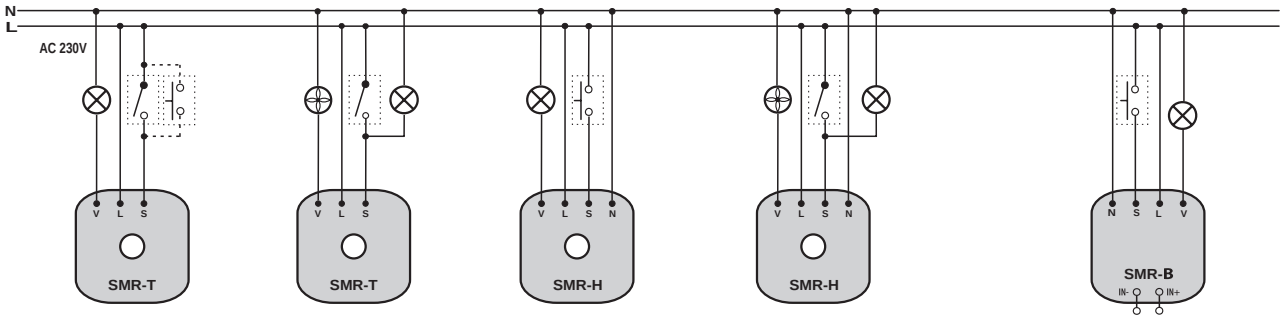
Function h - impulse relay with delay
one press switches on, another one switches the output off incase it is done before the end of timing



Function i - delay on after switched off
output cycles in regular intervals, cycler starts with a gap

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

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



Typical connection of SMR-T - timer for light

Fan control depending on light

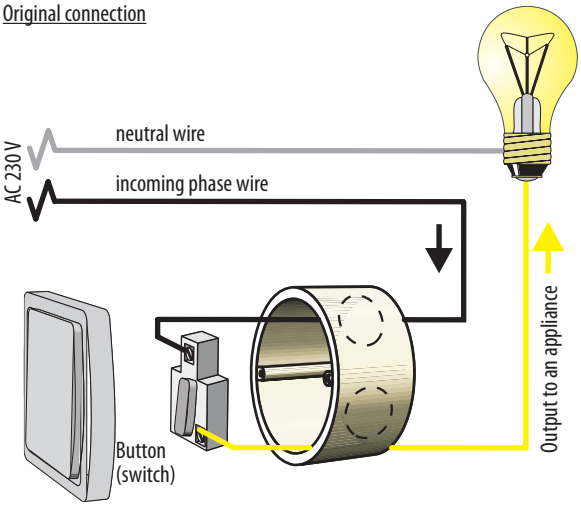
Typical connection of SMR-H - timer fot light

Fan control depending on light

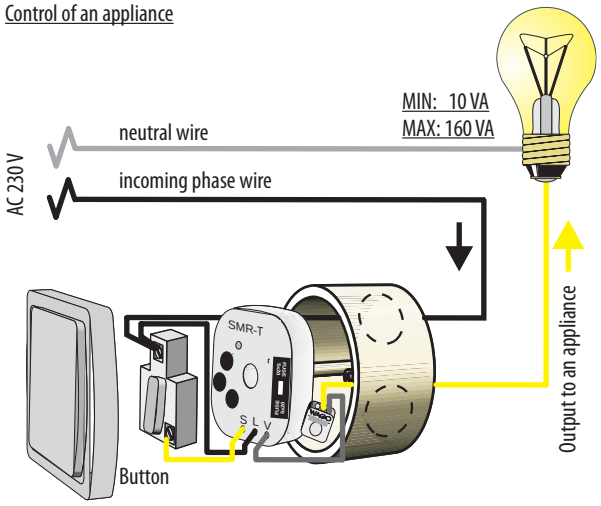
Input for external supply voltage AC/DC 5-250 V

Example of connection SMR-T

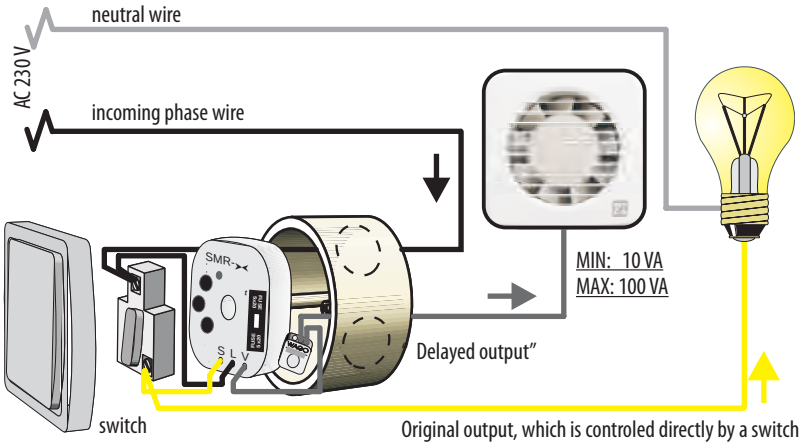
Original connection



Control of an appliance



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



Staircase switch CRM-4

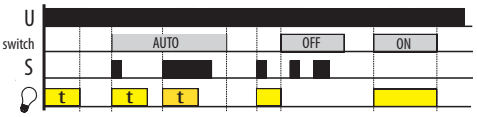
1M

EAN code
CRM-4 /230V: 8595188115605

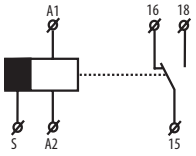
- It is used to control lights, fans, contactors, security systems, time counters and time blocking, remote control by external buttons.
- It is controled by a button or by several buttons from more places (connected in parallel) buttons can be equipped by glow lamps (max. 20 pcs of glow lamps)
- Output relay contact 16 A/AC1 with surge current up to 80 A enables switching of el. bulbs and fluorescent lights.
- 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
Max. capacity of cable control:	
- without connected glow-lamps	12nF
- with connected glow-lamps	9nF (max. 20 pcs, 1pc-1mA)
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

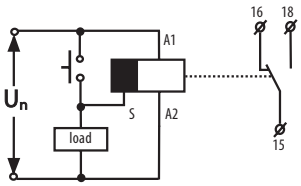


Symbol



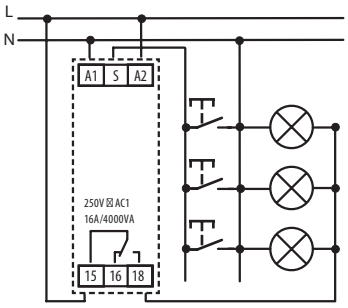
Connection

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.)

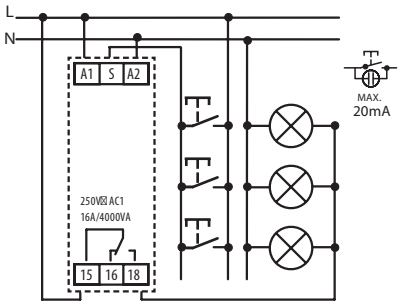


Connection circuit

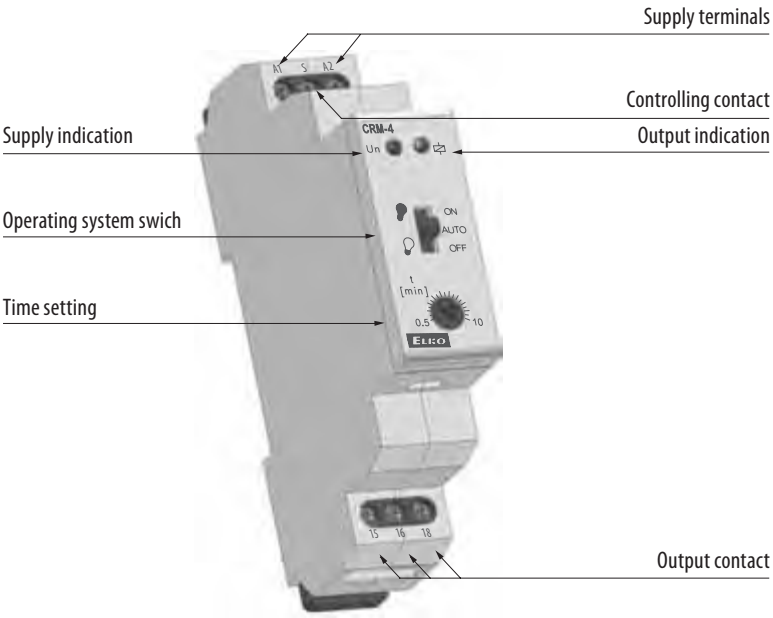
3-wire connection



4- wire connection



Description



Programmable staircase switch with signalling before switch off CRM-42

1M

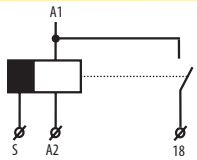
EAN code
CRM-42 /230V: 8595188136693

- 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 model)
  - 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 (altogether 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
- 1- MODULE, DIN rail mounting

Technical parameters

	CRM-42
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:	Yes, max.100 pcs (at 1 mA)
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

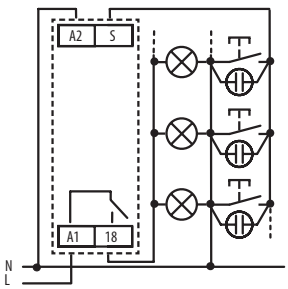
Symbol



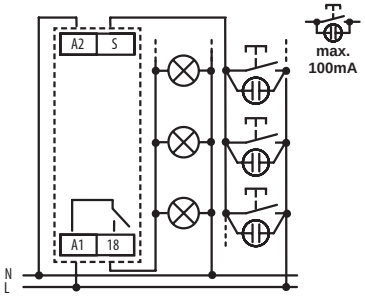
* For bigger bulb loads and frequent switching is recommanded to intensify the contact relay with power contactor. VSXXX

Connection

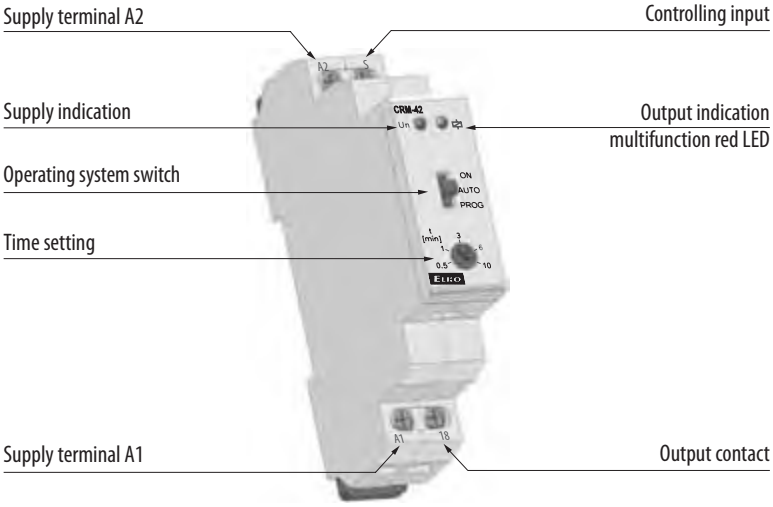
3- wire connection



4- wire connection

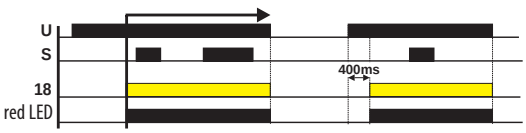


Description

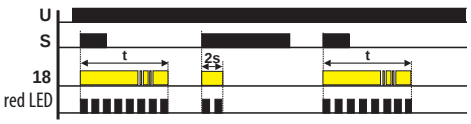


Function

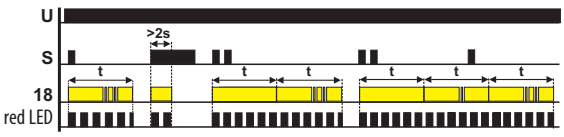
MODE ON



MODE AUTO



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



MODULE

- Separation or reinforcement of control circuit outputs.
- Protection of contacts of energy tariff switching, switching of boilers, el.bulbs.
- State indication by color LED.

PLUG-IN TYPE

- Industrial relay with long-life and quick replacement.
- Mechanical arrest and contol LED.

Auxiliary and Power relays

Power and auxiliary relays

VS(K)

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.

782

782
Power relays plug-in
Output contacts: 4 x
changeover contact/
SPDT 8 A
Plug-in type.

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

750

750
Power relays plug-in
Output contacts:
3 x changeover contact /
SPDT 16 A
Plug-in type.

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

Type	Design	Coil voltage	Output contact	Other features			Designation	Page in catalogue
				LED signal light	RC unit	Paralel diode		
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	67-68
VS116U	1M-DIN	AC/DC 12..240 V	1x16 A changeover/ SPDT	●	●	●	as VS116K, but multivoltage supply coil	67-68
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	67-68
VS308U	1M-DIN	AC/DC 12..240 V	3x8 A changeover/ 3PDT	●	●	●	as VS308K, but multivoltage supply coil	67-68
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	67-68
VS316/230	1M-DIN	AC 230 V	3x16 A changeover/ 3PDT	●	●	●	as VS316/24, but AC 230V	67-68
782	PLUG-IN	AC 6-230 V, DC 6-110 V	4x8 A changeover/ 4PDT	●			compact small relay in to 14-pin socket, basic version equipped by LED indication, detent and testing lever, gold-plated contact	69-70
750	PLUG-IN	AC 6-230 V, DC 6-110V	3x16 A changeover/ 3PDT	●			as 782, but wiht 11-pin round socket, 3x changeover contact / 3PDT 16A/250V	69-70

More about contact loadability on page 153-154

1M

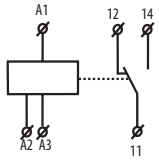
EAN code
see page 68

- To strengthen current switching or multiply contacts
- Output contact: VS116K, VS116U: 1x changeover 16 A
  VS308K, VS308U: 3x changeover 8 A
  VS316/24, VS316/230: 3x changeover 16 A – possibility of connection into 3-phase circuit
- Output status is indicated by highly luminous LED
- Choice of LED color for output status indication: red, green, yellow, blue or white LED*
- Inbuilt diode for suppressing unwanted peaks while relay opening and RC element against disturbances
- 1- MODULE, DIN rail mounting

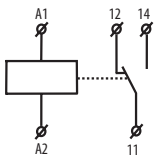
Technical parameters	VS116K	VS116U	VS308K	VS308U	VS316/24	VS316/230
Supply terminals:	A1 - A2					
Voltage range:	AC 230 V/50-60 Hz	AC/DC 12-240 V/ 50-60 Hz	AC 230 V/ 50-60 Hz	AC/DC 12-240 V/ 50-60 Hz	AC/DC 24 V/ 50-60 Hz	AC 230 V/ 50-60 Hz
Burden:	AC max. 7.5 VA/ 1W	AC 0.7 - 3 VA/ DC 0.5 - 1.7 W	AC 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:	A1-A3	x	A1-A3		x	
Voltage range:	AC/DC 24 V (50-60 Hz)	x	AC/DC 24 V (50-60 Hz)		x	
Burden:	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:	high intensity of LED					
Mechanical life:	$3x10^7$					$1x10^7$
Electrical life (AC1):	$0.7x10^5$					$1x10^5$
Time between switching:	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:	DIN rail EN 60715					
Protection degree:	IP 40 from front panel					
Overvoltage cathegory:	III.					
Pollution degree:	2					
Max. cable size (mm^2):	max.1x 2.5 or 2x1.5 max. 1x2.5					
Dimensions:	90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝)					
Weight:	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					

Symbol

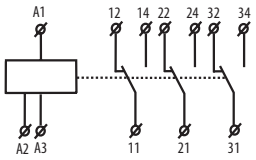
VS116K



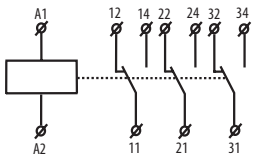
VS116U



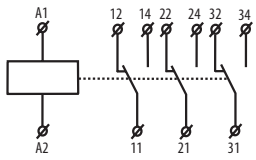
VS308K



VS308U



VS316/24, VS316/230

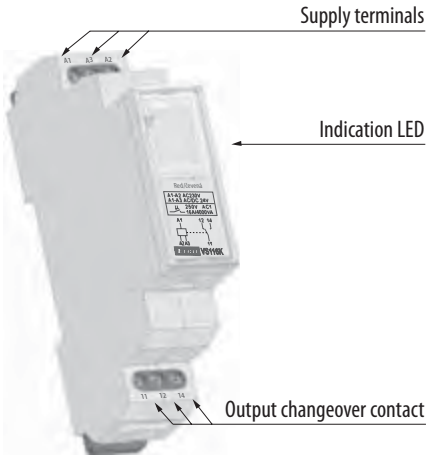


Notes:

Max. time of changeover of contact is 10ms.
VS316/24 or VS316/230 enables switching of different phases or 3 phase voltge.
* - blue and yellow - possibility to choose blue and yellow color of LED for power relays line VS in case of minimal order uantity 100 pcs.

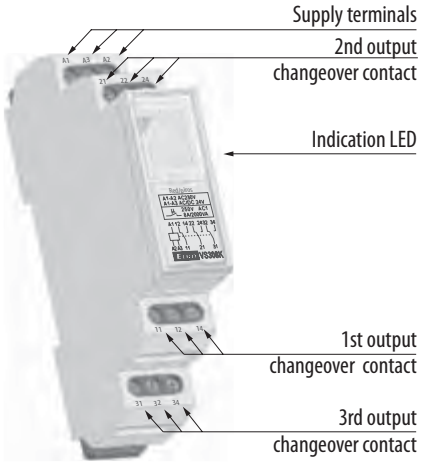
Description

VS116K, VS116U



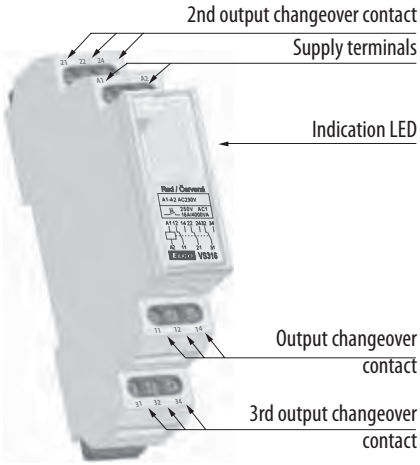
terminal A3 only for VS116K

VS308K, VS308U



terminal A3 only for VS308K

VS316/24, VS316/230



EAN kód

VS116U /červená	8595188124607	VS308U /červená	8595188130103	VS316 /230 červená	8595188135559
VS116U /zelená	8595188136433	VS308U /zelená	8595188136440	VS316 /230 zelená	8595188136075
VS116U /žlutá (*	8595188138499	VS308U /žlutá (*	8595188138529	VS316 /230 žlutá (*	8595188136082
VS116U /bílá (*	8595188138482	VS308U /bílá (*	8595188138512	VS316 /230 bílá	8595188136051
VS116U /modrá (*	8595188138475	VS308U /modrá(*	8595188138505	VS316 /230 modrá (*	8595188136068
VS116K /červená	8595188122597	VS308K /červená	8595188122696	VS316 /24 červená	8595188135771
VS116K /zelená	8595188122610	VS308K /zelená	8595188122719	**VS316 /24 zelená**	8595188136105
VS116K /žlutá (*	8595188122580	VS308K /žlutá (*	8595188122689	**VS316 /24 žlutá (***	8595188136129
VS116K /bílá (*	8595188122573	VS308K /bílá	8595188122672	**VS316 /24 bílá (***	8595188136099
VS116K /modrá (*	8595188122603	VS308K /modrá (*	8595188122702	**VS316 /24 modrá (***	8595188136112

Power relays plug-in type 750, 782

11

14

- to switch higher output (load) than is the capacity of the switched element (amplifier) or multiply contacts
- auxiliary control of light, signalization, free-lever signal box, boiler,signalling receiver on electrometers, heaters
- includes: mechanical indication, LED indication, cadmium-free gold plated contact, and detent lever
- quality prooved and certified in EZU, VDE, UL and other testing laboratories
- 750 - 3x changeover contact /3PDT16 A
- 782 - 4x changeover contact/4PDT 8 A
- recomended sockets - page 70

Technical parameters	750	782
Contacts		
Number of Number of contacts:	3	4
Material of contacts:	$AgSnO_2$ + 0.25 µm Au	$AgSnO_2$ + 0.25 µm Au
Rated voltage:	AC 277 V (50 - 60 Hz) / DC 28 V	AC 277 V (50 - 60 Hz) / DC 28 V
Current rating:	16 A	8 A
Inrush current:	24 A	22.5 A
Switching output (AC1):	4430 VA	2216 VA
Switching output (AC15):	1500 VA	1500 VA
Minimal switching voltage/current	100 mA / DC 5 V	
Coil		
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 input (AC/DC):	2 - 3.55 VA / 1.4 W	1.2 VA / 0.9 W
Tolerance of Voltage range:	-20 / +10 %	-20 / +10 %
Insulation data		
Insulation category:	B (130°C / 266 °F)	B (130 °C / 266 °F)
Rated insulating voltage (AC):	2500 V	1500 V
Dielectric strength (AC)		
Coil- contact:	2500 V	1500 V
Contact- contact:	1500 V	1000 V
Insulating resistance at 500 V DC:	10^7 Ω	10^7 Ω
Distance contact-coil		
For rated load:	4.32 mm (0.17˝)	4.57 mm (0.18˝)
Without load:	5.84 mm (0.23˝)	4.57 mm (0.18˝)
General Data		
Mechanical life:	$5x10^6$	$1x10^7$
Electrical life (AC1):	$2x10^5$	$2x10^5$
Max. switching frequency		
for rated load:	360 cycles / hrs	360 cycles / hrs
without load:	1800 cycles / hrs	1800 cycles / hrs
Time of relay operation/return of contacts:	max. 25 ms	max. 25 ms
Operating temperature:	-40 to +65 °C (-40 °F to 149 °F) (AC)	-40 to +65 °C (-40 °F to 149 °F)
Storing temparature:	-40 to +85 °C (-40 °F to 185 °F)	-40 to +85 °C (-40 °F to 185 °F)
Protection:	IP 40	IP 40
Shakeout resistance:	20 g (0.71 oz.)	20 g(0.71 oz.)
Vibration resistance (10-55 Hz):	5 g(0.18 oz.)	5 g(0.18 oz.)
Dimensions:	35.4x34.9x57.9 mm (1.39˝x1.37˝x2.28˝)	27.9x21.8x40.9 mm (1.1˝x0.86˝x1.61˝)
Weight:	88 g (3.1 oz.)	30 g(1.06 oz.)
Applicable standards:	EN 60947-4-1, EN 60947-5-1	EN 61810-1, EN 60255-1-00, EN 61810-7

Coil data - for 750

Type of product	voltage [V]	resistance [Ω]
AC voltage		
750XCXM4L-6A	AC 6	4.2
750XCXM4L-12A	AC 12	18
750XCXM4L-24A	AC 24	72
750XCXM4L-120A	AC 120	1700
750XCXM4L-230	AC 230	7200
DC voltage		
750XCXM4L-6D	DC 6	32
750XCXM4L-12D	DC 12	120
750XCXM4L-24D	DC 24	470
750XCXM4L-48D	DC 48	1800
750XCXM4L-110D	DC 110	10000

Coil data - for 782

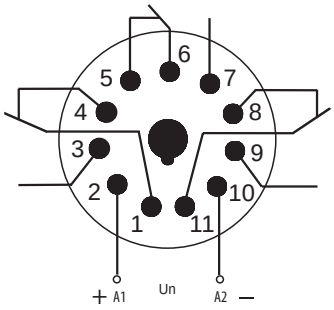
Type of product	voltage [V]	resistance [Ω]
AC voltage		
782XCXM4L-6A	AC 6	9.6
782XCXM4L-12A	AC 12	46
782XCXM4L-24A	AC 24	180
782XCXM4L-120A	AC 120	4430
782XCXM4L-230A	AC 230	15000
DC voltage		
782XCXM4L-6D	DC 6	40
782XCXM4L-12D	DC 12	160
782XCXM4L-24D	DC 24	650
782XCXM4L-48D	DC 48	2600
782XCXM4L-110D	DC 110	11000

EAN code

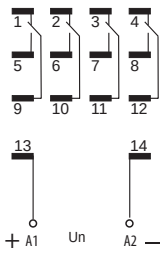
782 /6V DC	8595188129909	750 /6V DC	8595188129961
782 /12V DC	8595188119030	750 /12V DC	8595188129978
782 /24V DC	8595188119047	750 /24V DC	8595188125147
782 /48V DC	8595188129916	750 /48V DC	8595188129985
782 /110V DC	8595188129923	750 /110V DC	8595188129992
782 /6V AC	8595188129930	750 /6V AC	8595188130004
782 /12V AC	8595188119085	750 /12V AC	8595188130011
782 /24V AC	8595188119092	750 /24V AC	8595188119207
782 /48V AC	8595188129954	750 /120V AC	8595188130028
782 /120V AC	8595188129947	750 /230V AC	8595188119221
782 /230V AC	8595188119115		

Connection

Connection - 750



Connection - 782



Socket ES-11 - for 750

Max. voltage: 10 A
Weight: 60 g
DIN rail mounting
Designated for 3-contact relay

ES-11

Socket ES-15/4N - for 782

Max. voltage: 12 A
Weight: 59 g
DIN rail mounting
Designated for 4-contact relay

ES-15/4N

Accessories ES-11 - for 750

annotation label - T
clip to relay 750 -16-1351

Accessories ES-15/4N - for 782

annotation label - T
clip to relay 785 -16-785SC

It is possible to add LED MODULE, protective diode and RC element into a socket.

EAN code

ES15/4N	8595188119245
ES11	8595188129879
ES8	8595188136167
Spona k relé 750	8595188119283
Spona k relé 782	8595188119276

Dimmers

MODULAR

R, L

DIM-2
staircase switch with gradual dimming up/down, level and time of illumination, all values are adjustable.

R, L

DIM-5
control by a button/buttons (connected in parallel), short pressing ON/OFF, long pressing regulates brightness, memory storing.

R, L, C

DIM-14
as DIM-5 but dims all types of loads, in-built protection against temperature and current overload, electronic fuse.

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

MODULAR

DIM-6
designed for dimming incandescent bulbs and halogen lights with wound or electronic transformer.

DIM6-3M-P
DIM6-3M-P is a power module expansion unit for DIM-6

MINI

SMR-S
as DIM-5, but for mounting under a wall-switch into a wiring box, 3 wire connection (without neutral).

SMR-U
as DIM-14, but for mounting under a wall-switch into a wiring box.

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				Designation	Page in catalogue
			resistive (el. bulbs, halogen lights) R	inductive (wound transformers) L	capacitive (electronic transformers) C	output element	Rated load R	Rated load L	Rated load C		
DIM-2	1M-DIN	AC 230V	●	●		triac	10-500VA	10-250VA	-	staircase switch with gradual dim-up/dim-down, level and length of illumination, all values are adjustable	73
DIM-5	1M-DIN	AC 230V	●	●		triac	10-500VA	10-250VA	-	control by button/buttons (connected in parallel), short pressing ON/OFF, long pressing regulated brightness, memory recoding	74
DIM-14	1M-DIN	AC 230V	●	●	●	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	75
DIM-15	1M-DIN	AC 230V	-	-	-	2x mosfet	●**	-	●**	designated for dimming of: 1) LED bulbs and LED lighting sources 2) dimmable saving fluorescent lamps	78
DIM-6	6M-DIN	AC 230V	●	●	●	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)	76
DIM-6-3MP	3M-DIN	AC 230V	●	●	●	2x mosfet	1 000 VA*	1 000 VA*	1 000 VA*	is expanding power modul for controlled dimmer DIM-6	77
SMR-S	BOX	AC 230V	●	●		triak	10-300VA	10-150VA	-	as DIM-5, but for mounting under a wall-switch, into a wiring box, 3 wire connection (without neutral) is expanding power modul for	80
SMR-U	BOX	AC 230V	●	●	●	2x mosfet	500VA*	500VA*	500VA*	as DIM-14, but for mounting under a wall-switch, into a wiring box	80

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

Note: ** - more info on the page 78-79

Staircase switch with dimming DIM-2

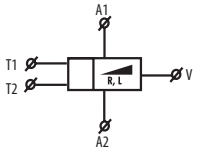
1M

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

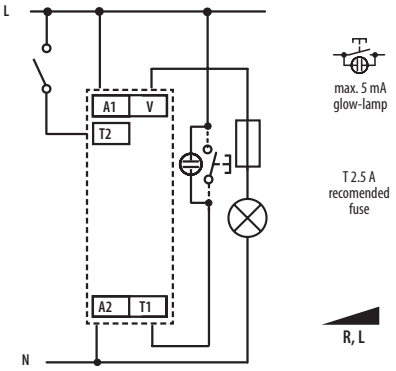
- Designated for dimming el. bulbs, halogen lights and winding transformers for halogen lights
- Intelligent control of halogen lights, function of gradual switching on and dimming
- Controlling inputs for push button and switch
- Values are set by potentiometers on front panel of the product, adjustable:
  - 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
- Pote: 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	
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, 5 pcs (1ks - 1 mA)
Controlling T2	
Terminals:	T2 - A1
Voltage:	AC 230 V
Power on control input:	0.1 VA
Impulse length:	min.100 ms /max. unlimited
Glow-lamps:	No
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

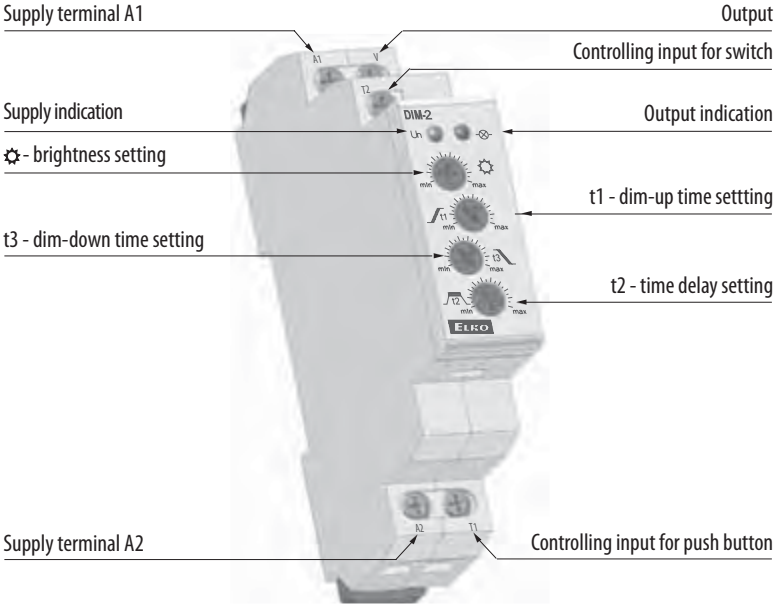
Symbol



Connection



Description



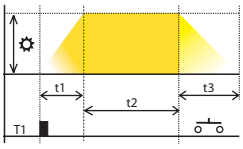
Recommendation for mounting: leave a gap of min. 0,5 module (approx. 9 mm) on side of the device to ensure better cooling of the device.

Function

Legend:

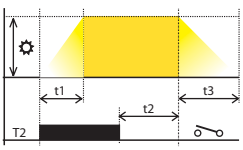
☼ Brightness: 10-100%
t1 Dim-up time: 1-40 s
t2 Time delay: 0s-20min
t3 Dim-down time: 1-40s

Controlled via input T1(button)



Dim-up delay -down is started by a button. Cycle extensi-onanother button pressing (during 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.

Controlled dimmer DIM-5

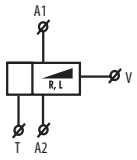
1M

- Designated for dimming el. bulbs, halogen lights and winding transformers for halogen lights
- For switching and dimming lights in corridors, staircases... control input for push-buttons (parallel connection possible)
- Short press turns light on/off, long 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-temperature inside the product - switches output off + signalizes overheating by LED flashing

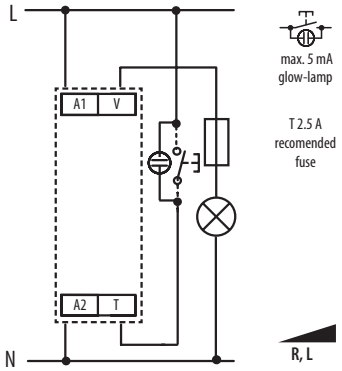
EAN code
DIM-5 /230V: 8595188115612

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, 5 pcs (5 mA)
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

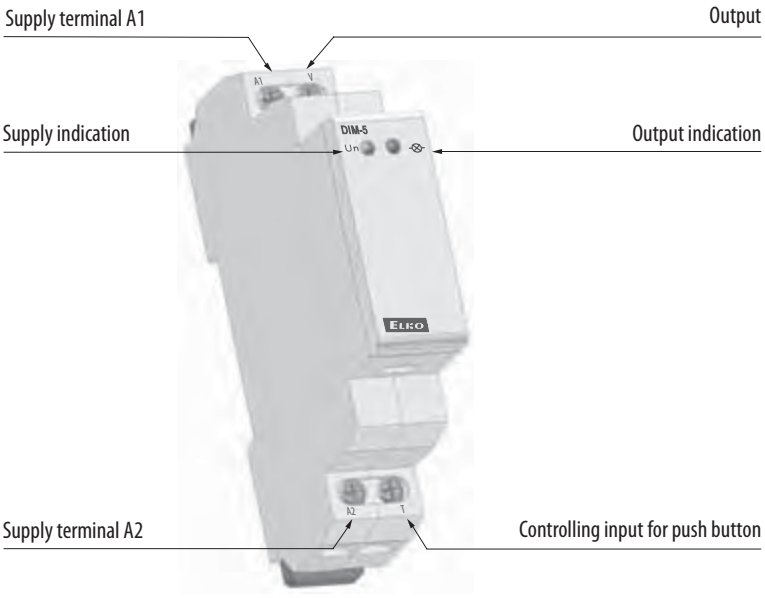
Symbol



Connection

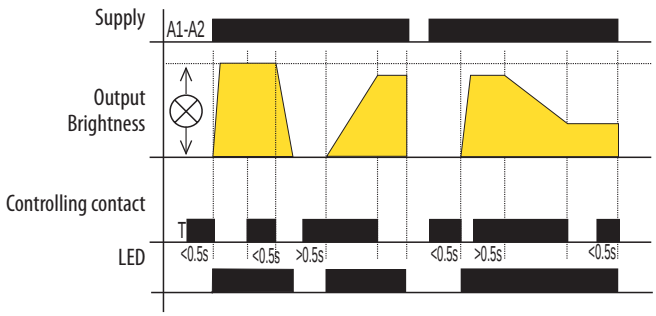


Description



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.

Function



Controlled dimmer DIM-14

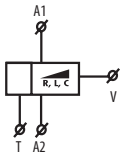
1M

- 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, long 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-temperature inside the device - output off

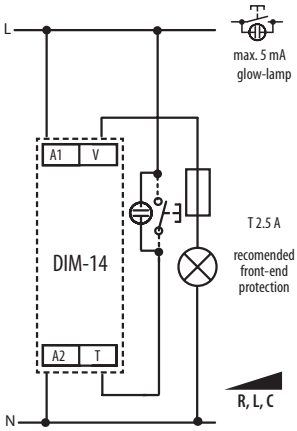
EAN code
DIM-14 /230V: 8595188135955

Technical parameters	DIM-14
Supply terminals:	A1-A2
Voltage range:	AC 230 V / 50 Hz
Burden:	1.3 W
Supply voltage tolerance:	-15 %; +10 %
Supply indication:	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, 5 pcs (5 mA)
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 (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

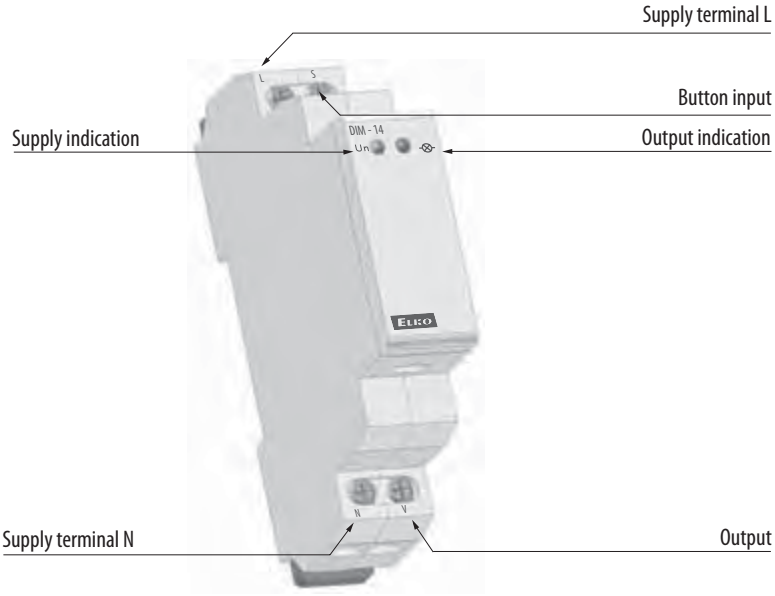
Symbol



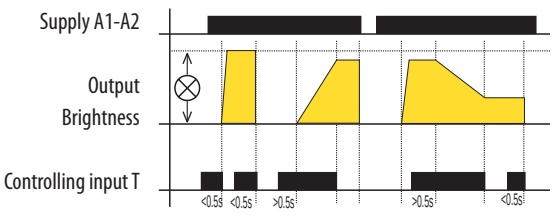
Connection



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.

Controlled dimmer DIM-6

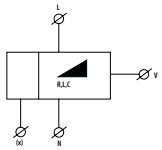
6M

- 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 10000 VA , by module DIM6-3M-P
- Electronic overcurrent protection, overvoltage and short-circuit protection.
- Protection against over temperature inside device - switch off output+signalize overheat by fl ashing red LED.
- 6-MODUL version, mounting on DIN rail

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:	YES (AC 230V), 20ks (1ks-1mA); 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 data	
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.)
Applying standards:	EN 60669-2-1, EN 61010, EN 55014

Symbol

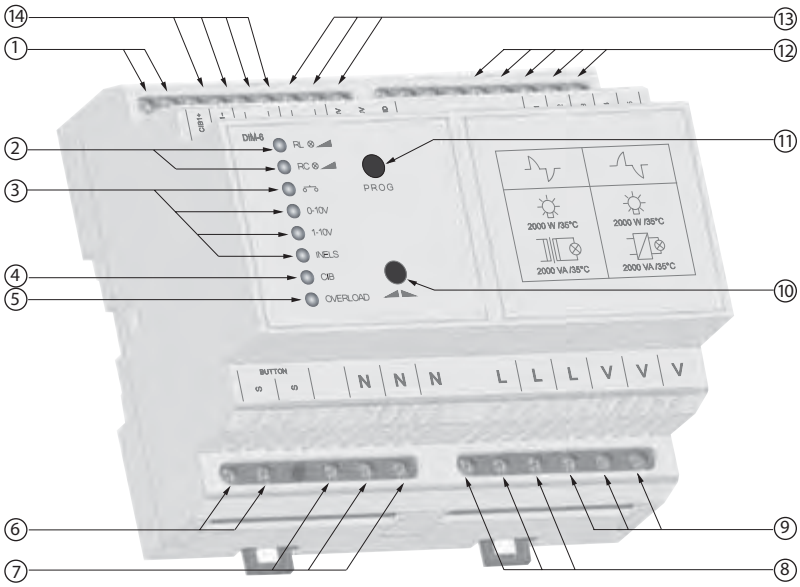


(x) - according to control type setting

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 overrun inside the device, shinnig LED signalizes current overload

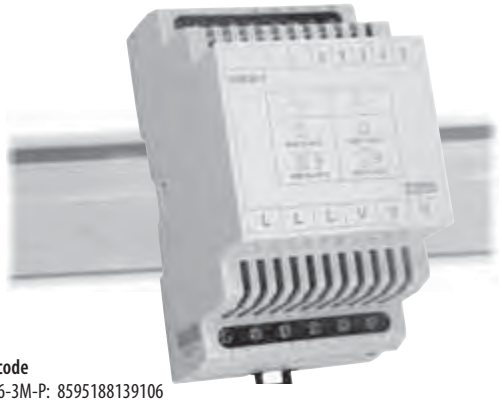
Device description



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.

Expanding power modul DIM6-3M-P

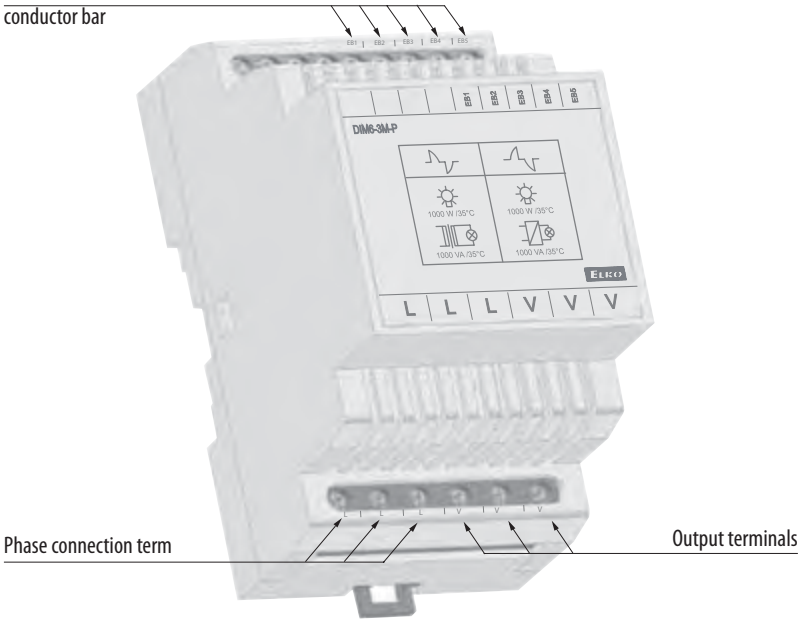


EAN code
DIM-6-3M-P: 8595188139106

- Expansion power module only for use in conjunction 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 series breaker unit , compatable to size of connecting load.
- DIM-6 in installation is cooled b y 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.

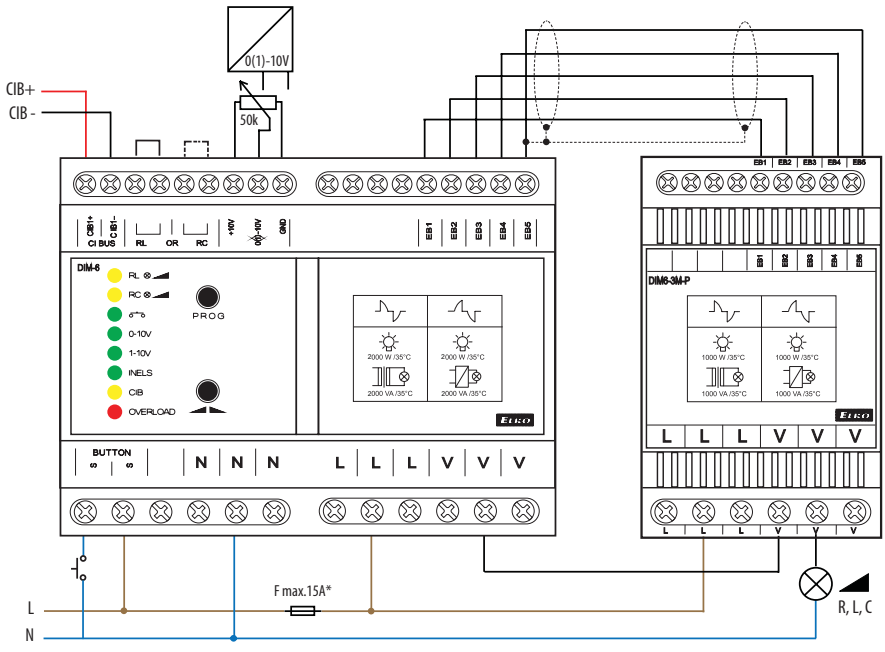
Technical parameters	DIM6-3M-P
Load	max. 1 000VA
Dissipated power:	2.5 % from load
Output	
Contactless:	2 x MOSFET
Current rating:	5 A
Resistive load:	1 000 VA*
Inductive load:	1 000 VA*
Load capacity:	1 000 VA*
Other data	
Operating temperature:	-20 °C to +35 °C (-4 °F to 95 °F)
Storing temperature:	-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 (mm²)	
- 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



*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.

Dimmer for LED bulbs and dimmable fluorescent lamps DIM-15

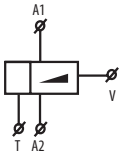
1M

EAN code
DIM-15 /230V: 8595188140690

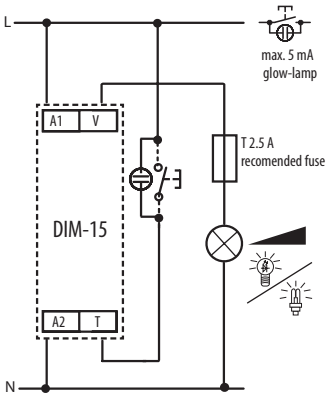
- Designated for dimming of: a) LED bulbs and LED light sources
  b) dimmable saving fluorescent lamps
- Enables gradual setting of luminance by push-button (non-detent) or parallel buttons
- Returns to last state upon re-energization
- Type of light source (LED or saving fluorescent lamp) is set by 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
- 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

Technical parameters	DIM-15
Supply terminals:	A1-A2
Voltage range:	AC 230 V / 50 Hz
Operating range:	-15 %; +10 %
Apparent power:	max. 1.5VA
Loss power:	max. 0.7W
Supply indication:	green LED
Controlling	
Control terminals:	A1-T
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, 5 ks (5 mA)
Output	
Contactless:	2 x MOSFET
Load:	see the chart of recommended light sources
Output status indication:	red LED
Other data	
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
Protection degree:	IP40 from the front panel, IP10 terminals
Overvoltage category:	III.
Pollution level:	2
Terminal wire capacity:	max. 2x2.5, 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˝) (3.5˝ x 0.7˝ x 2.5˝)
Weight:	57 g (2 oz.)
Standards:	EN 60669-2-1, EN 61010-1

Symbol



Connection

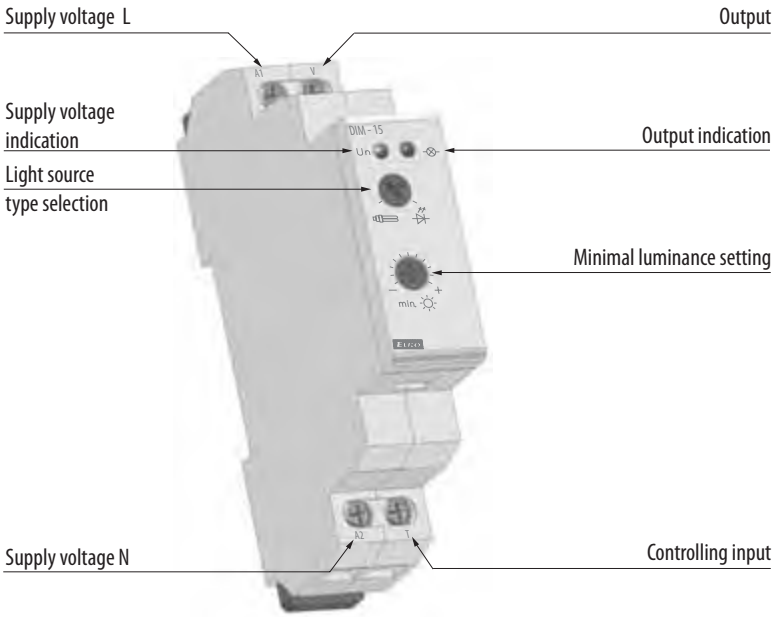


Light source type setting

dimmable saving fluorescent lamps

LED bulbs

Device describtion



Mounting recommendation:
-on each side of device keep a gap with width 0.5 of module (approx. 9 mm/ 0.4˝) for better device cooling.

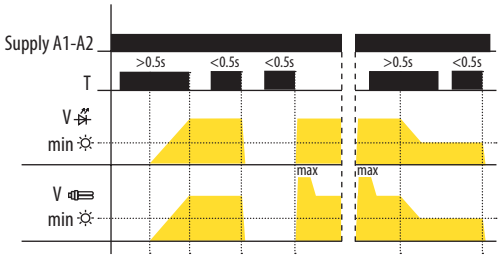
Warrning:
-do not connect loads with inductive character (e.g. motors, ferromagnetic transformers)

-device is not designated for dimming of classical bulbs or halogen bulbs with electronic transformer

-it is not recommended to connect light sources with different types and brands, to one dimmer

Dimmer for LED bulbs and dimmable fluorescent lamps DIM-15

Functions



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

„Fluorescent 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

Recommended light sources

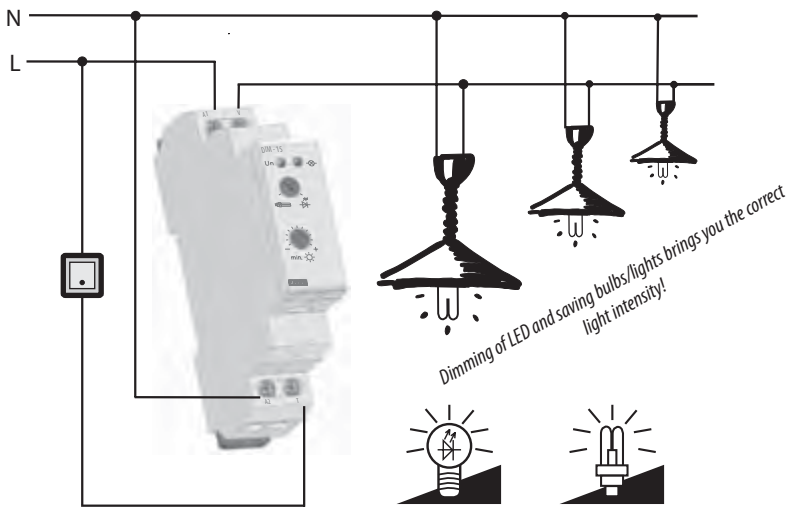
The maximal universality became to be a habit by our products – by this dimmer it is its wide spectrum of applicable light souces. Area of LED lights dimming - as well as saving lamps dimming area – is relatively new and there are not so many manufacturers, who are producing these devices. Therefore we will be continuing with tests and extending the chart below with more types. We will appreciate your cooperation and informations about new types on the market.

Overview of tested light sources types and its loads

Type	Manufacturer	socket	quantity [pcs]	max.load [W]
	BRILUM LED line white (21LED)	GU10D	22	29
	OSRAM DULUX EL.DIMMABLE LUMILUX Warm White 1230lm	E27	11	220
	MEGAMAN DIMMERABLE 2700K DEC01	E14	16	144
	LUMEE GU 10-60-CW-120	GU-10	8	24
	LUMEE GU 10-P-60-CW-120	GU-10	8	24
	LUMEE JDRE 14-60-CW-120	E14	8	24
	LUMEE Ball-80-CW	E14	20	80

Notice:
- 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.cz/www.elkoep.com

Connection example



Dimmer flush mounting SMR-S, SMR-U

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

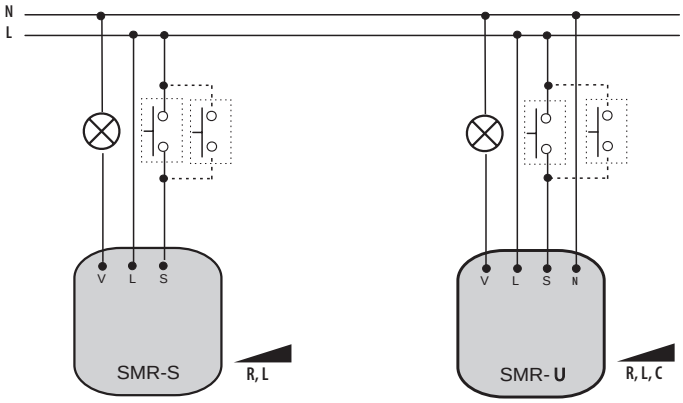
- Button-controlled dimmers designated for flush mounting into a wiring box, into an existing elecal-installation (SMR-S doesn´t need neutral for correct function)
- Can control lamp brightness, dimming , control from more places(parallel connections) possible
- Protection against temperature overrun 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)
- Should not be used without a fluorescent ballast or on CFL's

- 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 overload and over-temperature protection – output off in case of short-circuit or overvoltage

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	
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	

Connection SMR-S, SMR-U



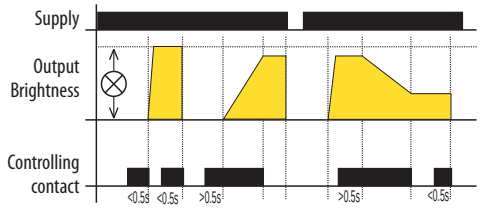
Typical connection of SMR-S - dimmer of lights

Typical connection of SMR-U - dimmer of lights

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

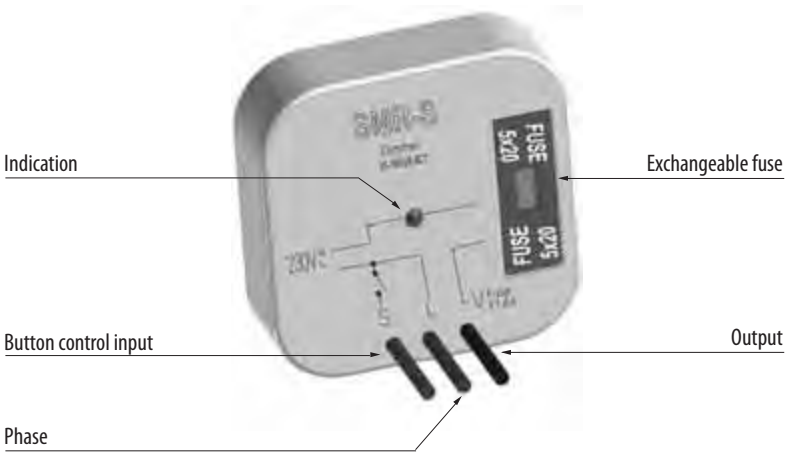
SMR-U: It is not allowed to connect together loads of inductive and capacitive type in the same time.

Function SMR-S, SMR-U



KA 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



UNSTABILIZED

- Stable AC or DC output voltage.
- Supplying of simple devices, indicating lights and home door bells .

STABILIZED WITH STABLE VOLTAGE

- Galvanically separated from the main, electronic fuse.
- Supply of control systems, automats, versions 12-24V.

STABILIZED REGULATE

- Specific voltage setting, regulation by potentiometer.
- Indication of current limit exceeding.
- Protection against short-circuit on output.
- Supply of appliances with galvanical separation from the main.

Power supplies

BELL TRANSFORMER

- Simple supplies with alternating output voltage.
- Supplying of door locks and door bells.

Power supplies

Voltage	Stabilized DC- switching	Stabilized DC- linear	Nonstabilized AC+DC

12V

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

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

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	88
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	88
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	88
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	86-87
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	86-87
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	86-87
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	86-87
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	86-87
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	86-87
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	86-87
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)	85
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)	85
ZTR-8-8	2M-DIN	AC 230 V, -15/+10%	●			8 V	1A	-			●	bell transformer (short-circuit-proof) for supply og bells, door openers, home call-boxes	89
ZTR-8-12	2M-DIN	AC 230 V, -15/+10%	●			12V	0.66A	-			●		89
ZTR-15-12	3M-DIN	AC 230 V, +/- 10%	●			4-8-12 V	2-1.5-1A	-			●		89

4.5M

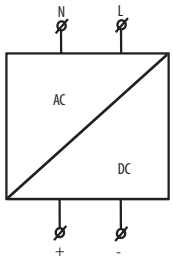
- Stabilized switching power supply
- Input voltage (Uprim) in a wide range 100 - 240 V AC
- DR-60-12: power supply with fixed output voltage DC 12 V, stabilized 54 W
- DR-60-24: power supply with fixed output voltage DC 24 V, stabilized 60 W
- Max. load 12 V-4.5 A, 24 V-2.5 A
- Electronic protection 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 mounted, isulation class II

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

Technical parameters:	DR-60-12	DR-60-24
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 (mm^2):	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	

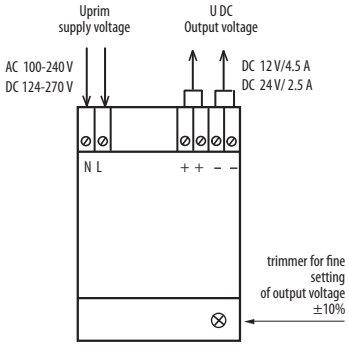
Symbol

DR-60-12
DR-60-24

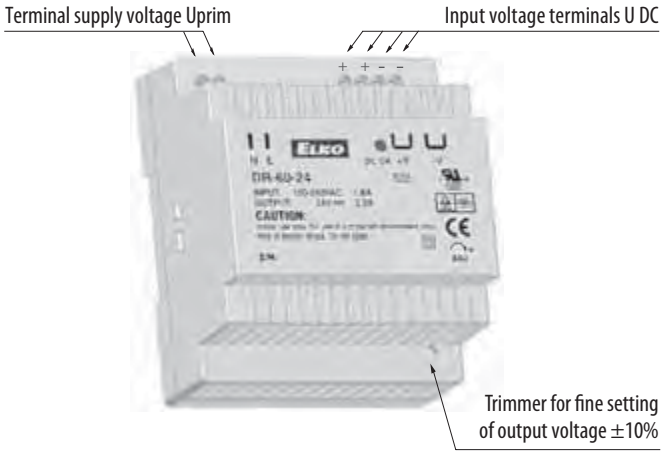


Connection

DR-60-12
DR-60-24



Description



Switch mode power supplies PS

1M
3M
6M

EAN code

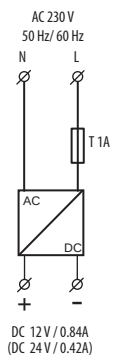
PS-10-12V	8595188139052
PS-10-24V	8595188139069
PS-30-12V	8595188137966
PS-30-24V	8595188139045
PS-30-R	8595188136655
PS-100-12V	8595188137195
PS-100-24V	8595188139021

- 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
- Indication of overload by red LED on front panel – only for PS-30-R.
- Temperature protection – if temperature is exceeded, the device switches off and after cooled down, it switches on again.

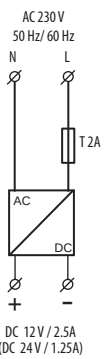
Technical parameters:	PS-10-12	PS-10-24	PS-30-12	PS-30-24	PS-100-12	PS-100-24	PS-30-R
Input							
Voltage range:	AC 230V / 50 - 60Hz						
Supply voltage tolerance:	-20%; +10%						-15% ;+10%
Burden without load (max):	5VA / 2W		5VA / 2W		6VA / 2W		4VA / 2W
Burden with full load (max):	25VA / 13W		78VA / 40W		195VA / 118W		71VA / 40W
Protection:	fuse T1A		fuse T2A		fuse T 3.15A		fuse T1A
Output							
Output voltage DC / max. current:	12.2V/0.84A	24.2V/0.42A	12.2V/2.5A	24.2V/1.25A	12.2V/8.4A	24.2V/4.2A	12.2V/2.5A 24.2V/1.25A
Tolerance of output voltage:	± 2%						± 3%
Output indication:	green LED						
Wave of off-load output voltage:	80mV		80mV		55mV		80mV
Wave of output voltage with max load:	20mV		20mV		5mV		40mV
Time delay after connection:	max. 0.5s						max.1s
Time delay after over-load	max. 0.5s						max.1s
Overload capacity:	max. 120% of rated output						
Efficiency:	> 75%		>75%		>82%		>77%
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:	IP20 device/ IP40 in-built in distribution board						
Overvoltage category:	III.						
Polutioon degree:	2						
Max. cable size (mm²):	solid wire max.1x2.5 or 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″ x 2″ x 2.6″)		90 x 105 x 65 mm (3.5″ x 4.1″ x 2.6″)		90x52x65mm (3.5″x2″x2.6″)
Weight:	62 g (2.2 oz.)	62 g (2.2 oz.)	136 g (4.8 oz.)	136 g (4.8 oz.)	375 g (13.2 oz.)	363 g (12.8 oz.)	152 g (5.4 oz.)
Standards:	EN 61558-1, EN 61010-1, EN 61558-2-17						

Connection

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

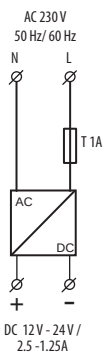


PS-30-12
(PS-30-24)

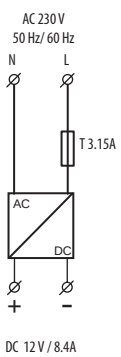


PS-30-12 replacement for PS-12
PS-30-24 replacement for PS-24

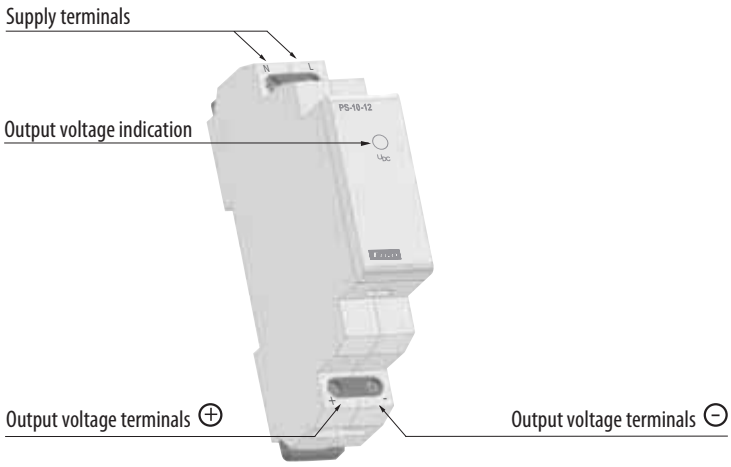
PS-30-R



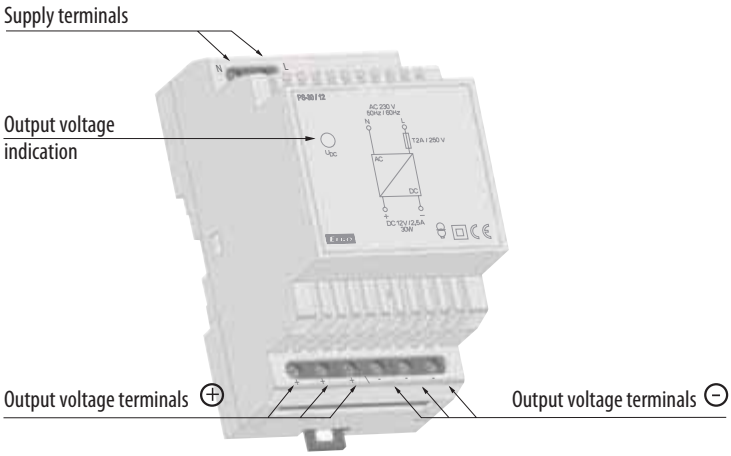
PS-100-12
(PS-100-24)



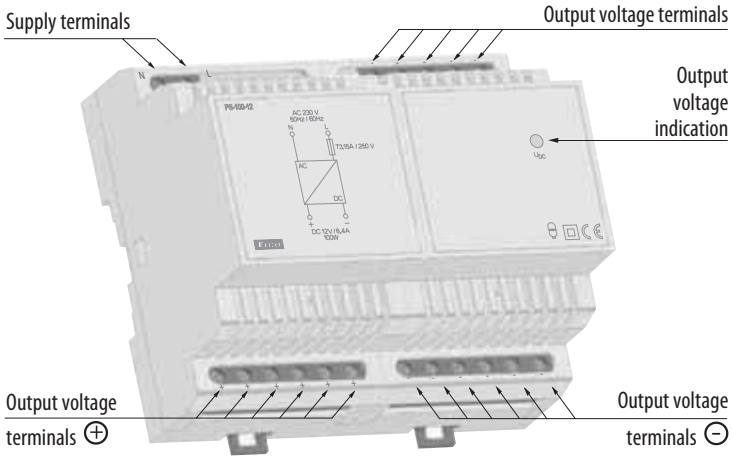
PS-10-12



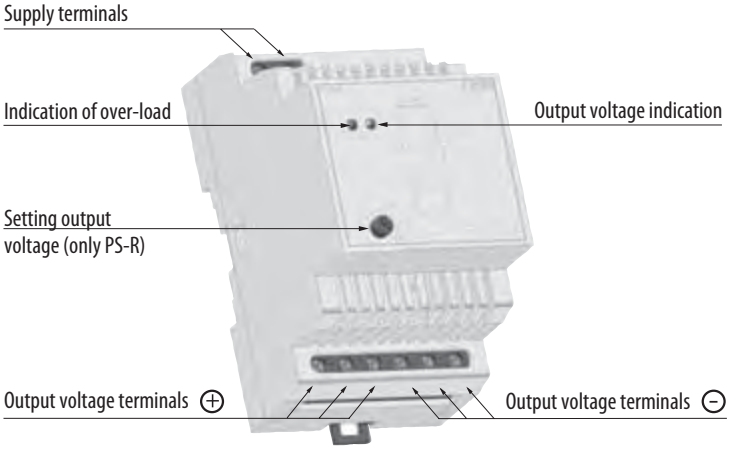
PS-30-12



PS-100-12



PS-30-R



Power supply ZSR-30, ZNP-10

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

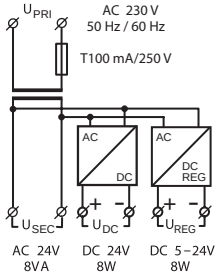
Nonstabilized power supply ZNP-10-12V, ZNP-10-24V

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

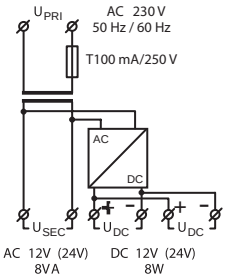
Technical parameters	ZSR-30	ZNP-10-12V	ZNP-10-24V
Entry (U prim)			
Voltage range:	AC 230 V / 50 - 60 Hz		
Supply voltage tolerance:	-15 %; +10 %		
Consumption without load (max):	6VA	7 VA	6.5 VA
Consumption with load (max):	10VA	11 VA	
Output (Usec)			
Output voltage:	DC 5-24 V stab. DC 24 V nonstab. 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:	Against black-out 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



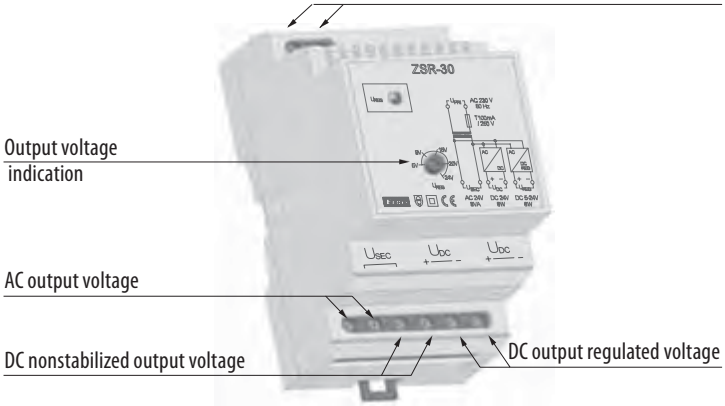
ZNP-10



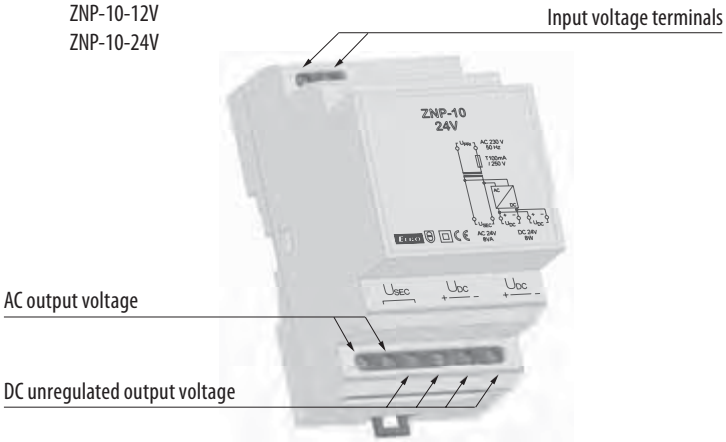
WARNING! Values of max. load are valid for (operational) temperature.
Total loads on all output terminals may not exceed this values:
by supplying 230 V-253 V – 8W
from 230 V. . . 207 V output power is eaqualy decreesing onto 5 W

Description

ZSR-30

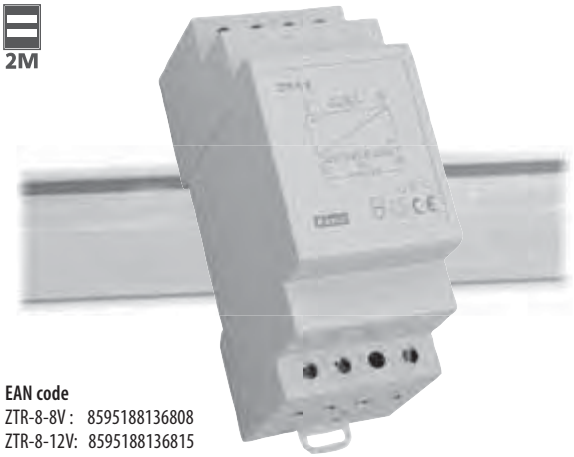


ZNP-10-12V
ZNP-10-24V



Bell transformer ZTR

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

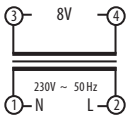
  ZTR-15-12: output voltage 4 - 8 -12V

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

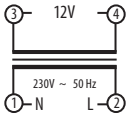
Technical parameters	ZTR-8-8	ZTR-8-12	ZTR-15-12
Entry (U prim)			
Voltage range:	AC 230 V / 50 Hz		
Supply voltage tolerance:	-15 %; +10 %		± 10 %
Consumption without load (max):	7.2 VA	9.4 VA	3.5 VA
Output (Usec)			
Output voltage:	AC 8 V	AC 12 V	AC 4 V AC 8 V AC 12 V
Output voltage-no load AC:	12 V	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 (mm^2):	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

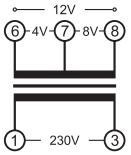
ZTR-8-8



ZTR-8-12



ZTR-15-12



Memory relays

MR

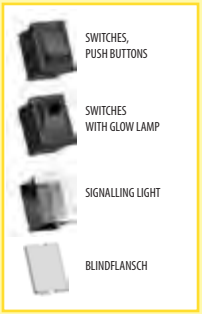
MR-41
Voltage range:
AC 230 V or AC/DC 12 -240 V
Output contact:
1x changeover/SPDT 16 A.

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.



Twilight switchs

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.

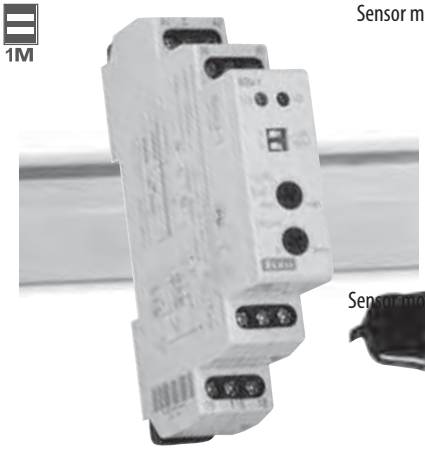
SOU-3
Twilight and light switch
Voltage range:
AC 230 V / 50 - 60 Hz
Output conatct:
1x changeover/SPDT 16 A.

Accessories
of twilight switches:

Sensor to SOU-1 and SOU-2
Protection degree: IP56.
Issuitable for mounting on the wall or in panel.

Twilight switch SOU-1

1M



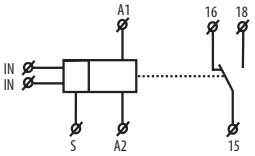
Sensor mounting on the wall

Sensor mounting on the panel

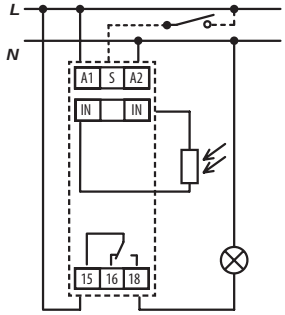
- Serves to control lights on the basis of ambient light intensity
- Used for switching street illumination and garden lights, illumination of advertisements, shop windows, etc.
- Level of ambient intensity is monitored by an external sensor and output is switched according to set level on the device
- 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
- Sdjustable 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

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
Max. capacity of cable control:		
-without connected glow-lamps		12 nF (UNI), 12 nF (AC 230V)
-with connected glow-lamps		(UNI), glow lamps cannot connected/NO 9 nF (AC 230 V), max.4pcs(1pc-1mA)
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 157
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:		

Symbol



Connection



Description of DIP switch

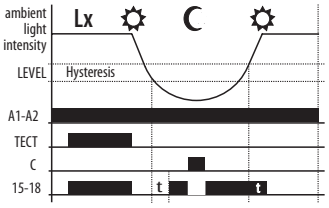
DIP 1 - LUX

ON
100 - 50000 Lx
1 - 100 Lx

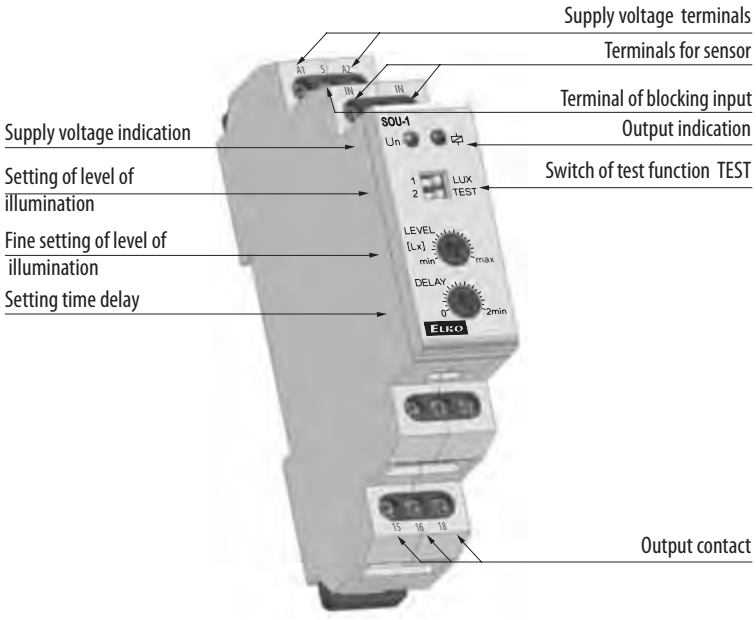
DIP 2 - TEST

ON
TECT ON
NORMAL

Function



Description



Accessories:

External sensors, see page 93

SOU-1 /230V + sensor: 8595188121002
SOU-1 /UNI + sensor 8595188121019
Sensor for SOU: 8594030337288

Twilight switch SOU-2 with digital time switch clock

Sensor mounting on the wall

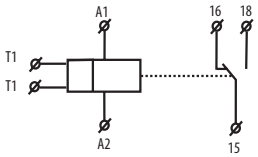
Sensor mounting on the panel

- 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)
- 2-MODULE, DIN rail mounting

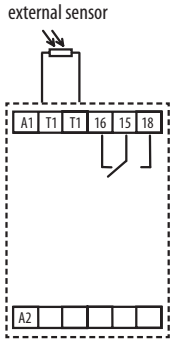
EAN code
SOU-2 /230V + sensor: 8595188130523
Sensor for SOU: 8594030337288

Technical parameters	SOU-2
Supply terminals:	A1 - A2
Voltage range:	AC 230 V / 50 - 60 Hz
Burden:	max. 3.5 VA
Voltage range:	-15 %; +10 %
Back-up supply:	yes
Summer/winter time:	automatic
Output	
Number of contacts:	1x changeover/ SPDT ($AgSnO_2$)
Current rating:	8 A / AC1
Breaking capacity:	2500 VA / AC1, 240 W / DC
Switching voltage:	250 V AC1 / 24 V DC
Min. breaking capacity DC:	500 mW
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:	-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 (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 158
Weight:	110 g (3.9 oz.)
Weight sensor:	20 g (0.7 oz.)
Standards:	EN 61812-1, EN 61010-1, EN 60255-6

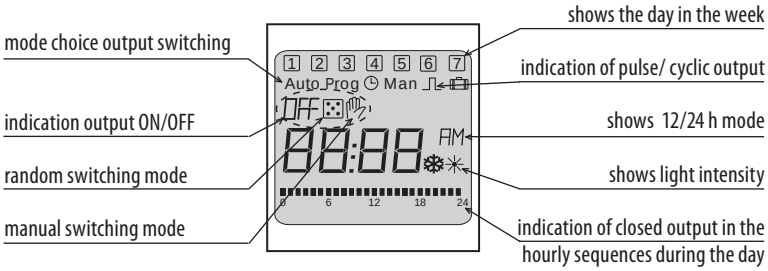
Symbol



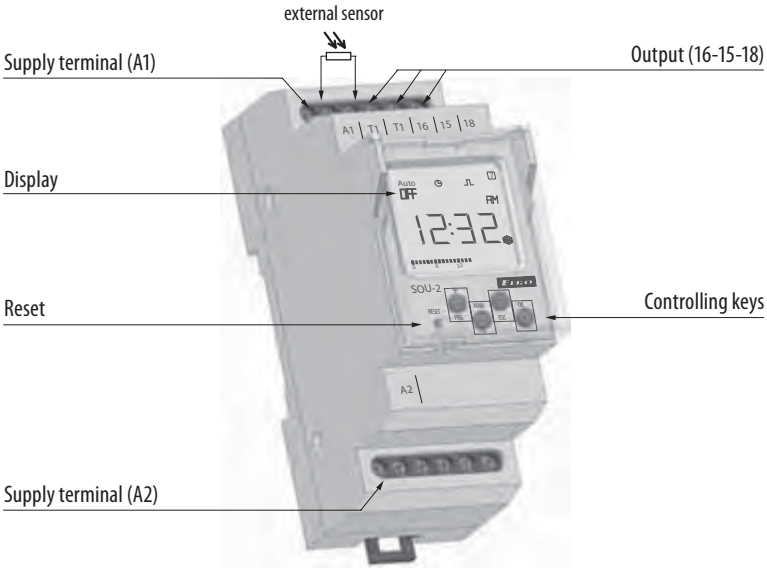
Connection



Description of visual elements on the display



Description



Accessories:

external sensor suitable for mounting on the wall/ in panel

Sensor resistance:	Value:
1 Lx	22.6 kΩ
100 Lx	1.1 kΩ
50 000 Lx	59 Ω
Tolerance sensor:	± 33 %

Ambient light sensor SOU-3

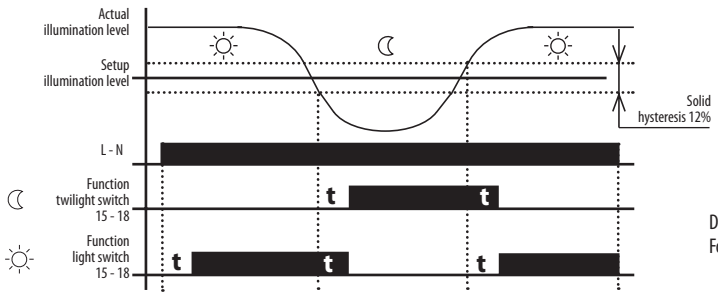
98x62x34
IP65

EAN code
SOU-3 /230V: 8595188140560

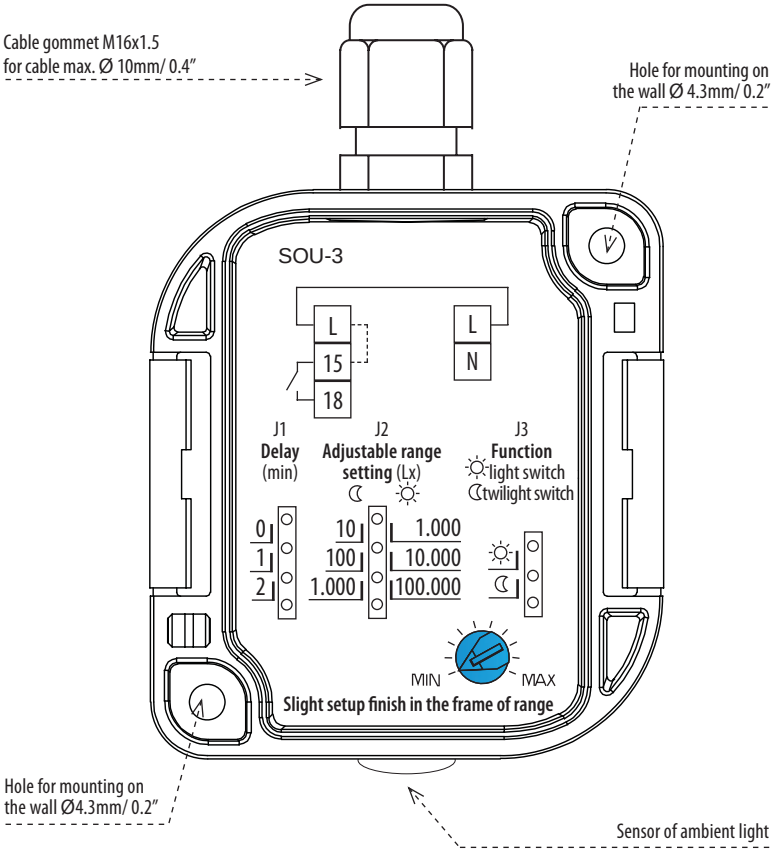
- Serves as control of the device on the basis of ambient light intensity.
- External version in IP65, box for mounting on the wall
- Built in high resolution light sensor
- Two devices in one, function is set by jumper:
  - twilight switch – contact closes by decreasing of ambient light intensity, and 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
- Potentialless NO- SPST contact 12 A/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 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 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

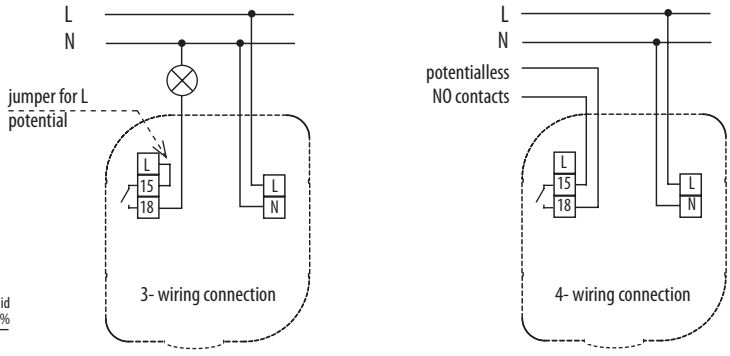
Function



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

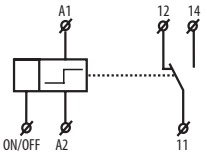
MR-41 /230V	8595188115889
MR-41 /UNI	8595188115896
MR-42 /230V	8595188115902
MR-42 /UNI	8595188115919

- 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
- Using single poles switches from several locations, installation will be lower cost and wiring less complicated.
- Relay MR-41/UNI, MR-42/UNI returns to the last state if A1-A2 power is lost
- 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

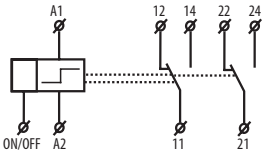
Technical parameters	MR-41	MR-42
Number of functions:	1	2
Supply terminals:	A1 - A2	
Voltage range:	AC/DC 12 - 240 V (AC 50 - 60 Hz)	
Burden:	AC 0.17 - 3 VA / DC 0.1 - 1.2 W	AC 0.17 - 12 VA / DC 0.11 - 1.9 W
Voltage range:	AC 230 V / 50 - 60 Hz	
Consumption (apparent/loss):	AC max. 12 VA / 1.2 W	AC max. 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	
Max. capacity of cable control:		
- without connected glow-lamps	12 nF	
-with connected glow-lamps	(UNI), glow lamps cannot connected 9 nF (AC 230 V), max.pcs 4ks(1ks-1mA)	
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

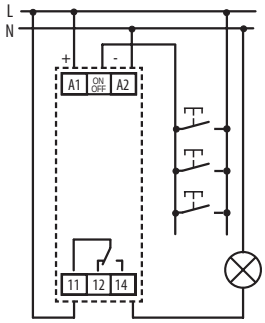


MR-42

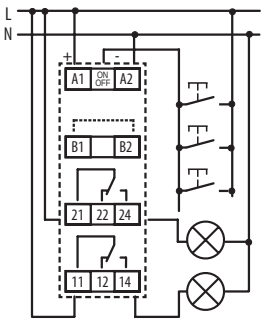


Connection

MR-41

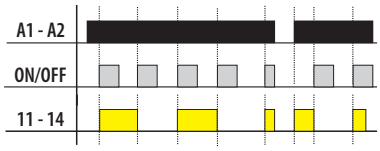


MR-42

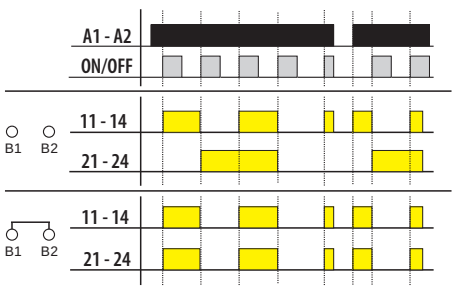


Function

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	A3 (A13) – A1 (A12)	10 A / 250 V	Switch
USS-02	A3 (A13) – A1 (A12), A2 (A11)	10 A / 250 V	Alternation switch
USS-03	A3 (A13) – A1 (A12), A2 (A11)	6 A / 250 V	Switch with cental position
USS-04	A3 (A13) – A1 (A12), A2 (A11)	4 A / 250 V	Switch + button with central position
USS-05	A3 (A13) – A1 (A12), A2 (A11)	4 A / 250 V	Switching button with central position
USS-06/S	A3 (A13) – A1 (A12)	4 A / 250 V	NO switch
USS-06/R	A3 (A13) – A1 (A12)	4 A / 250 V	NC switch
USS-07	A3 (A13) – A1 (A12), A2 (A11)	10 A / 250 V	Switch with glow lamp (red)
USS-08	A3 (A13) – A1 (A12), A2 (A11)	10 A / 250 V	Switch with glow lamp (green)
USS-09	A3 (A13) – A1 (A12), A2 (A11)	10 A /250 V	Switch with glow lamp (yellow)
USS-10	A1 (A11) – A3 (A13), A2 (A12)	A1-A2, AC 250 V A1-A3, AC/DC 24 V	Signalling LED (red)
USS-11	A1 (A11) – A3 (A13), A2 (A12)	A1-A2, AC 250 V A1-A3, AC/DC 24 V	Signalling LED (green)
USS-12	A1 (A11) – A3 (A13), A2 (A12)	A1-A2, AC 250 V A1-A3, AC/DC 24 V	Signalling LED (yellow)
USS-13	A1 (A11) – A3 (A13), A2 (A12)	A1-A2, AC 250 V A1-A3, AC/DC 24 V	Signalling LED (white)
USS-14	A1 (A11) – A3 (A13), A2 (A12)	A1-A2, AC 250 V A1-A3, AC/DC 24 V	Signalling LED flashing (red)
USS-15	A1 (A11) – A3 (A13), A2 (A12)	A1-A2, AC 250 V A1-A3, AC/DC 24 V	Signalling LED (blue)

Make your own device USS - easy and intelligent solution!

BLANK PANEL
Used to fill in an empty position in the front panel of the USS Module
Color: Gray, 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.
Unit: 07-09

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

Switching units (01-06) come form a wellknown French company APEM. High quality contacts will provide years of switching service. Quality of switches is garanteed by many years of experience in this fi eld (since 1952) and by world-approved certifi cates VDE a UL. A unique switching mechanism ensures long-term life of switching with continual parameters.

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 158-161

CURRENT

- Control of current flow.
- Monitoring of heating poles on rail-switches.
- Monitoring of heating rods on junctions -for control systems, motors or monitoring

LEVEL

- Monitor levels in wells,basins, reservoirs or pools.

POWER FACTOR

- Control of power factor in 1 and 3-phase mains.
- To monitor unload or overload of motors, pumps, elevator system sand other devices.

MONITORING RELAY

VOLTAGE

- Protection of appliances and devices against under-voltage/over-voltage.
- Control of phase sequence and failure in a switchboard.

MONITORING RELAYS

Voltage

1 phase

AC

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/DC

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

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.

Current

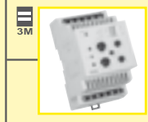
AC

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

AC/ DC



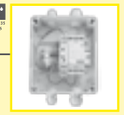
PRI-41 (Hysteresis)
3 inputs (0,4-1,6, 1,25-5, 4-16A) divided into 3 ranges (selectable by a switch).

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

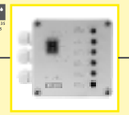
Level

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



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



HRH-6
device s mainly designated for monitoring water level in fire-engine tanks. Protection degree IP65

Power factor

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

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

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

Relay monitoring

Type	Analog (A) / Digital (D)	Phases	Modules	Over (max)	Under (min)	Failure	Sequence	Asymmetry	Cos-φ	TYPE AC	TYPE DC	Function Window	Function Hysteresis	Supply (V) Supply voltage	Supply (V) galvanic. separated	Monitored voltage/current range Upper level - MAX	Bottom level - MIN WINDOW	Bottom level - MIN Hysteresis	Delay for MAX, MIN	Delay MAX independ.	Delay independ. MIN	Contacts	Function 2nd relay	Memory	Description
HRN-33	A	1	1	●	●					●			●	from monitored		160-276 V		30-95 %	●			1			- normal closed contact, opened when exceeding MAX or MIN and timing
HRN-34	A	1	1	●	●						●		●	from monitored		18-30 V		35-95 %	●			1			- like HRN-33, but monitoring battery circuits and supply
HRN-35	A	1	1	●	●					●			●	from monitored		160-276 V		30-95 %	●			2			- contact in normal state open, when level MAX or MIN is overpassed timing starts, 2 output contacts, for each level independent
HRN-37	A	1	1	●	●					●				from monitored		80-150 V		30-95 %	●			1			- contact in normal state closed, in case MAX or MIN levels are overpassed, timing of delay stops
HRN-63	A	1	1	●	●					●				from monitored		160-276 V		30-95 %			●	1			- contact switches when exceeding MAX level, when falling below MIN level, it switches off after a delay
HRN-64	A	1	1	●	●						●			from monitored		18-30 V		35-95 %			●	1			- contact switches when exceeding MAX level, when falling below MIN level, it switches off after a delay
HRN-67	A	1	1	●	●					●				from monitored		80-150 V		30-95 %			●	1			- contact switches when exceeding MAX level, when falling below MIN level, it switches off after a delay
HRN-41	A	1	3	●	●					●	●		●	AC 230	●	12.5-50 V		30-90 %		●	●	2	●	●	- monitores AC and DC, galvanicly separated measured and supply circuits
													●	AC/DC 24V	●	12.5-50 V		30-90 %		●	●		●	●	- 3 measuring ranges, Imin adjusted as % of Imax
													●	AC 400 V	●	40-160 V		30-90 %		●	●		●	●	- 2 output independent relays for each level
													●	AC 110 V	●	125-500 V		30-90 %		●	●		●	●	
HRN-42	A	1	3	●	●					●	●	●		AC 230	●	12.5-50 V	12.5-50 V			●	●	2	●	●	-like HRN-41, but Umax and Umin adjusted in % acc. to measured range
												●		AC/DC 24V	●	12.5-50 V	12.5-50 V			●	●		●	●	
												●		AC 400 V	●	40-160 V	40-160 V			●	●		●	●	
												●		AC 110 V	●	125-500 V	125-500 V			●	●		●	●	
HRN-43	A	3	3	●	●	●	●	●		●			●	AC 230, 400, AC/DC 24V	●			35-99 %	●		●	2	●	●	- like HRN-43N, but for 3x400V without neutral
HRN-43N	A	3	3	●	●	●	●	●		●			●	AC 230, 400, AC/DC 24V	●	240-480 V		35-99 %	●		●	2	●	●	- in 3-phase mains monitoring voltage, failur, sequence and asymmetry of phases. For 3x400/230V.
HRN-55	A	3	1		●	●	●			●				from monitored		138-276 V			●			1			- monitors phase sequence and failure in 3-phase mains, designated for circuits 3x400 V
HRN-55N	A	3	1		●	●	●			●		●		from monitored					●			1			- monitors phase sequence and failure in 3-phase mains, monitors disconnection of neutral wire, designated for circuits 3x400/ 230V+ N
HRN-57	A	3	1	●	●	●				●		●		from monitored		420-500 V	300-380 V		●			1			- monitors under/over voltage in 3-phase mains, designated for circuits 3x400 V
HRN-57N	A	3	1	●	●	●				●		●		from monitored		242-288 V	173-219 V		●			1			- monitors under/over voltage in 3-phase mains, disconnection of neutral wire, designated for circuits 3x400 V/ 230 V+ N
HRN-54	A	3	1	●	●	●	●			●		●		from monitored		420-500 V	300-380 V		●			1			- monitors under/over voltage in 3-phase mains, designated for circuits 3x400 V
HRN-54N	A	3	1	●	●	●	●			●		●		from monitored		242-288 V	173-219 V		●			1			- monitors under/over voltage in 3-phase mains, disconnection of neutral wire, designated for circuits 3x400 V/ 230 V+ N
HRN-56 (1 M)	A	3	1		●	●	●			●				from monitored							●	1			- monitors phase sequence and failure, designated for circuits 3x120V, 3x208V, 3x240V, 3x400V
HRN-56 (3 M)	A	3	3		●	●	●			●				from monitored							●	1			- monitors phase sequence and failure, designated for circuits 3x480V, 3x575V

Relay monitoring current

PRI-32	A	1	1	●						●				AC 24-240, DC 24V	●	1-20 A						1			- adjustable current value, output contact closes when value exceeded
PRI-41	A	1	3											AC 230	●	0.4-1.6 A, 1.25-5 A, 4-1.6 A		30-90 %		●	●	2	●	●	- monitores AC and DC, galvanicly separated measured and supply circuits
				●	●					●	●		●	AC/DC 24V	●	0.4-1.6 A, 1.25-5 A, 4-1.6 A		30-90 %		●	●				- 3 measuring ranges, Umin adjusted as % of Umax
														AC 400 V	●	0.4-1.6 A, 1.25-5 A, 4-1.6 A		30-90 %		●	●				- 2 output independent relay for each level
														AC 110 V	●	0.4-1.6 A, 1.25-5 A, 4-1.6 A		30-90 %		●	●				
PRI-42	A	1	3	●	●					●	●	●		AC 230	●	0.4-1.6 A, 1.25-5 A, 4-16 A	0.4-1.6 A, 1.25-5 A, 4-16 A			●	●	2	●	●	- like PRI-41, but Imax and Imin adjusted in % acc. to measured range
														AC/DC 24V	●	0.4-1.6 A, 1.25-5 A, 4-16 A	0.4-1.6 A, 1.25-5 A, 4-16 A			●	●				- 2 output independent relay, independent for each level
														AC 400 V	●	0.4-1.6 A, 1.25-5 A, 4-16 A	0.4-1.6 A, 1.25-5 A, 4-16 A			●	●				- adjustable current value, output contact closes when value exceeded
														AC 110 V	●	0.4-1.6 A, 1.25-5 A, 4-16 A	0.4-1.6 A, 1.25-5 A, 4-16 A			●	●				
PRI-51	A	1	1	●						●				AC 24-240, DC 24 V	●	*				●		1			- adjustable current limit, by which will output relay close
PRI-52	A	1	1	●						●				AC 230V	●	0.5-25A				●		1			- adjustable current limit, by which will output relay close, adjustable delay time

*6 ranges, see the catalogue list

Relay monitoring power factor cos-φ

COS-1	A	3	3	●	●					●	●	●		AC 230 V	●	0.1-0.99	0.1-0.99		●			2	●	●	
	A	3	3	●	●					●	●	●		AC 400 V	●	0.1-0.99	0.1-0.99		●			2	●	●	- monitoring load of motors, thus power factor cos-φ
	A	3	3	●	●					●	●	●		AC/DC 24 V	●	0.1-0.99	0.1-0.99		●			2	●	●	

Level switch

HRH-1	A	1	3	●	●							●		AC 110 V	●	5-100 kΩ	5-100 kΩ			●	●	2		●	- selectable function of pump in / out and sensitivity of sounders acc. to resistance of liquid.
	A	1	3	●	●							●		AC 230 V	●	5-100 kΩ	5-100 kΩ			●	●	2		●	
	A	1	3	●	●							●		AC 400 V	●	5-100 kΩ	5-100 kΩ			●	●	2		●	
	A	1	3	●	●							●		AC/DC 24V	●	5-100 kΩ	5-100 kΩ			●	●	2		●	
HRH-5	A	1	1	●	●							●		AC/DC 24-240V	●	5-100 kΩ	5-100 kΩ		●			1			- selectable function of pump in / out and sensitivity of sounders acc. to resistance of liquid.
HRH-4	A	3		●	●							●		AC 230 V	●	5-100 kΩ	5-100 kΩ		●			4			- a set of two devices for an automatic operation of 1-phase and 3-phase pumps
	A	3		●	●							●		AC 24 V	●	5-100 kΩ	5-100 kΩ		●			4			
HRH-6	A	1	x		●									DC 12-24V	●	5-100 kΩ	5-100 kΩ		●			1			- device monitors 5 levels by using six probes (one probe is common)
	A	1	x		●									AC 230V	●	5-100 kΩ	5-100 kΩ		●			1			

Monitoring voltage relay HRN-41, HRN-42

3M

- Monitoring DC / AC 1-phase in 3 ranges
- Monitoring voltage with 2 independent levels (overvoltage / undervoltage)
- Two version, HRN-41: Function "HYSTEREZE" 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 isolated supply voltage
- Output contact: 1x changeover/SDPT 16 A / 250 V AC1 for all monitored levels
- 3-MODULE, DIN rail mounting

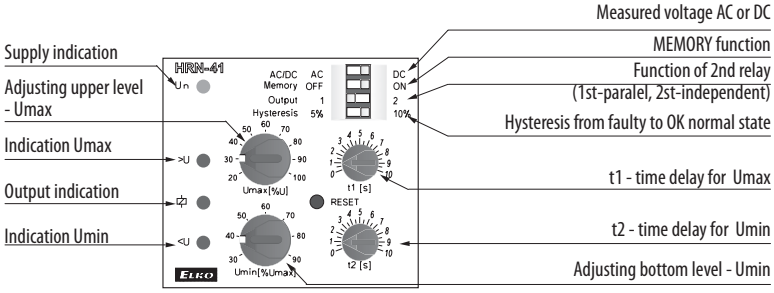
EAN code

HRN-41 /230V	8595188140409
HRN-41 /400V	8595188121521
HRN-41 /24V	8595188140416
HRN-42 /230V	8594030337653
HRN-42 /24V **	8594030338070

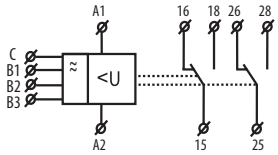
Technical parameters

	HRN-41	HRN-42	
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		
Supply voltage tolerance:	-15 %; +10 %		
Measuring circuit			
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)16 A / 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:	500 mW		
Min. breaking capacity DC:	yellow LED		
Output indication:	$3x10^7$		
Mechanical life:	$0.7x10^5$		
Electrical life (AC1):			
Other information	-20 °C to +55 °C (-4 °F to 131 °F)		
Operating temperature:	-30 °C to +70 °C (-22 °F to 158 °F)		
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:	239 g (8.4 oz.)		
Weight:	EN 60255-6, EN 61010-1		
Standards:			

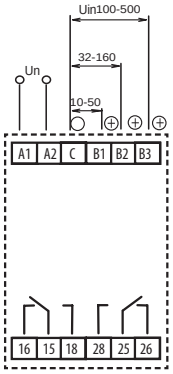
Description



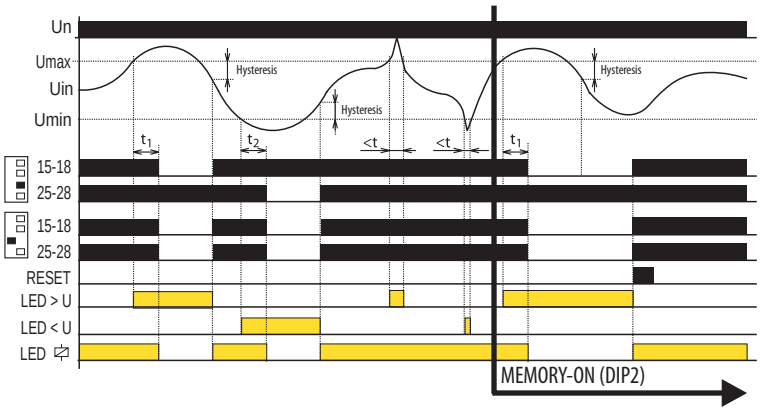
Symbol



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 has choise of function MEMORY, in case the relay get 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).

Monitoring voltage relay line HRN-3x and line HRN-6x

1M

EAN code

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

- 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 - pes see grach 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

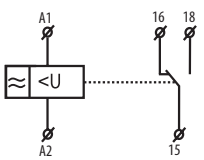
HRN-37, HRN-67 - like HRN-33, monitors voltage in range AC 24 -150 V
- it is possible to monitor level of overvoltage and undervoltage independently

- 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

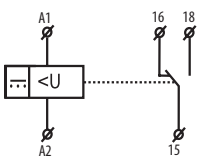
Technical parameters	HRN-33/ HRN-63	HRN-34/ HRN-64	HRN-35	HRN-37/ HRN-67
Supply and measuring				
Terminals:	A1 - A2	A1 - A2	A1 - A2	A1 - A2
Voltage range:	AC 48 - 276 V / 50Hz	DC 6 - 30 V	AC 48 - 276 V / 50Hz	AC 24-150 V / 50Hz
Burden:	AC max. 1.2 VA	DC max. 1.2 VA	AC max. 1.2 VA	AC max. 1.2 VA
Upper 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

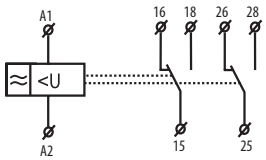
HRN-33, HRN-37, HRN-63, HRN-67



HRN-34, HRN-64



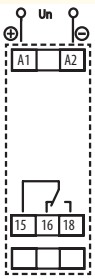
HRN-35



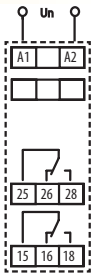
Connection

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

HRN-34, HRN-64



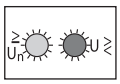
HRN-35



Indication LED

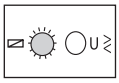
HRN-33, HRN-37

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

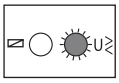


Exceeded Umax(overvoltage)
Drop below Umin(undervoltage)
Un>Umax or Un<Umax
Green LED = ON
Red LED = ON

HRN-34

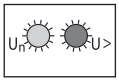


Normal state
Umin<Un<Umax
Green LED = ON
Red LED = OFF

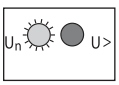


Exceeded Umax(overvoltage)
Drop below Umin(undervoltage)
Un>Umax or Un<Umax
Green LED = OFF
Red LED = ON

HRN-63, HRN-67

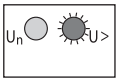


Exceeded Umax(overvoltage)
Un>Umax
Green LED = ON
Red LED = ON

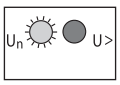


Drop below Umin(undervoltage)
Un<Umin
Green LED = ON
Red LED = OFF

HRN-64

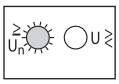


Exceeded Umax(overvoltage)
Un>Umax
Green LED = OFF
Red LED = ON

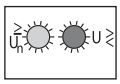


Drop below Umin(undervoltage)
Un<Umin
Green LED = ON
Red LED = OFF

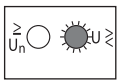
HRN-35



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



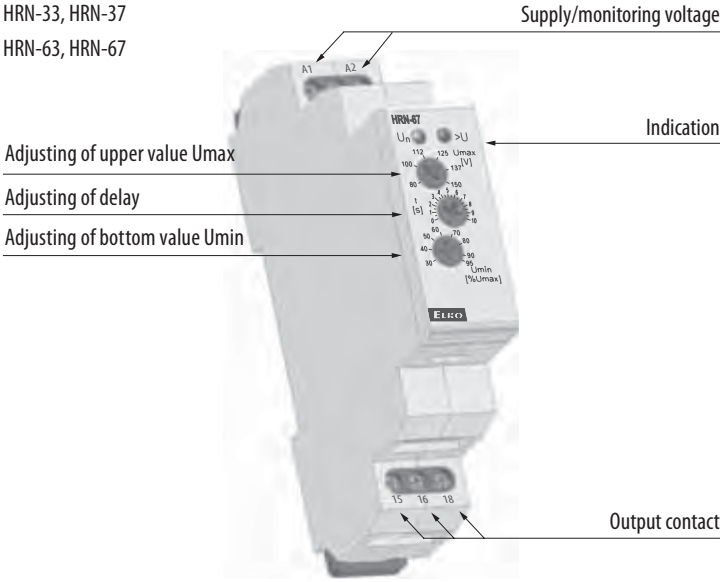
Exceeded Umax(overvoltage)
Un>Umax
Green LED = ON
Red LED = ON



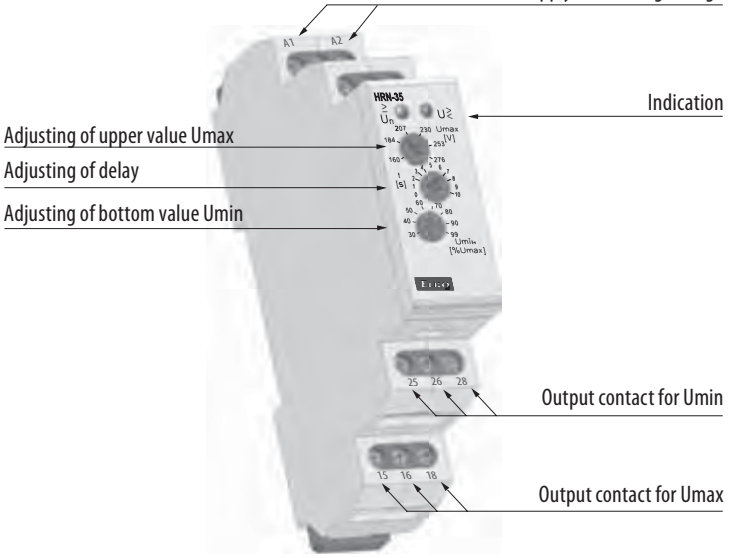
Drop below Umin(undervoltage)
Un<Umin
Green LED = OFF
Red LED = ON

Description

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

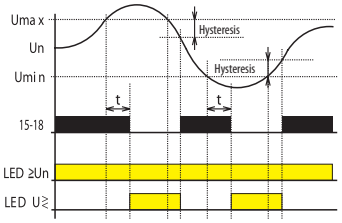


HRN-35

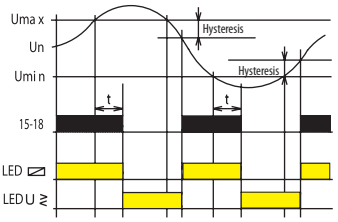


Function HRN-33, 34, 35, 37 (band voltage relay)

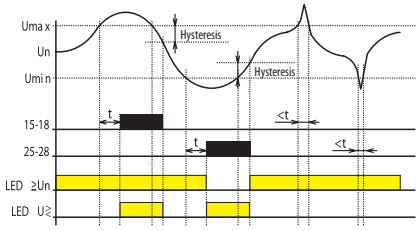
HRN-33,HRN-37



HRN-34



HRN-35



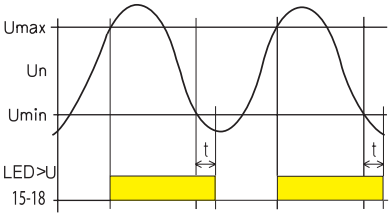
Legend:

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 iindependant (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 .
Diff erently HRN-35 version uses independayt 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

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 independayt 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.

Relay for monitoring phase sequence and failure HRN-55, HRN-55N

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 (0.5-10s)
- 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

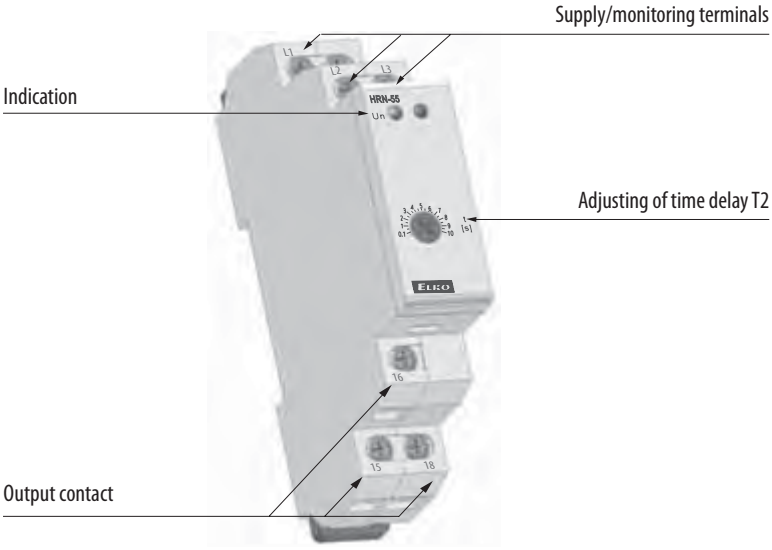
Technical parameters	HRN-55	HRN-55N
Monitoring terminals:	L1, L2, L3	L1, L2, L3,N
Supply terminals:	L1, L2, L3	L1, N
Voltage:	3x400 V / 50 Hz	3x400V/230V / 50 Hz
Level Umax:	125 % Un	
Level Umin:	75% Un	
Burden:	max. 2 VA	
Hysteresis:	5%	
Max. permanent:	AC 3x460 V	AC 3x265 V
Peak overload <1ms:	AC 3x500 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.

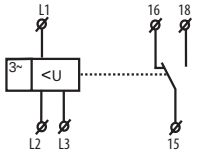
HRN-55: thanks to supply form all phases, this relay is able to stay operational also if one phase is out.
HRN-55N -supply L1-N, means that relay monitor also failure in neutral wire

Description

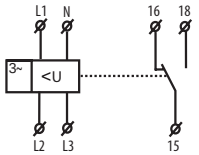


Symbol

HRN-55

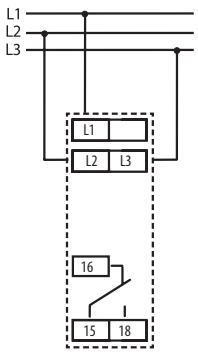


HRN-55N

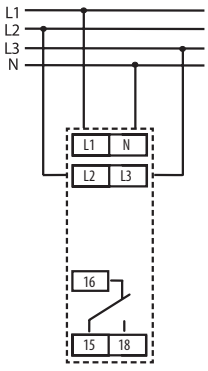


Connection

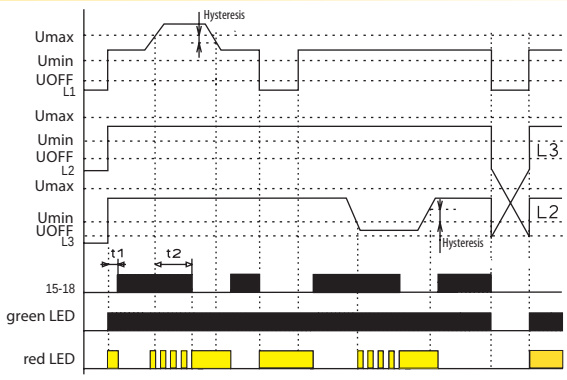
HRN-55



HRN-55N



Function



Relay for monitoring over/under voltage and phase failure HRN-57, HRN-57N

1M

EAN code
HRN-57 8595188137256
HRN-57N 8595188137249

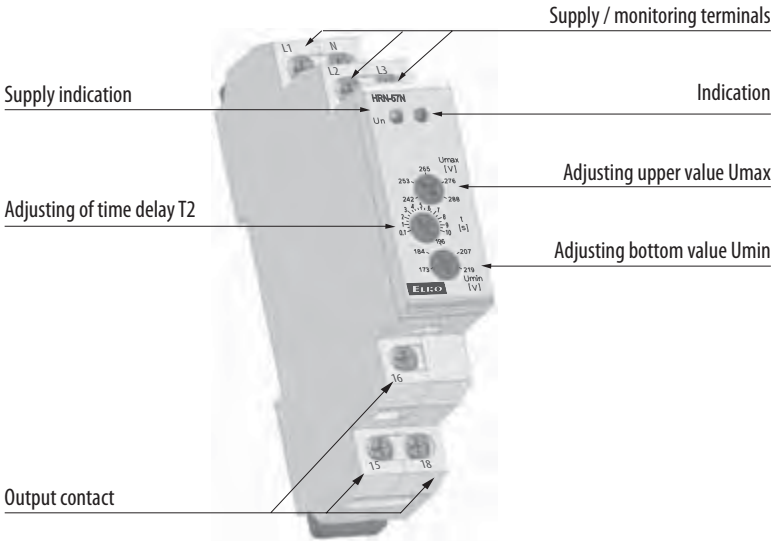
- Serves to monitor voltage in a switchboard, protection of devices in 3-phase main
- Monitors value of voltage in 3-phase main
- It is possible to set upper and lower level independently
- Adjustable time delay eliminated short voltage peaks and failures in the main
- The device is supplied from monitored 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
- In case supply voltage falls below 60 %Un (U off lower level) relay immediately switch OFF with no delay
- 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	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

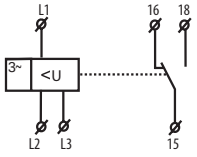
Relay in 3-phase main monitors size of phase voltage. It is possible to set two independayt voltage levels and thus it is possible to set two independayt voltage levels and monitor e.g. undervoltage and overvoltage independaytly. In normal state when voltage is within set levels, output relay is closed 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 progress and faulty state is indicated, timing is immediately stopped.

Description

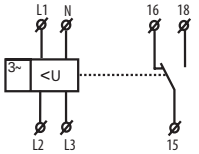


Symbol Connection

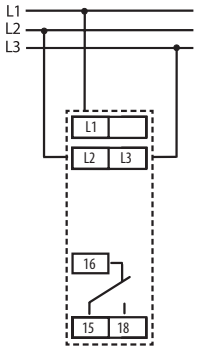
HRN-57



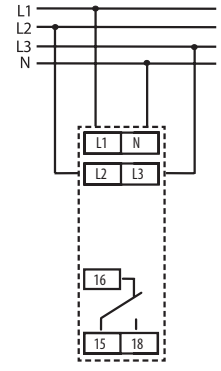
HRN-57N



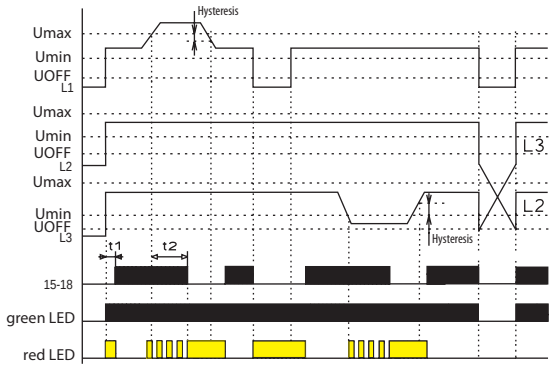
HRN-57



HRN-57N



Function



Relay for monitoring over/under voltage, phase sequence and failure HRN-54, HRN-54N

1M

EAN code

HRN-54	8595188137201
HRN-54N	8595188137218

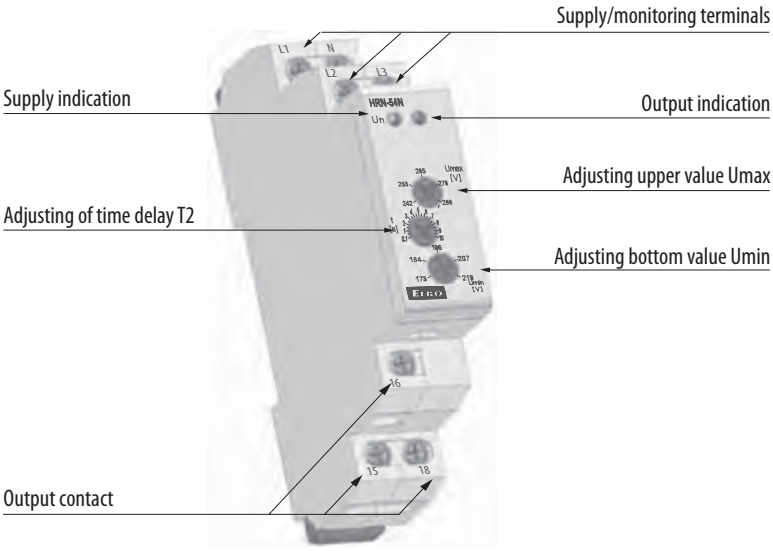
- Serves to monitor voltage , phase failure and sequence in switchboards, protection of devices in 3-phase mains
- It is possible to set upper and lower level of monitoring voltage
- Adjustable time delay eliminates short voltage peaks and failures in the main
- Supply is done from monitored voltage
- Faulty state is indicated by red LED and by breaking 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 breaks with no 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

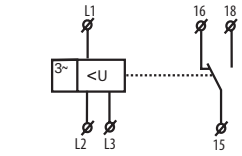
Relay in 3-phase main monitors size of phase voltage. It is possible to set two independayt voltage levels and thus it is possible to set two independayt voltage levels and monitor e.g. undervoltage and overvoltage independaytly. In normal state when voltage is within set levels, output relay is closed 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 of
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 progress and faulty state is indicated, timing is immediately stopped.

Description

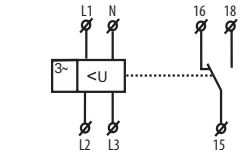


Symbol

HRN-54

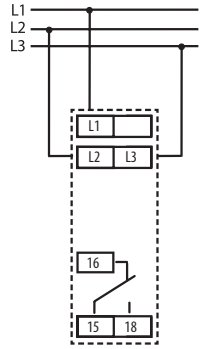


HRN-54N

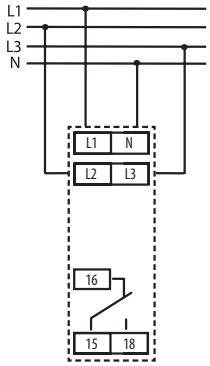


Connection

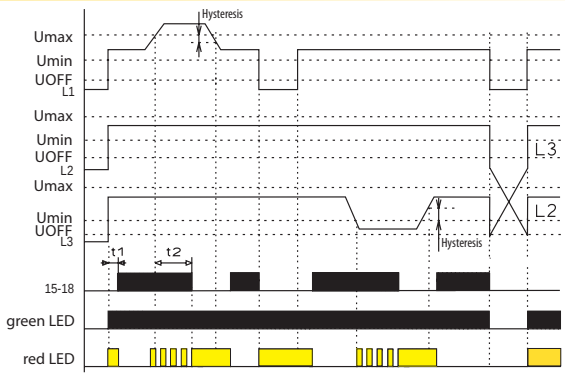
HRN-54



HRN-54N



Function



Relay for monitoring phase sequence and failure HRN-56

1M

3M

- Relay monitors phase sequence and failure (e.g. control of correct motor winding etc.)
- Relay 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	

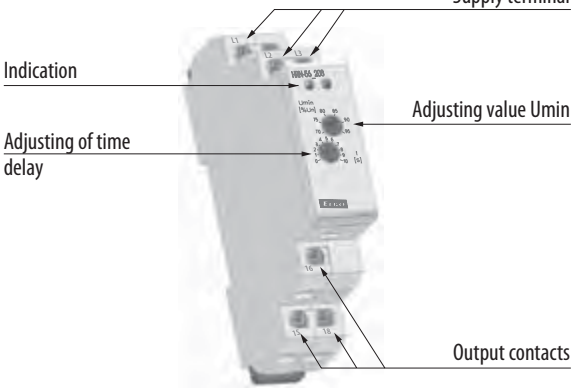
- Fixed time delayT1 (500ms) and adjustable time delay T2 (0 -10s)
- Faulty state is indicated by LED and breaking contact of output relay
- Output contact 1x changeover/SPDT 8 A /250V AC1
- 1-MODULE, 3-MODULE, DIN rail mounting

Technical parameters

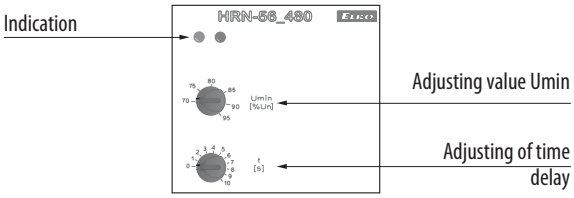
	HRN-56					
	120	208	240	400	480	575
Monitoring terminals:	L1, L2, L3					
Supply terminals:	L1, L2, L3					
Supply/measured voltage:	3 x 120V/50Hz	3 x 208V/50Hz	3 x 240V/50Hz	3 x 400V/50Hz	3 x 480V/50Hz	3 x 575V/50Hz
Level Umin:	adjustable 70 - 95 % Un					
Level Uoff:	60 % Un					
Burden:	max. 2 VA					
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					
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

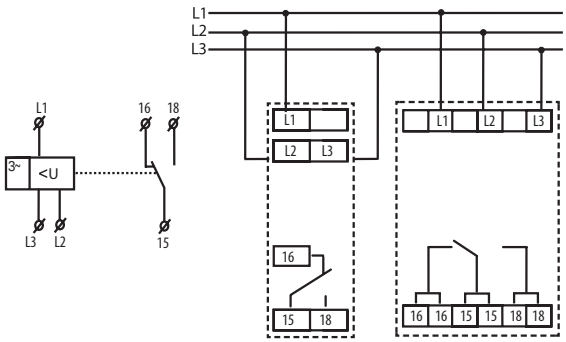


3-MODULE front pannel



Symbol

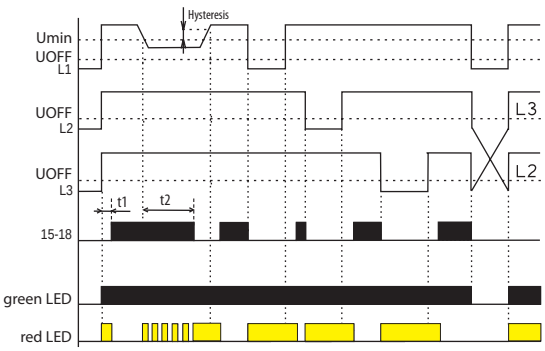
Connection



Function description

Relay in 3-phase main monitor correct phase sequence and phase failure. Green LED shines permanently and indicates energization. Red LED flashes and relay breaks in case of phase failure. 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 relays is open. In case supply voltage falls below 60%Un (Uoff lower level)relay immediately breaks 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 failure on in one phase.

Function



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

3M

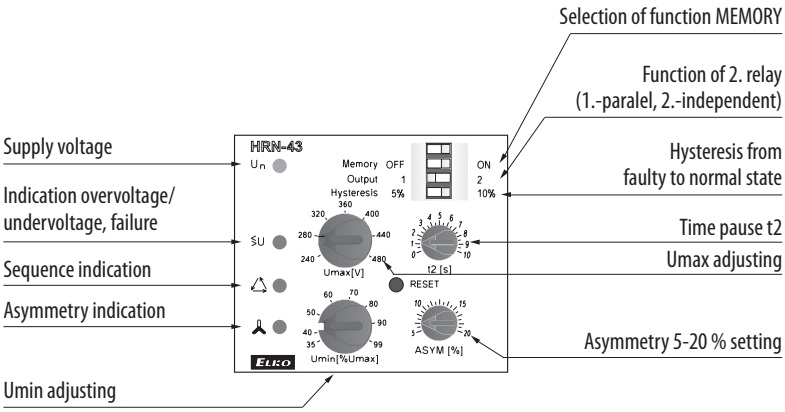
EAN code

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 160-276 V (3x400/230 V) or 280-480 V (3x400 V)
  - phase imbalance
  - phase sequence
  - phase failure
- Function "MEMORY" - manual reset, "RESET" button on front pannel
- 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
- Galvanic isolated 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

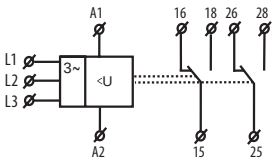
Technical parameters	HRN-43	HRN-43N
Supply		
Supply terminals:	A1 - A2	
Voltage range:	AC 230 V, AC 400 V, AC/DC 24 V / (AC 50-60Hz)	
Burden:	max. 4.5 VA	
Supply voltage tolerance:	-15 %; +10 %	
Measuring circuit		
Nominal voltage:	3x400V / 50Hz	3x400V / 230V / 50Hz
Terminals:	L1, L2, L3	L1, L2, L3, 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

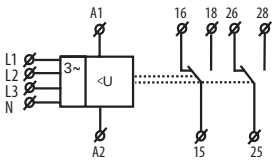


Symbol

HRN-43

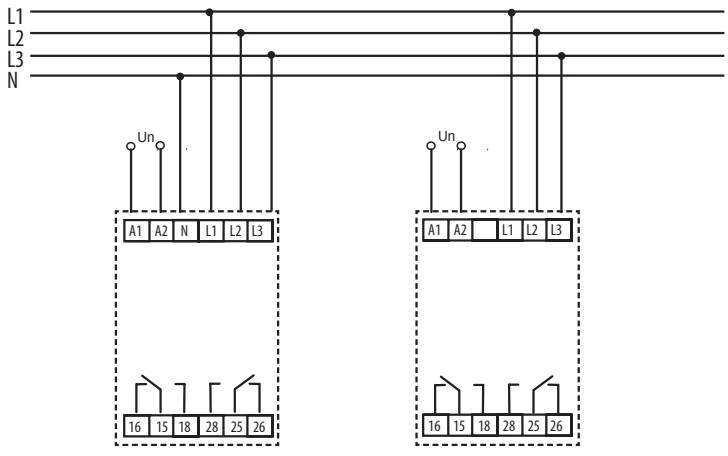


HRN-43N



Connection

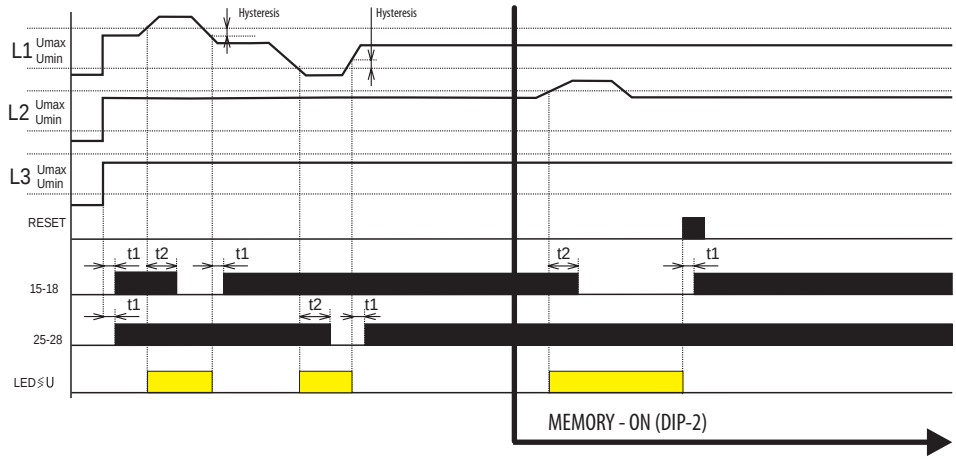
HRN-43N



HRN-43

Function

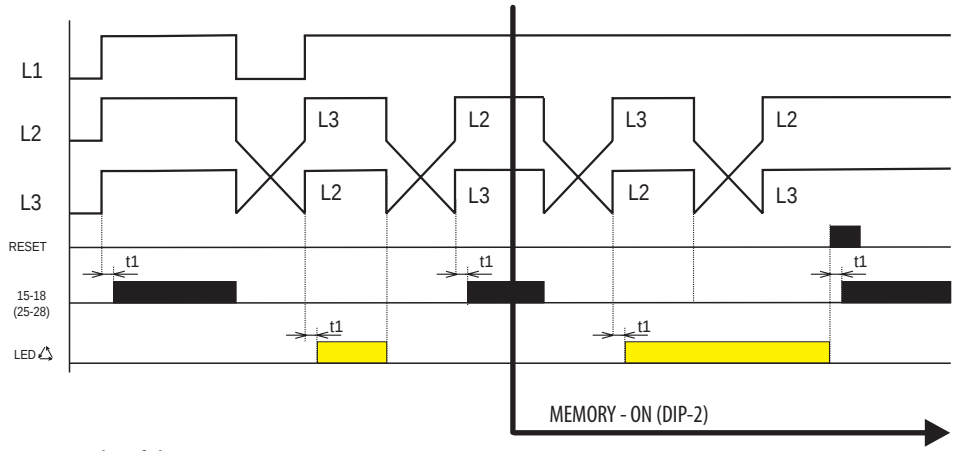
Overvoltage - undervoltage



Legend:
L1, L2, L3 - 3-phase voltage
RESET - press of the button on frontal pannel
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 monitore 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.

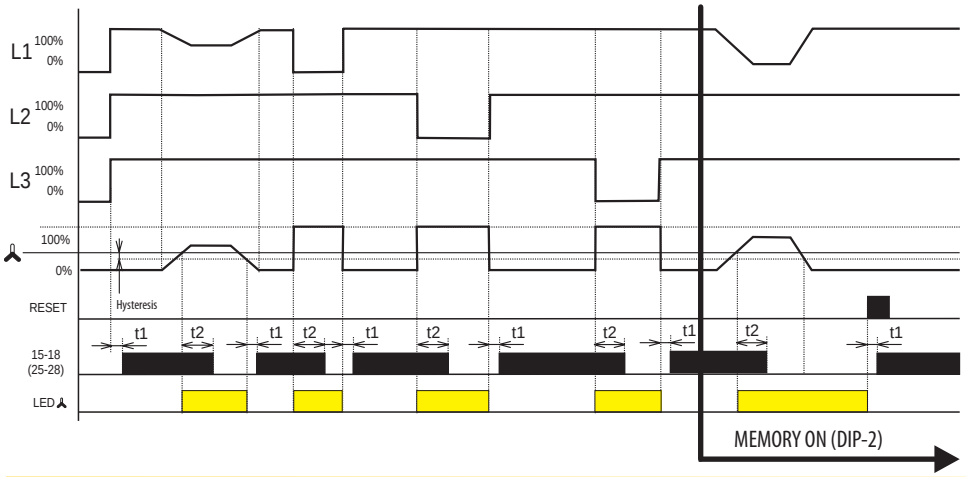
Phase sequence



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

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 pannel
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 against 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 – independayt 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 breaks. 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 open.

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.

Current monitoring relay PRI-32

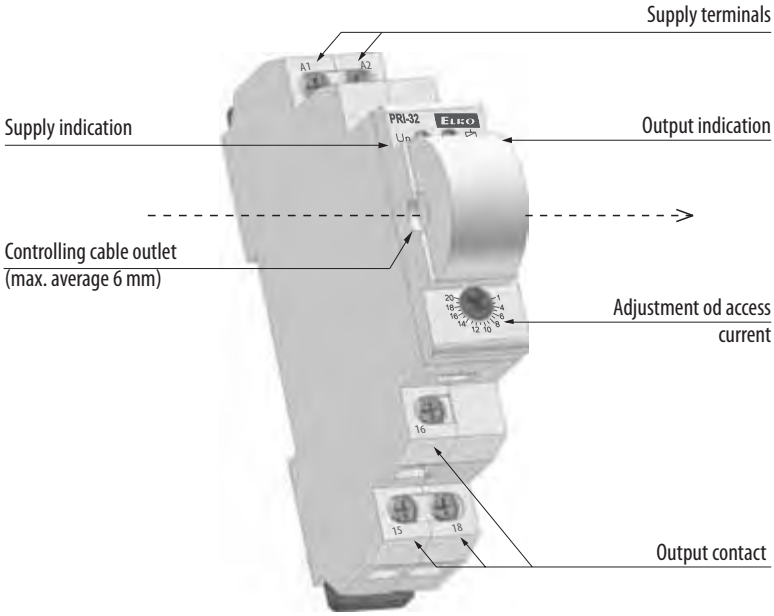
1M

- Current transformer is a part of the product. Inside this transformer there is a wire which senses the volume of flowing current
- This construction decreases temperature 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 fl ow, 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

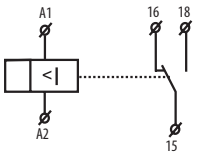
EAN code
PRI-32 8595188121965

Technical parameters	PRI-32
Supply circuit	
Supply terminals:	A1 - A2
Voltage range:	AC 24 - 240 V, DC 24 V (AC 50 - 60 Hz)
Burden:	max. 1.5 VA
Operating range:	-15 %; +10 %
Measuring circuit	
Current range:	1 - 20 A (AC 50 Hz)
Current adjustment:	potentiometer
Accuracy	
Setting accuracy (mechanical):	5 %
Repeat accuracy:	<1 %
Temperature dependancy:	< 0.1 % / °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



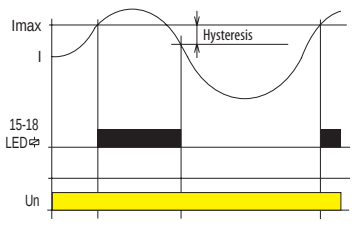
Symbol



Connection

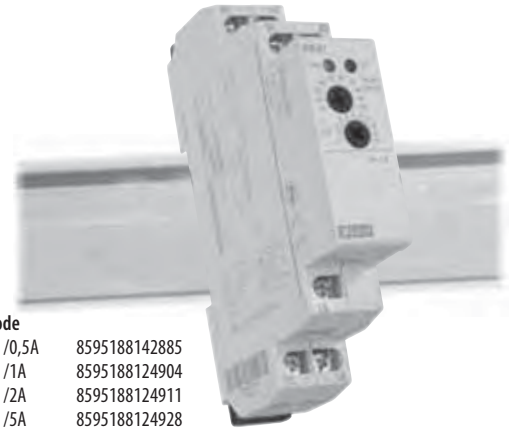
Function

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.



Current monitoring relay PRI-51

1M



EAN code

PRI-51 /0,5A	8595188142885
PRI-51 /1A	8595188124904
PRI-51 /2A	8595188124911
PRI-51 /5A	8595188124928
PRI-51 /8A	8595188124935
PRI-51 /16A	8595188124942

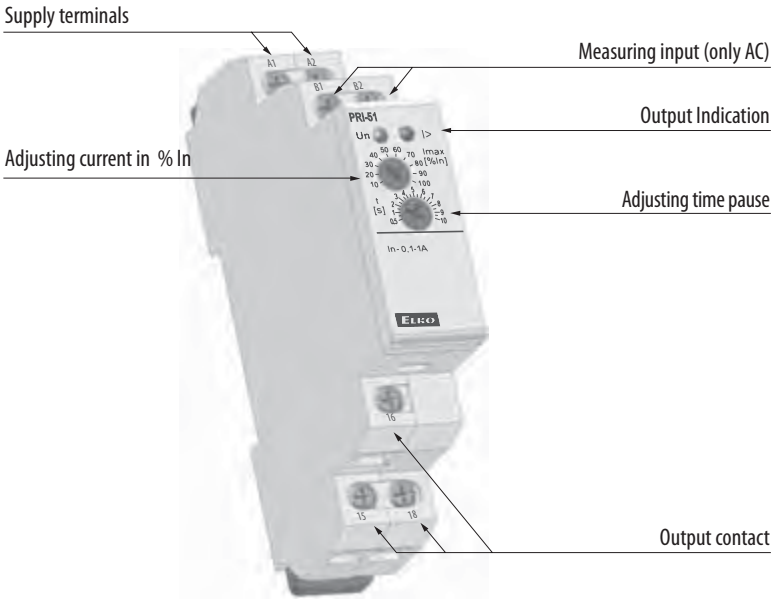
- To monitor heating rods in shunts, heating cables, to indicate current flow, to monitor consumption of one-phase motors
- Flexible adjustment via potentiometer, choice of 6 ranges:

  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
- 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

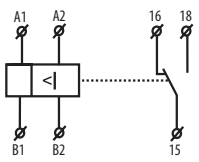
Technical parameters

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 114					
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

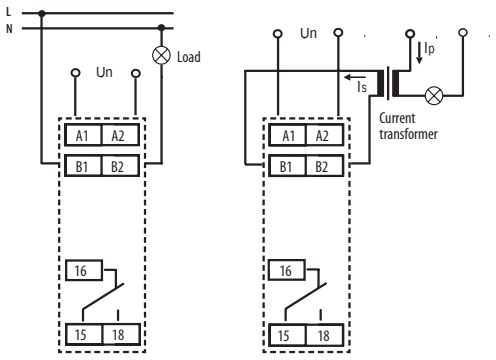


Symbol



Connection

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

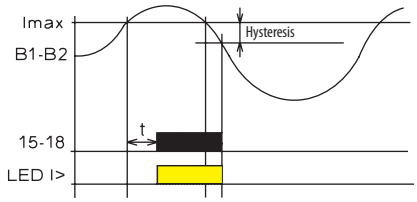


Example of an order

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 open. 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.



Current monitoring relay PRI-52

1M

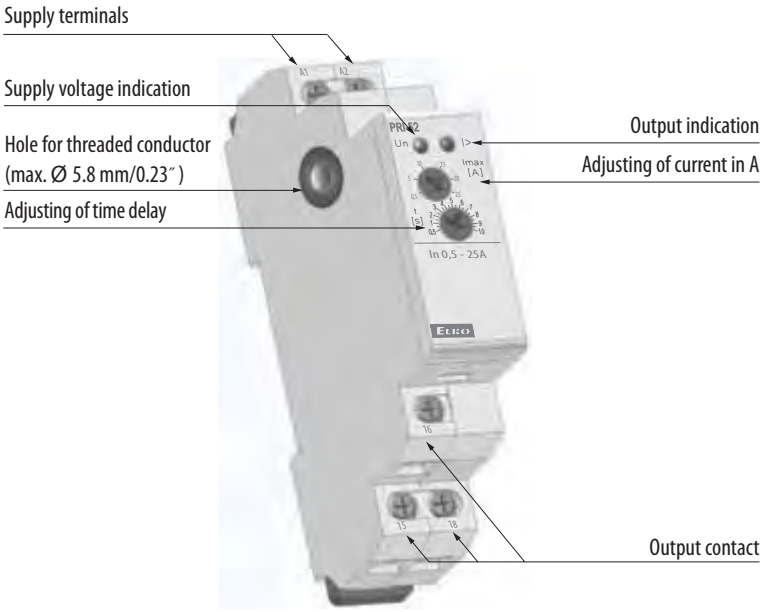
EAN code

PRI-52 8595188136556

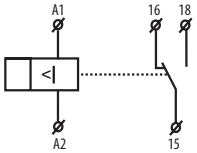
- Relay is designated for:
  - distant device diagnostic (short circuit, take-off increasing)
  - preferred (priority) relay – two appliances (boiler and floor heating) operating on one phase, but never run together – prevention against current overload and circuit breaker tripping. Enables to save your 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, mounting onto DIN rail, saddle 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

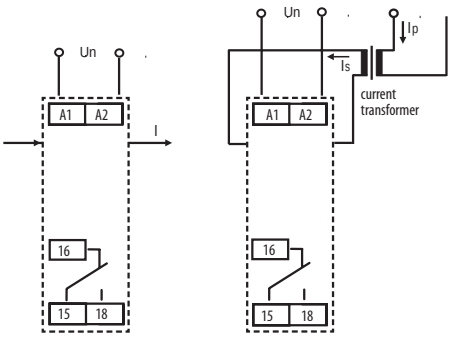
Device describtion



Symbol

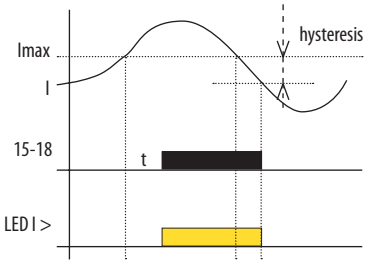


Connection



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

Functions

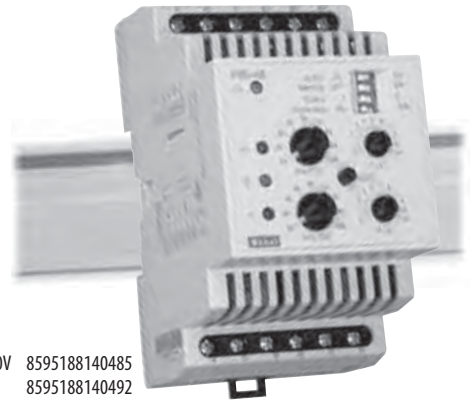


Monitoring relay PRI-52 serves for monitoring of current level in 1-phase AC circuits. Slight setting of release current level designates this relay for many various applications. Output relay is in normal status switched off. When set current level is overrun, relay get closed after preset delay. By 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.

Current monitoring relay PRI-41, PRI-42



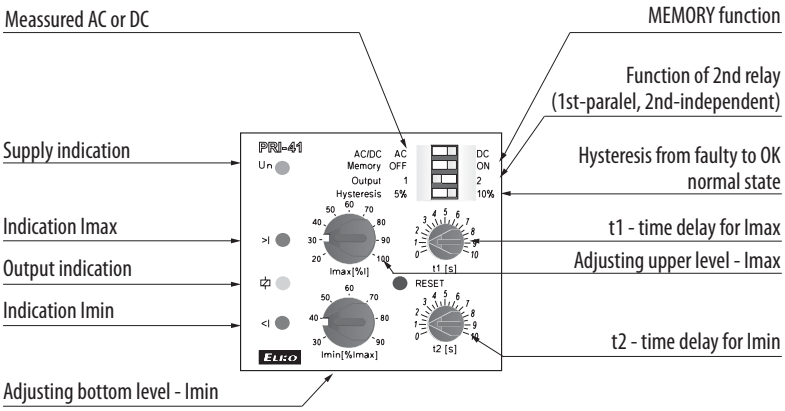
EAN code

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

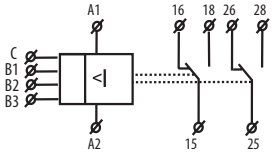
- To monitor overloading / discharge (machine, motor...), load sensing, diagnostics of remote device (interrunption, short circuit, current cunsumption increase...)
- Monitors AC/DC 1-phase current in 3 ranges
- Monitoring adjusted current in 2 independent levels
- PRI-41: "HYSTERESIS" function and PRI-42: "WINDOW" function
- function of 2nd relay (independent/parallel):
  "MEMORY" function - manual reset.
  "RESET" button on the frontal pannel
- 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		

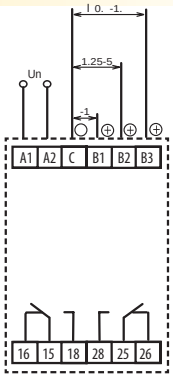
Description



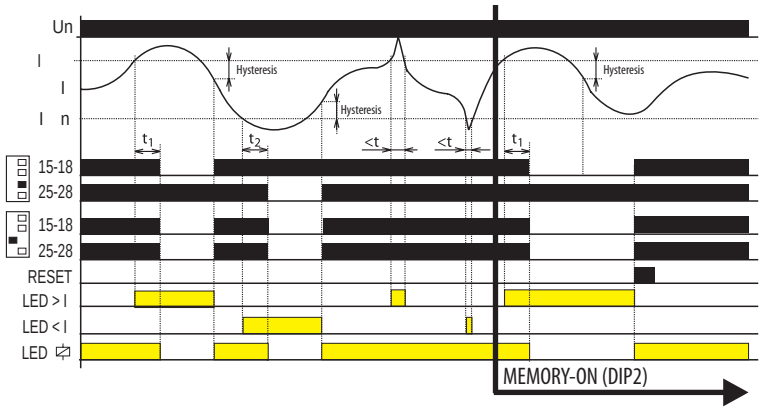
Symbol



Connection

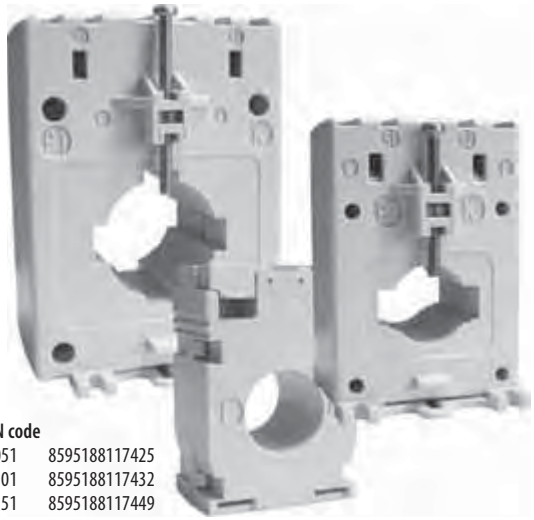


Function



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).

Current transformator SR - for Monitoring current relay PRI



- 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, installable to panel or DIN rail

EAN code

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

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)		

Power factor monitoring relay COS-1

3M

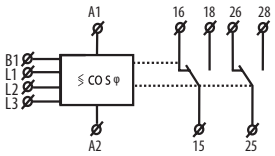
EAN code

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 pannel
- 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

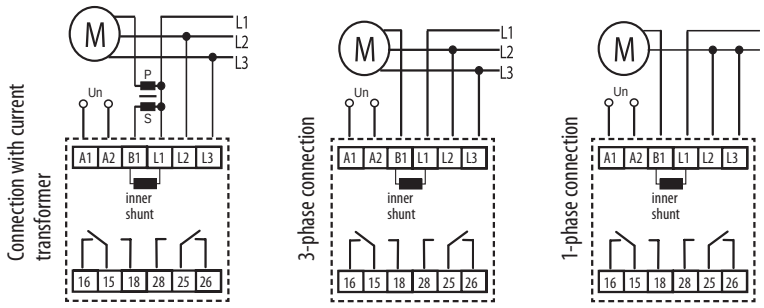
Technical parameters	COS-1
Supply	
Supply terminals:	A1 - A2
Voltage range:	AC 230 V, AC 400 V or AC/DC 24 V (AC/50-60Hz)
Burden:	max. 4.5 VA
Operating range:	-15 %; +10 %
Measuring circuit	
Voltage set:	3x400 V / 50 Hz
Terminals:	L1, L2, L3, B1
Upper level cos-φ:	adjustable 0.1 - 0.99
Bottom level cos-φ:	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

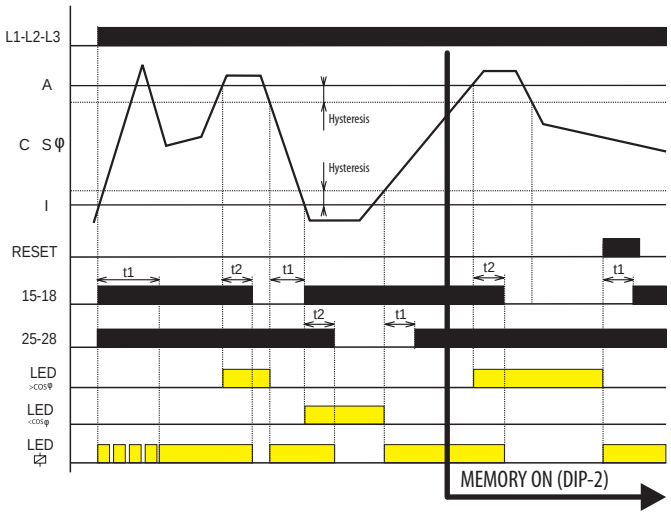


Description

Connection



Function



After the device is switched on, the yellow LED flashes for time t 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).

Level switch HRH-1

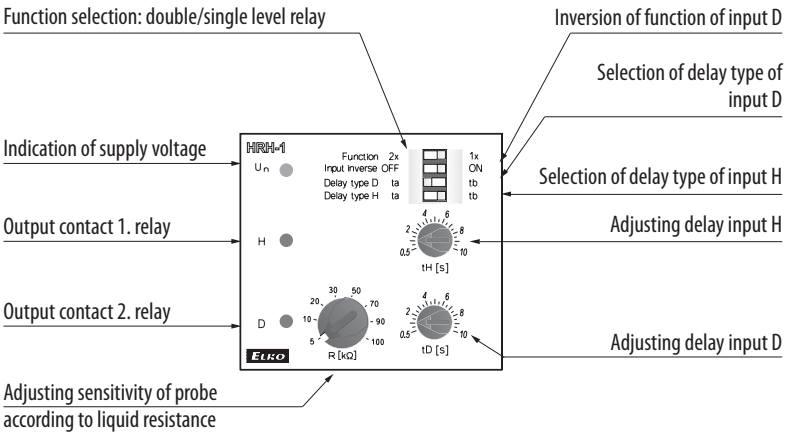
3M

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

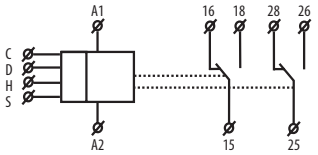
- Serves for level monitoring in wells, tanks, pools, reservoirs....
- Options:
  - single switch with single-state monitoring
  - single switch with double-state monitoring
  - 2 independent switches with single-state switching
- One-state monitors one liquid level (full or empty), two-state monitors two levels (switches at one level and switches off at another)
- Selectable by DIP switch:
  - drain in
  - drain away
  - combination
- Adjustable time delay when activated by level change, type selectable by DIP switch
- Sensitivity adjustable by potentiometer
- Frequency 50 Hz prevents liquid polarization and increased oxidation of measuring probes
- Supply AC 230 V, AC/DC 24 V or AC 110 V galvanically separated
- Output contact: 2x changeover/DPDT 16 A /250 V AC1

Technical parameters	HRH-1
Function:	4
Supply terminals:	A1 - A2
Voltage range:	AC/DC230V, AC/DC24V, AC110V, (galvanicaly separated)(AC50-60Hz)
Burden:	max. 4.5 VA
Operating range:	-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 .. +55 °C
Storage temperature:	-30 .. +70 °C
Electrical strength:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel / IP 20 terminals
Overvoltage 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
Weight:	240 g()
Standards:	EN 60255-6, EN 61010-1
Measuring sensors:	see page 122

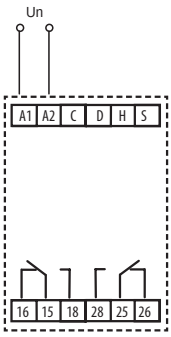
Description



Symbol



Connection



Terminals description:
A1, A2 - supply voltage
C - wire for both probes
D - wire of bottom probe E2
H - wire of upper probe E1
S - earth terminal for possible screening of cable
15-16-18 output contact relay 1
25-26-28 output contact relay 2

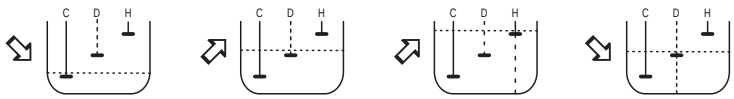
Measuring probes

Measuring probe can be arbitrary (whatever conductive contact, recommended is using of brass or stainless-steel material).
Conductor doesn´t need to be screened, but it is recommened .
In application of screened conductor is this contacted to terminal S (the earth potential).

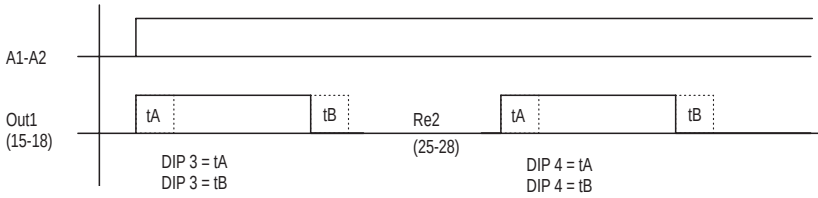
Funktion description

It is a relay to control levels of conductive liquids (water, chemical solutions, foodstuff. etc.) It means measuring of liquids by measuring probes. AC voltage 5V / 50 Hz is used as a measuring signal. Using this AC signal prevents increased oxidation of probes and undesirable polarization and electrolysis of liquid. It is possible to control two independent levels or to use a combined function for one level control. It depends on DIP switch setting (see also diagram of functions). Relay is equipped by sensitivity regulation that applies to liquid resistance. When the sensitivity is set according to particular conditions it is possible to eliminate some undesirable switching (e.g. pollution of probes, sediments, humidity etc.) It is also possible to set a delay for each probe in range 0.5 - 10 s and by ussing. DIP switch also the type of delay (when the relay is switched on/off, the choice dependson particular application.

Function

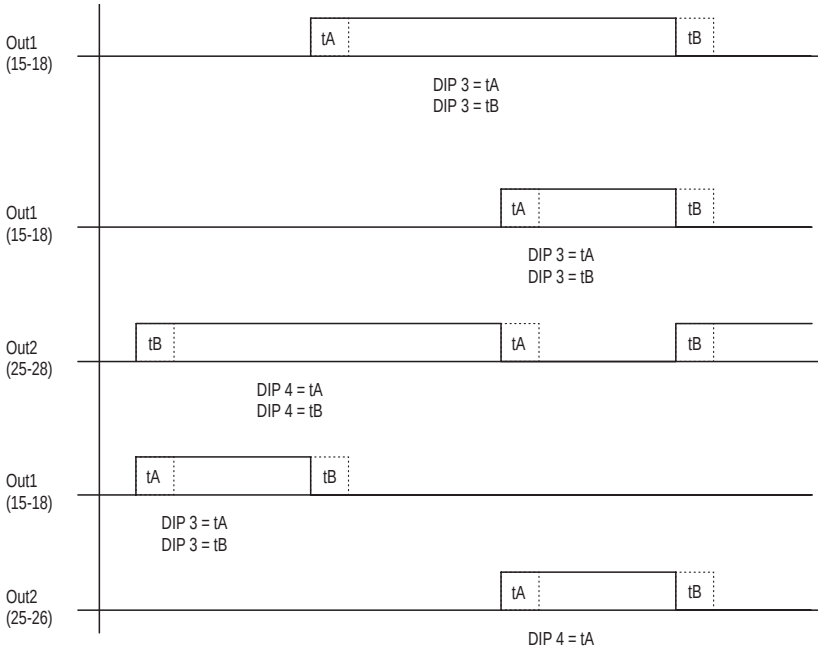


Level monitoring in two tanks



2 independent single level switches.
Relay closed when container is empty.
DIP 1 = 1x
DIP 2 = ON

Level monitoring in one tank



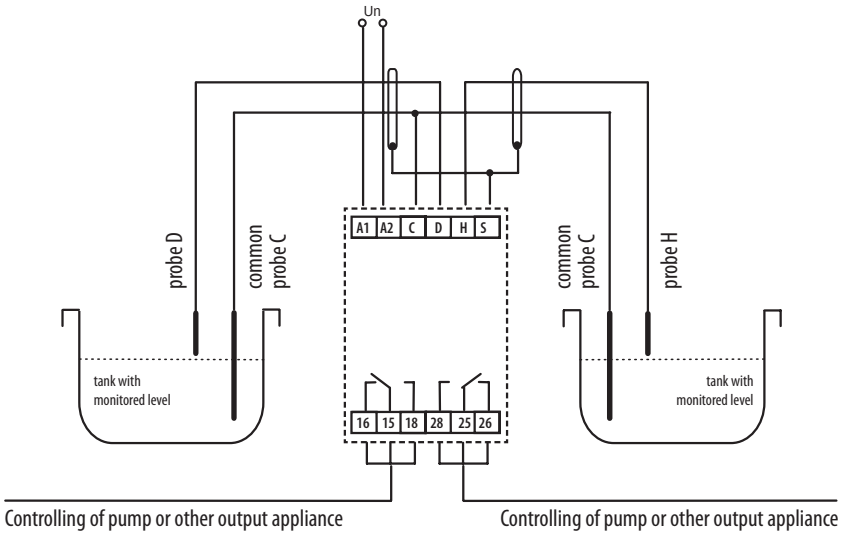
Input D is inverted when DIP 2 is in position OFF, relay is closed when the container is full. DIP2 = OFF
Function H is the same as in previous adjustment.

Both probes in one container.
DIP 1 = 2x
DIP 2 = ON
Relay 1 - closed when container is full - opened when bottom probe is disconnected
Relay 2 - closed when bottom probe is disconnected
- opened when upper probe is closed

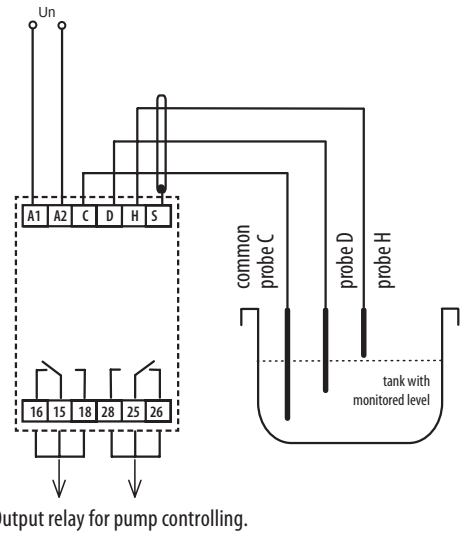
Monitoring liquid in container.
DIP 1 = 1x
DIP 2 = ON
Relay 1 closed when bottom probe is disconnected (liquid is being umped in).
Relay 2 closed (break contact used), when upper probe is connected (liquid is being pumped out).

Examples of use

Monitoring 2 independent containers



Monitoring level with combination of upper and bottom probe



Output relay for pump controlling.
Selection of contacts depends on required function.

Note:
A tank or metal tube, etc. can be used as a common probe. Due probes that are galvanically separated from supplyvoltage and monitoring voltage up to 5V, is possible to use standard communication cables for connection.

Level switch HRH-5

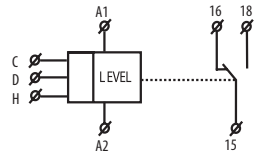
1M

EAN code
HRH-5 /UNI 8595188136396

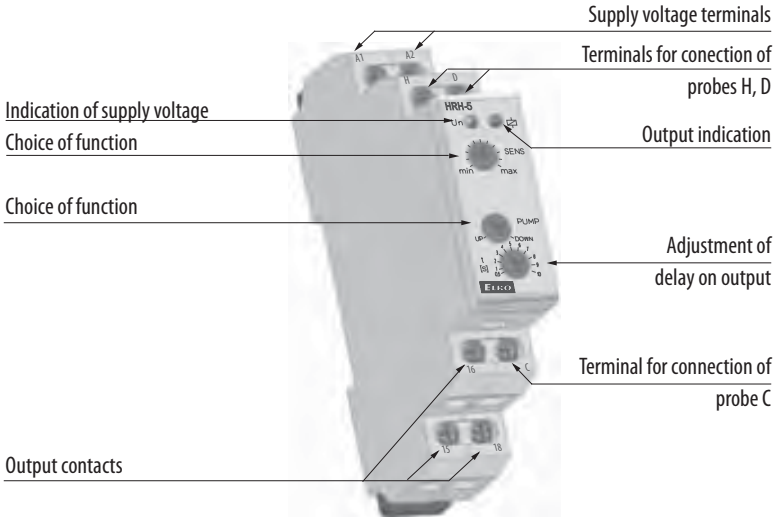
- Relay is designed for monitoring levels in wells, basins, reservoirs, tanks....
- In one device you can choose the following configurations:
  - one-level swotch of conductive liquids (by connecting H and D)
  - two-level switch of conductive liquids
- One-state device monitors one level, two-state 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	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 data	
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.)
Applicable standards:	EN 60255-6, EN 61010-1
Recomended measuring probes:	see pg. 122

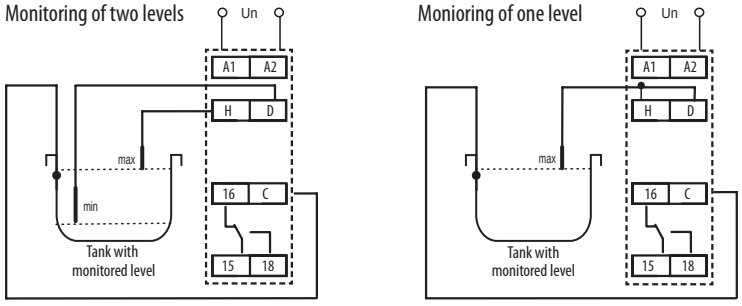
Symbol



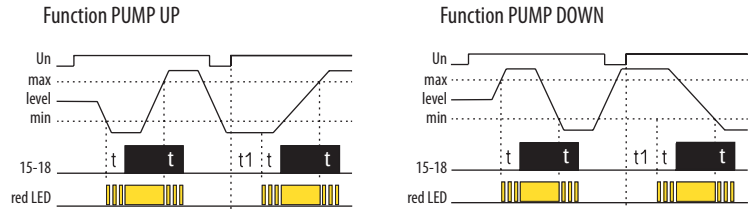
Device description



Connection



Function



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

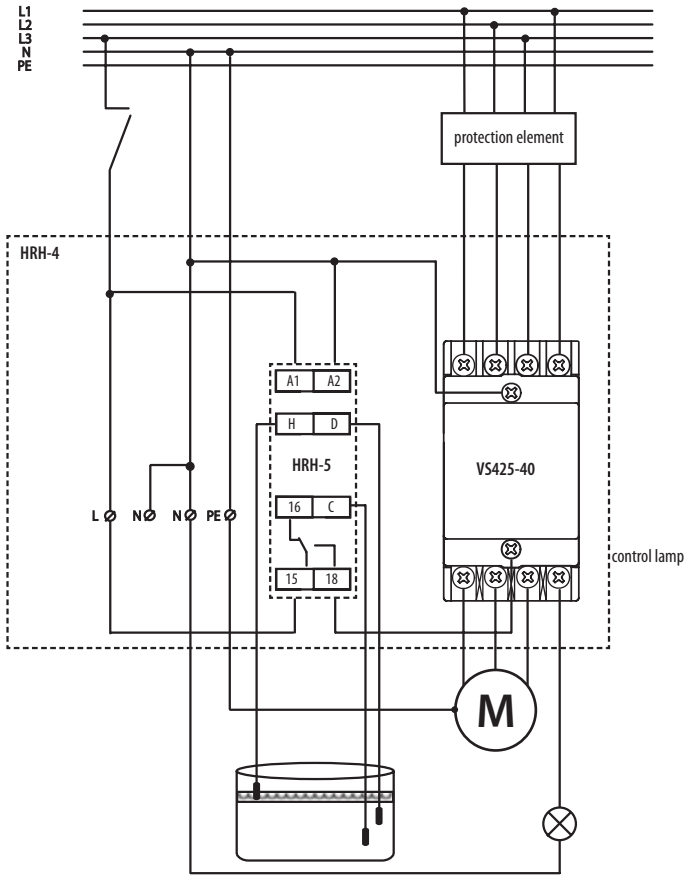
Level set HRH-4

- In an easy way automates operation of pumps depending on level
- Control of level in wells, tanks, reservoirs...
- Delivered as a connected set – easy installation
- Possibility to monitor level of any type of conductive liquid
- Designated 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)
- Unit is placed in a plastic box with dimensions 160x135x83

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

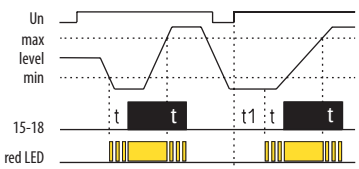
Technical parameters	HRH-4
Function:	2
Voltage range:	AC/DC 230 V or AC/DC 24 V (AC 50 - 60 Hz)
Burden:	7 VA
Operating range:	-15 %; +10 %
Measuring circuit	
Sensitivity (input resistance):	adjustable in range 5 kΩ -100 kΩ
Voltage n electrodes:	max. AC 3.5 V
Current in probes:	AC <0.1 mA
Time response:	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 (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

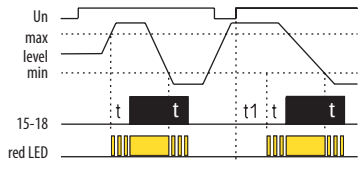


Function

Function PUMP UP



Function PUMP DOWN



Funktion 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.

Level switch HRH-6

EAN¨code

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

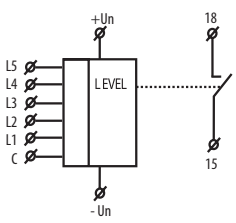
- Function 1 is watching minimal and maximal level depth, for example in fire engine cars, tanks etc.
- Function 2 is maintaining level depth in water collectors, basins, pools ec.
- Selection of particular function is made by jumper on the front panel
- Level depth is indicated on the panel of device 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	
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. 122	

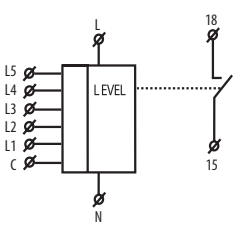
* Note: product is in a state of prototype, may be a subject of alternations .

Description of function:

HRH-6/DC

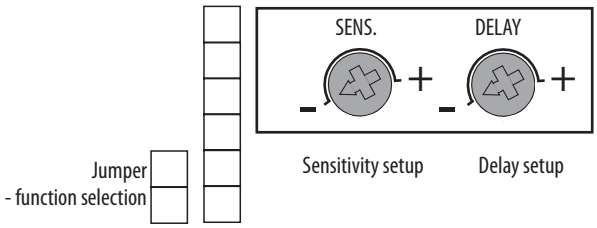


HRH-6/AC

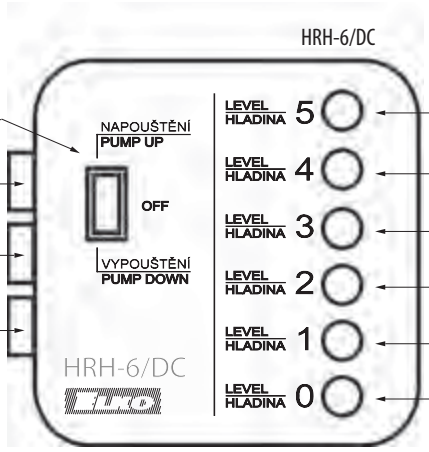


Connection

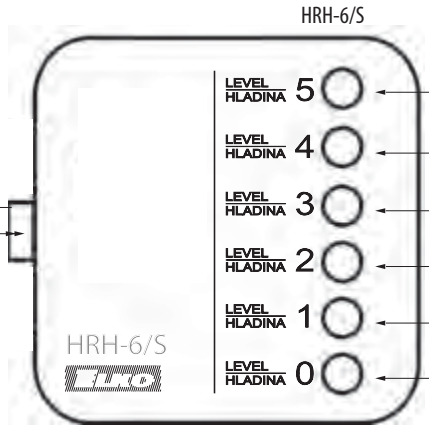
Connection of HRH-6 in a block



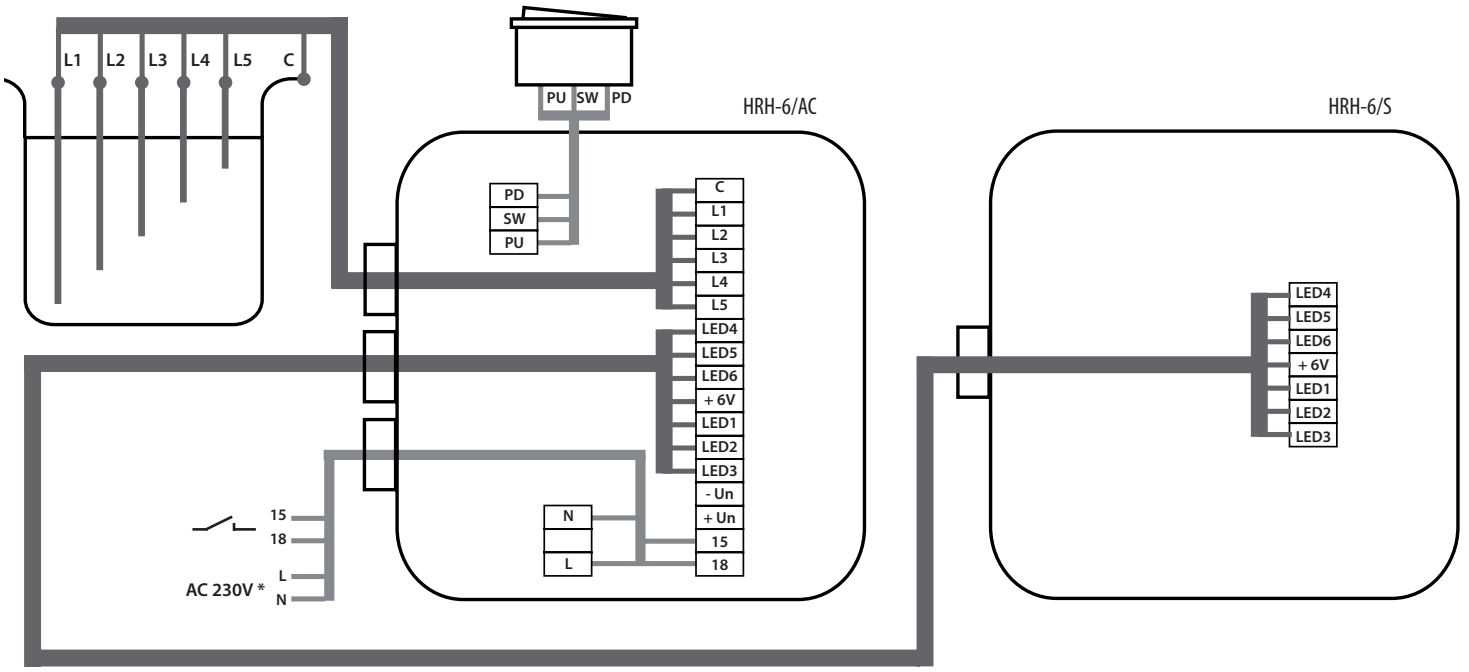
Basic unit



Auxiliary signalling

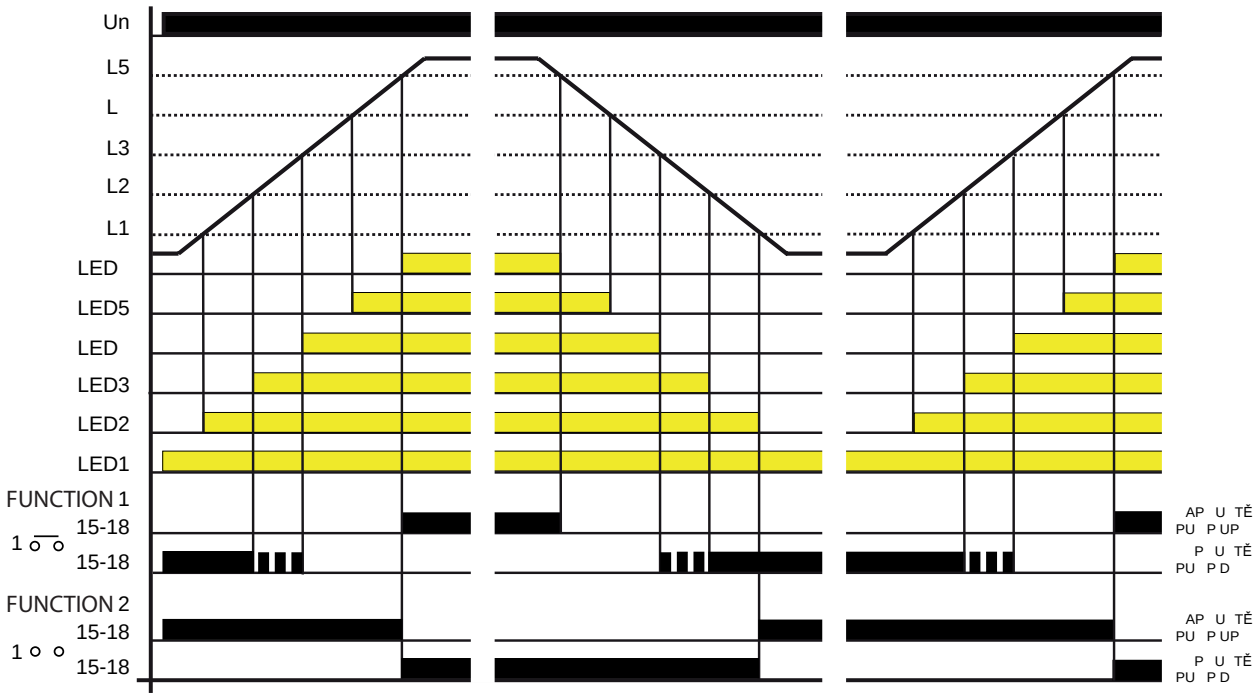


HRH-6 block connecting



*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-engnes it means its body) in case of supply voltage 12...24VDC.
In case of supply voltage 230VAC, the crcuits 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 t 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).

SHR-1-M SHR-1-N

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
- with 12 mm / 0.5" screw with nut
- 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 "

- 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"

EAN code

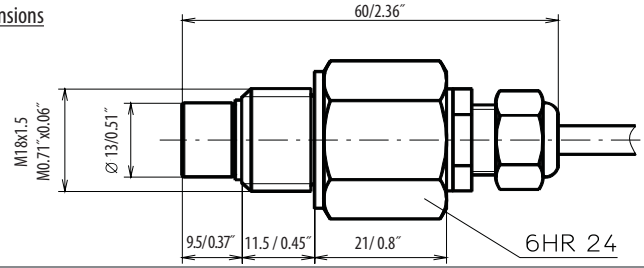
SHR-1-M	8595188110105
SHR-1-N	8595188111379
SHR-2	8595188111263
SHR-3	8595188111270
vodič k SHR-2	8595188129770

SHR-2 in open state

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



ANALOGUE

- Single thermostats with special temperature range, function or use.

THERMO

- Room thermostats in design ELEGANT.
- Monitoring and regulation of temperature in room, floor, or both.

TEV

- Thermostat for demanding environment with protection degree IP65.
- Protection against water-shoot, pavement, drives… freezing.

Thermostats and hygrostats

DIGITAL

- Complex control of heating and water warming in a house; solar heating.
- Maximally universal and variablethermostat with possibility of various functions and combination with time switch

Thermostats

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, 2 MODUL.
Temperature range: -40 °C to +110 °C / -40 °C to 230 °F

Hygro-thermostat

Hygro-stat

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

Accessories to thermostats:

TC
0.. +70 °C

TZ
-40.. +125 °C

PT100
-30.. +200 °C

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.

Thermostats

Type	DESIGN	Type		Sensor			Supply				Temperature range	Hysteresis	Relative humidity	Designation	Page in catalogue
		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	127
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	127
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...)	127
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	127
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	128
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	128
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	127
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	127
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	129
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	132
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	130
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 IP65	135
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	136
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	136
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	137
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	133
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	133
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	133
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	134
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	134
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	134
RHT-1	1M-DIN	●		●		built -in			●		0 to +60 °C (32 °F to 140 °F)		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)	138
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	single exteriors hygrostat for monitoring and regulation of humidity in the and demanding enviroments	139

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
- 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 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 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 indicated status of output, green LED indicates energization of the device
- 1-MODULE, DIN rail mounting

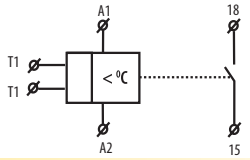
Technical parameters:

	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

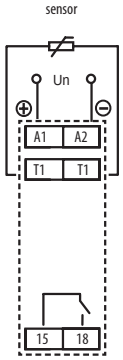
Example of an order

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

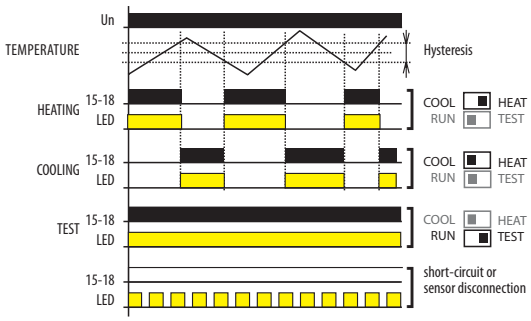
Symbol



Connection



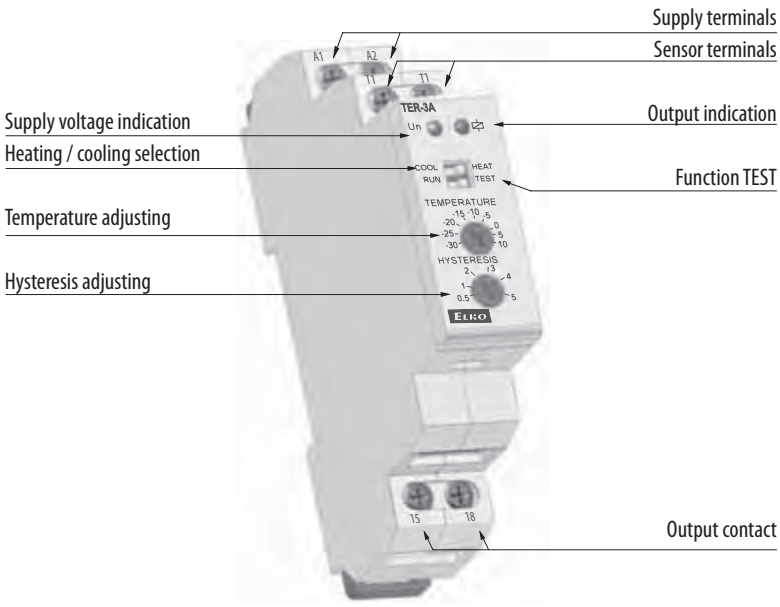
Function



Function description

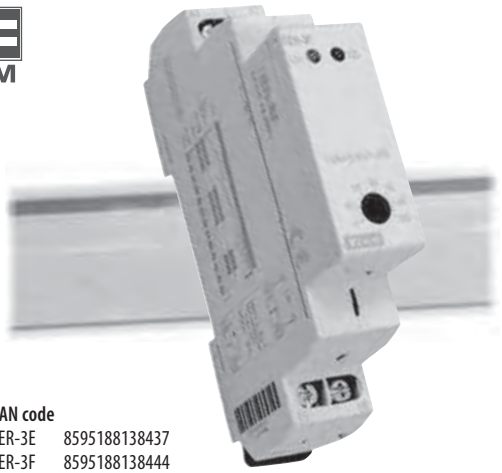
It is a single but practical thermostat with separated sensor for monitoring temperature. Device is placed in a switchboard and external sensor senses temperature of required space, object, or liquid. Supply is not galvanically separated from sensor. Sensor is double insulated. Maximal length of delivered 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 defi ne 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



Thermostats line TER-3 (E, F)

1M



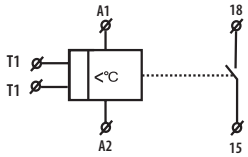
EAN code

TER-3E	8595188138437
TER-3F	8595188138444

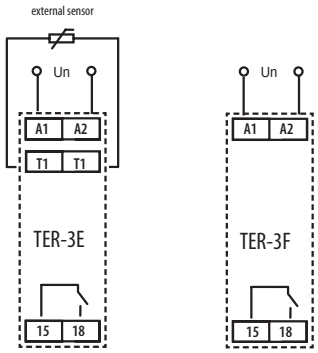
- Single thermostat for temperature monitoring and regulation in range 0 to +60 °C /(32 °F to 140 °F)
- Can be used for temperature monitoring e.g. in switchboards, heating systems, iquids, radiators, motors, devices, open spaces, etc
- Fixed hysteresis at 1 °C / 32 °F
- TER-3E - choice of external thermo 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 state 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	

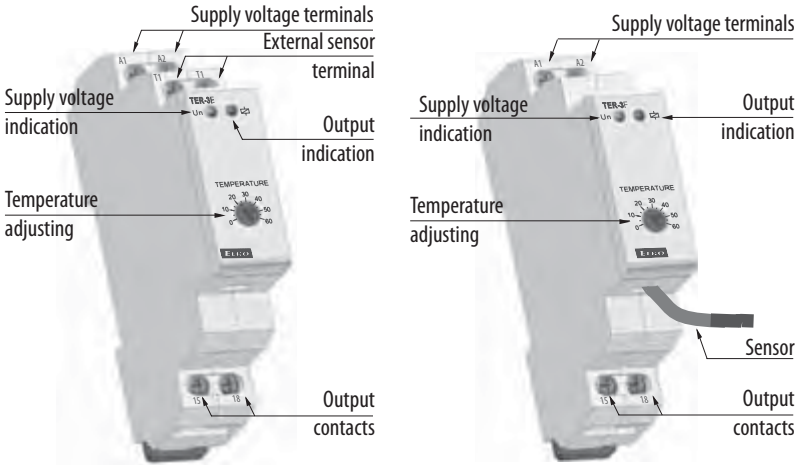
Symbol



Connection

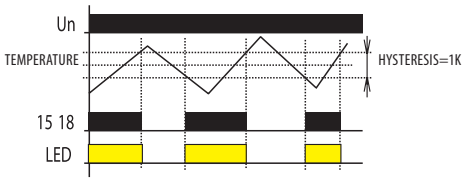


Description



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.

2-stage thermostat TER-4

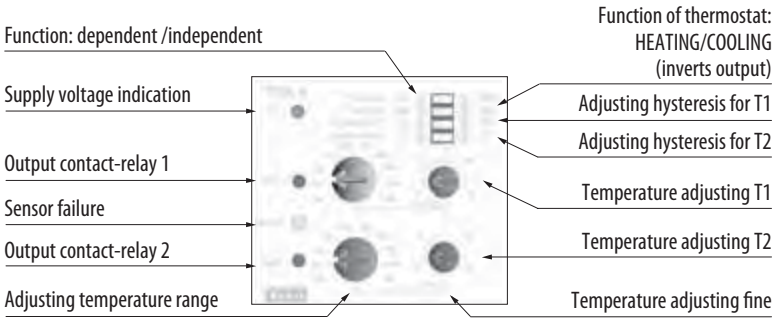
EAN kód
TER-4 /230V: 8594030337806

- 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)
- 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 states are indicated by red LED, faulty state of sensor by yellow LED
- 3-MODULE, DIN rail mounting

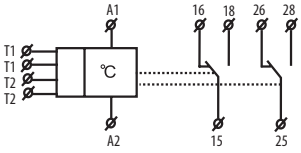
Technical parameters:

	TER-4
Function:	double thermostat
Supply terminals:	A1-A2
Voltage range:	AC 230 V (AC 50-60 Hz) galvanically separated, AC/DC 24V galvanically unseparated
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:	

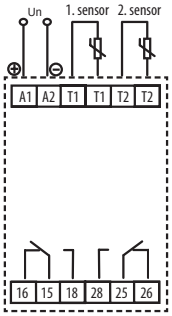
Description



Symbol

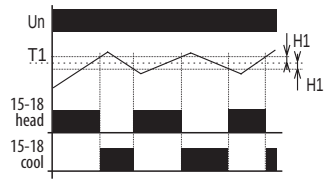


Connection



Function

Independent function



Dependent function

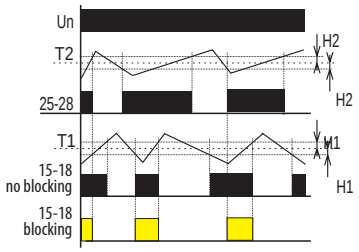


Chart information:
Un –supply voltage
T1 –set temperature of thermostat 1
T2 –set temperature of thermostat 2
H1 –set hysteresis of thermostat 1
H2 –set hysteresis of thermostat 2
15-18 output contact of thermostat 1
25-28 output contact of thermostat 2

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.

Multifunction digital thermostat TER-9

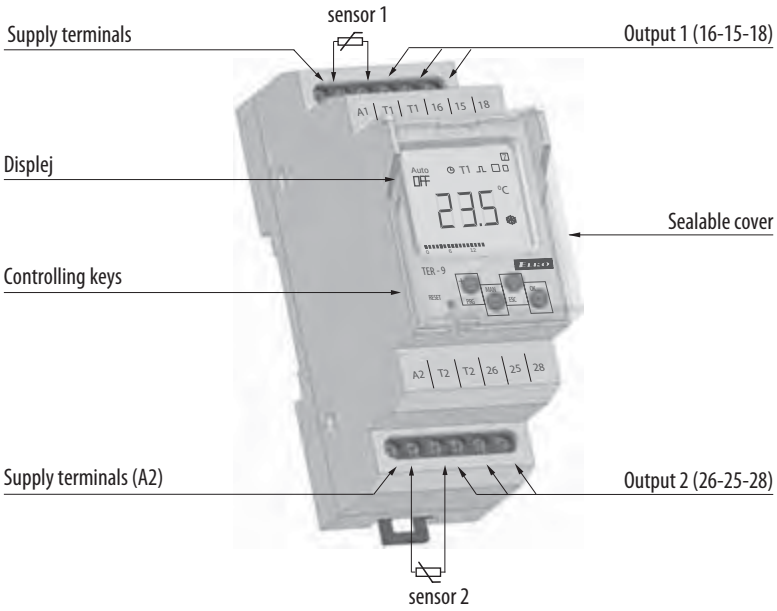
2M

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

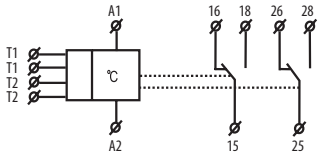
- Digital thermostat with 6 functions and in-built time switch clock, with daily and weekly program (as SHT-1/2). Thermo functions can be managed also in real time
- Complex control of heating and water heating in a house, solar heating....
- 2 thermostats in one, 2 temperature inputs, 2 output contact closures
- Universal and variable thermostat containing all common thermostatic functions
- Functions: two independent thermostats, 1x dependent, diff erential thermostat, 2-stage thermostat, thermostat with dead zone, heating functions
- Short circuit and monitor disconnect function
- Program setting of output function, calibration of sensors according to reference temperature (off set)
- Digital switch clock overrides thermostat
- Memory for the most often used temperatures
- Zero error when value setting
- User friendly display of set and measured data, illuminated LCD by backlight
- Supply galvanically separated AC 230 V or AC/DC 24 V galvanically unseparated
- 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. 3.5 VA
Operating range:	-15 %; +10 %
Measuring circuit	
Measuring terminals:	T1-T1 and T2-T2
Temperature range:	-40 °C to +110 °C (-40 °F to 230 °F)
Hysteresis (sensitivity):	< 0.5 °C (< 32.9 °F)
Diference temperature:	< 0.1 % / °C (< 0.1 % / °F)
Sensor:	termistor NTC 12 kΩ at 25 °C (77 °F)
Sensor failure indication:	sign "Err"
Accuracy	
Measuring accuracy:	5 %
Repeat accuracy:	< 0.5 °C/ 0.5 °F
Temperature dependance:	< 0.1 % / °C
Output	
Number of contacts:	1x changeover for each input/SPDT, (AgNi/ Silver Alloy)
Current rating:	8 A / AC1
Max. breaking capacity::	2500 VA / AC1, 240 W / DC
Switching voltage:	250 V AC1 / 24 V DC
Min. breaking capacity DC:	500 mW
Output indication:	symbol ON/OFF
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 - contact)
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 35.6 x 64 mm (3.5˝ x 1.4˝ x 2.5˝)
Weight:	140 g (4.9 oz.)
Standards:	EN 61812-1, EN 61010-1, EN 60730-2-9

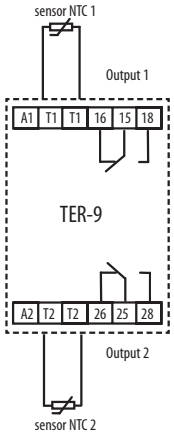
Description



Symbol

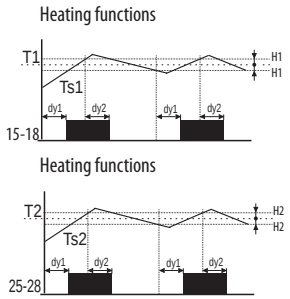


Connection



Note: The device is possible to operate with one sensor.In such case it is necessary to connect resistor10kΩ. This resistor is a part of delivery.

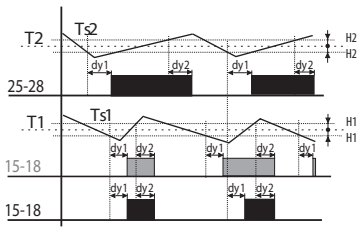
2 independent single-stage thermostat



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)

Output contact switched until adjusted temperature is reached. Hysteresis eliminates frequent switching.
Heating/cooling function adjusted in the menu.

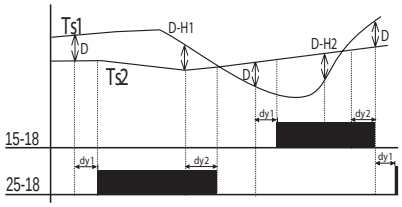
Dependent functions of 2 thermostats



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).

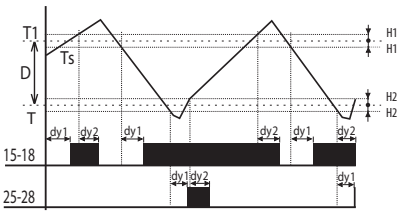
Differential thermostat



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.

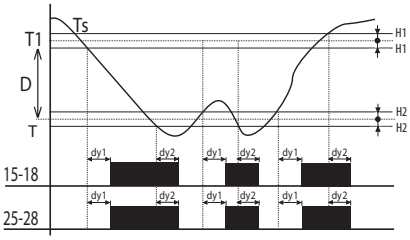
2-stage thermostat



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, output 2 switches.

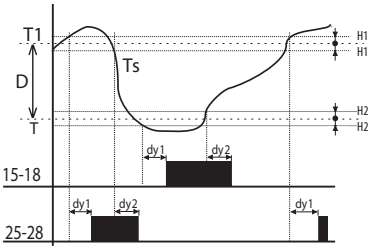
Thermostat with "WINDOW"



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.

Thermostat for monitoring temperature of motor winding TER-7

1M

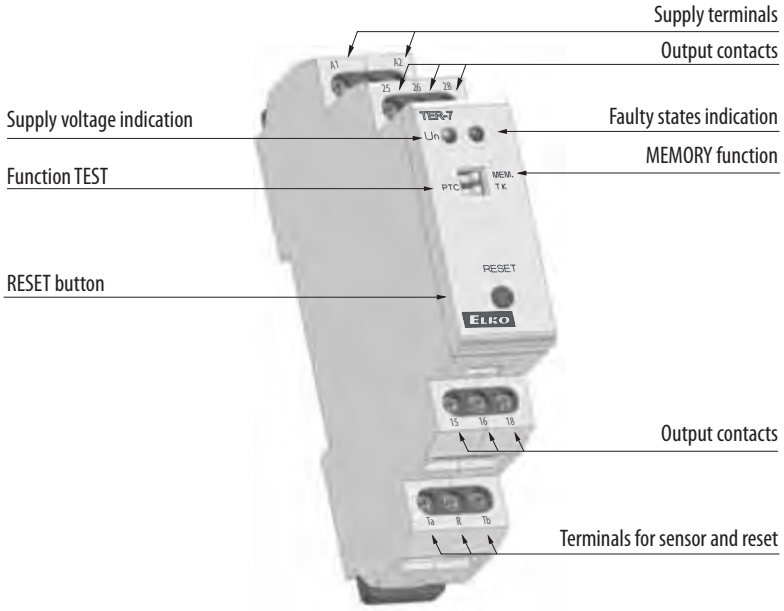
EAN code
TER-7: 8595188137164

- 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

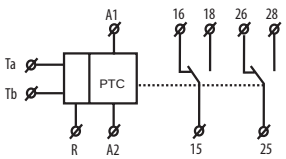
Technical parameters:

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

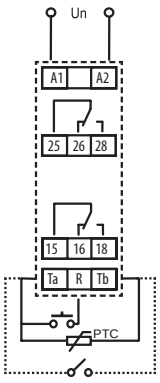
Description



Symbol



Connection

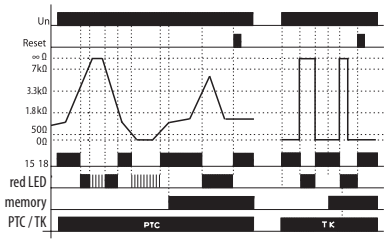


Note

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).

Room and floor analog thermostat Thermo

30mm
Ø 65mm

EAN code
ATR : 8595188125000
ATF : 8595188130165
ATC : 8595188130172

- 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
  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)
  Nastavení ofsetu (kalibrace ±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 Obzor ELEGANT*, wide range of colours, possibility to combine more frames together

Technical parameters:

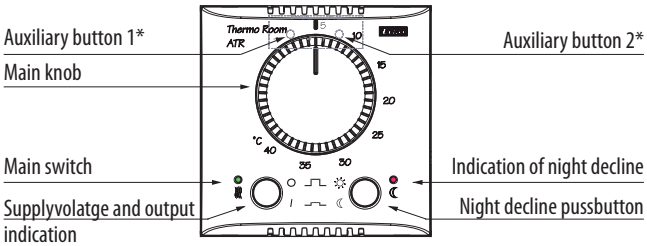
	ATR	ATF	ATC
Supply			
Power supply and tolerance:	AC 230 V ±10 %,		
Consumption, frequency:	6.5 VA/ 50-60 Hz		
Measuring			
Temperature range:	+5 to +40 °C (+41 °F to +104 °F)	+5 to +50 °C (+41 °F to +122 °F)	
Accuracy:	±2 °C/ 36 °F		
Hysteresis:	±1 °C/ 34 °F		
Temperature sensor:	room	floor	room + floor
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 blinking	
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		

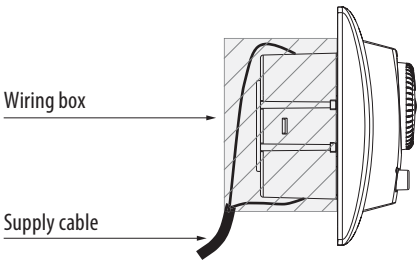
** - more information on page 154

Design

It is possible to combine thermostats into multiframe switches ELEGANT with a wide color range.
Note: Complete offer of switching devices line ELEGANT can be found in blue catalogue of Intelligent and comfortable electrical installation (INELS) pg. 10-11 or in an individual catalogue ELEGANT Home switches, which can be sent to you upon request.

Description

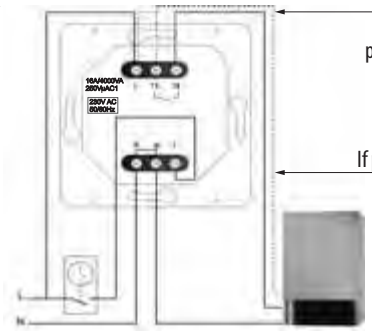




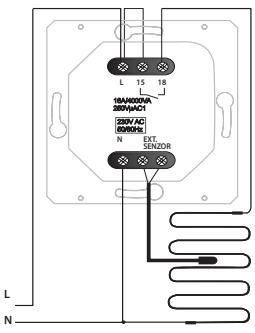
* Auxiliary button 1 and 2 are accessible after removal of the main knob

Connection

ATR



ATF
ATC



Accessories:

See page 140

Digital room and floor thermostat Thermo

30mm
Ø 65mm

- DTR - Digital Thermo Room:
  Room thermostat with temperature range +5 to +50 °C (+41 °C to+122 °C) with a built-in sensor
- DTF - Digital Thermo Floor:
  Floor thermostat with temperature range +5 to +50 °C (+41 °C to+122 °C) 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
DTR : 8595188125017
DTF : 8595188135924
DTC : 8595188135931

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 ⧖ 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		

** - more information on page 148

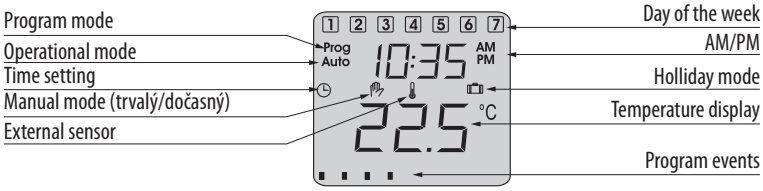
Design

It is possible to combine thermostats into multiframe switches ELEGANT with a wide color range. Note: Complete offer of switching devices line ELEGANT can be found in catalogue ELEGANT Home switches, which can be sent to you upon request.

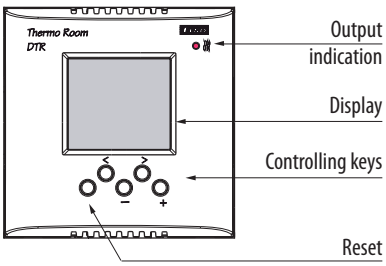
Other Funktions DTR, DTF, DTC

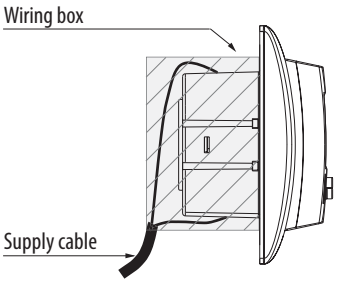
- programs are pre-set according to most frequently used functions =„Plug and Play"
- pushbutton lock to prevent unwanted manipulation with thermostat
- phoice of display current/set temperature
- „preezing protection" in case temperature drops below +50 °C (+122 °F) thermostat always switches heating on
- phoice of function heating or cooling
- pasy and intuitive control by four pushbuttons
- putomatic shift summer/winter time
- poliday 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...)

Description of visual elements on the display



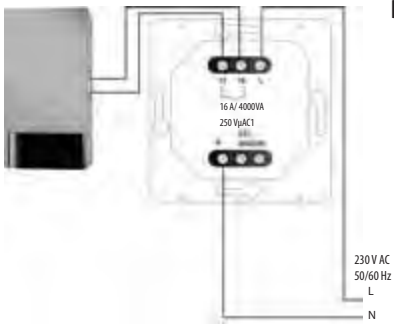
Description



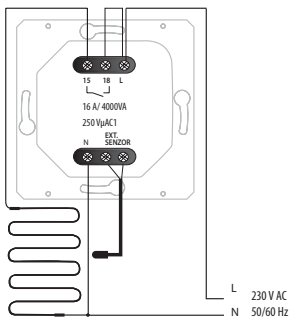


Connection

DTR



DTF
DTC



Accuracy:

See page 140.

Thermostat TEV-1

110x133
IP65

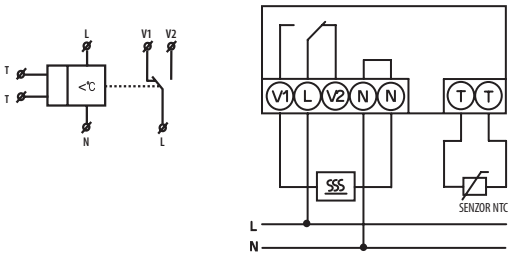
- Two-level thermostat with function "WINDOW" meaning that output is switched in case the measured temperature is within set range (adjustable in range -20.. +20 °C/ -4 °F to +68 °F)
- Used as protection against freezing (water-shoots, pavements, drives, pipes, etc.) heating is on when temperature falls 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 (3colours) under transparent cover
- Function monitoring short-circuit and sensor disconnection (break)
- Output changeover contact 16A/ SPDT (AC-1)

EAN kód
TEV-1: 8595188129121

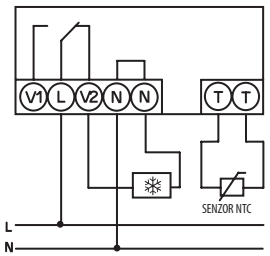
Technical parameters	TEV-1
Function:	two-level thermostat
Supply terminals:	L - N
Voltage range:	230V AC / 50 - 60 Hz
Input:	max. 2.5 VA
Tolerance of voltage range:	±15 %
Measured circuit	
Measuring terminals:	T - T
Temperature ranges:	
thermostat 1	-20.. +20 °C (-4 °F to +68 °F)
thermostat 2	-20.. +20 °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

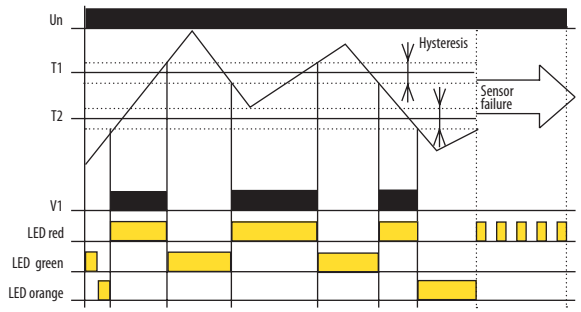
Function heating



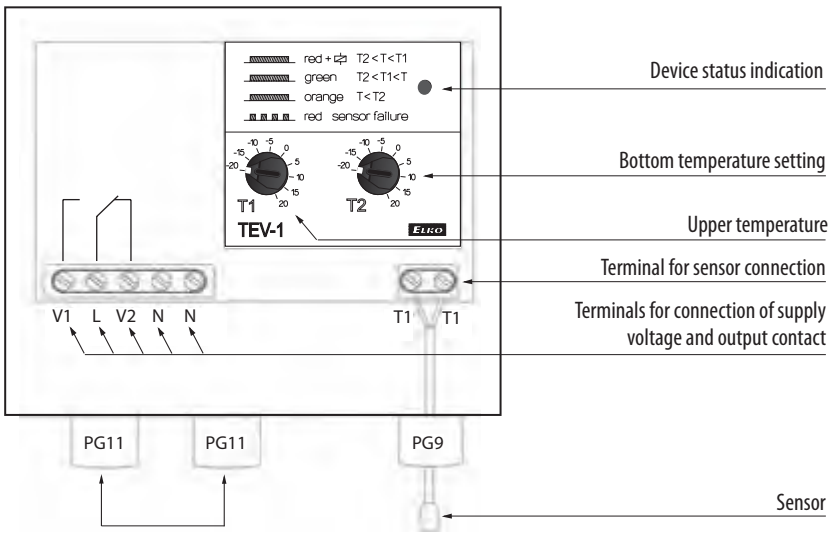
Function cooling



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 thermostata 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 thanT2 (bottom temperature),thermostat also switches heating off (to big freezing heating cannot manage to melt the ice).

Thermostats TEV-2, TEV-3

TEV-2

110x133
IP65

TEV-3

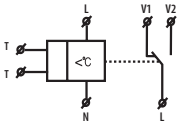
110x133
IP65

- Single thermostat with possibility of temperature management in adjustable range (it is possible to modify this range or make a special one on request)
- It is 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

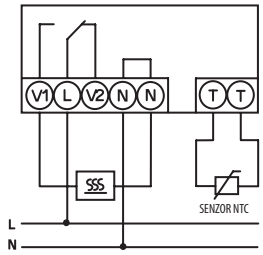
Technical parameters	TEV-2	TEV-3
Function:	one-level thermostat	
Supply terminals:	L - N	
Voltage range:	230V AC / 50 - 60 Hz	
Input:	max. 2.5 VA	
Tolerance of voltage range:	±15%	
Measured circuit		
Measuring terminals:	T- T	
Temperature ranges:	-20 to +20 °C / -4 °F to +68 °F	+5 to+35 °C/ +41 °F to +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	

Symbol

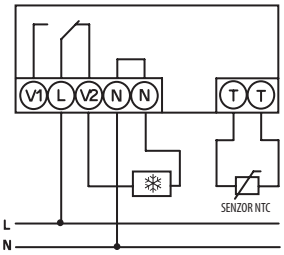


Connection

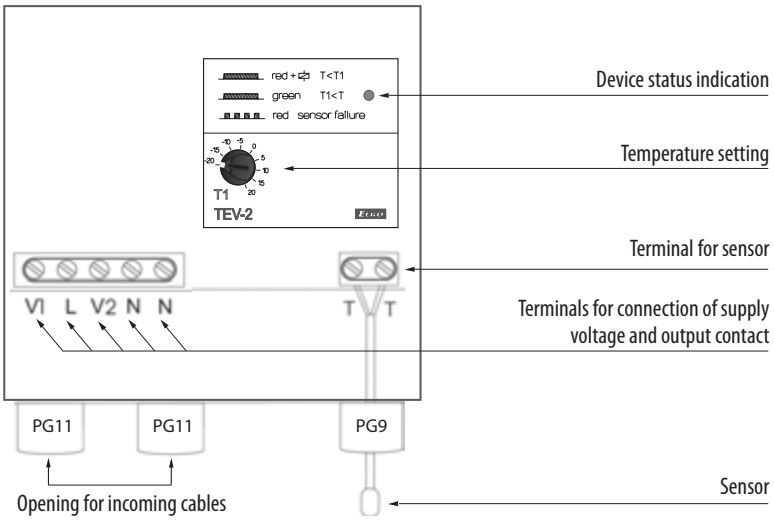
Function heating



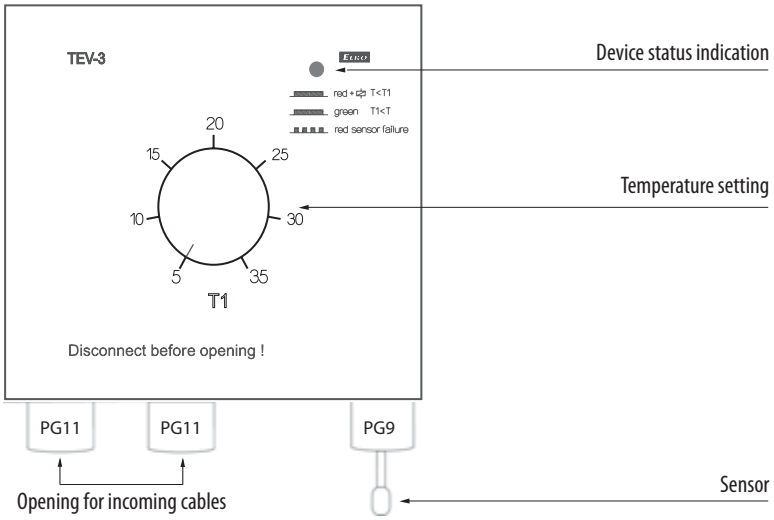
Function cooling



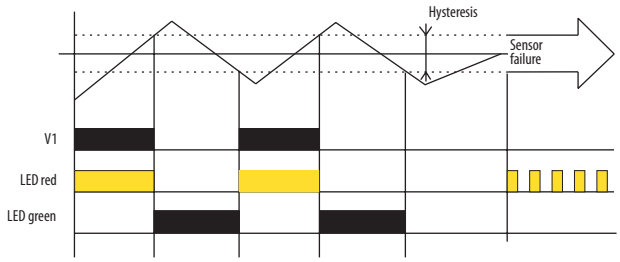
Description TEV-2 (without cover)



Description TEV-3 (cover)



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).

153x62x34
IP65

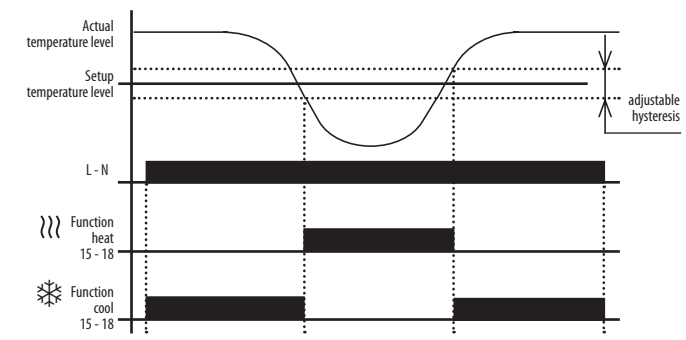
- Single point thermostat for monitoring and regulation of temperature in demanding enviroments (humid and contaminated, agressive and defective, industrial workshops, washing rooms, green-houses, cellars and cooling boxes…)
- External version in IP65, box for mounting on the wall
- Built-in thermo-sensor 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

EAN code
TEV-4: 8595188140577

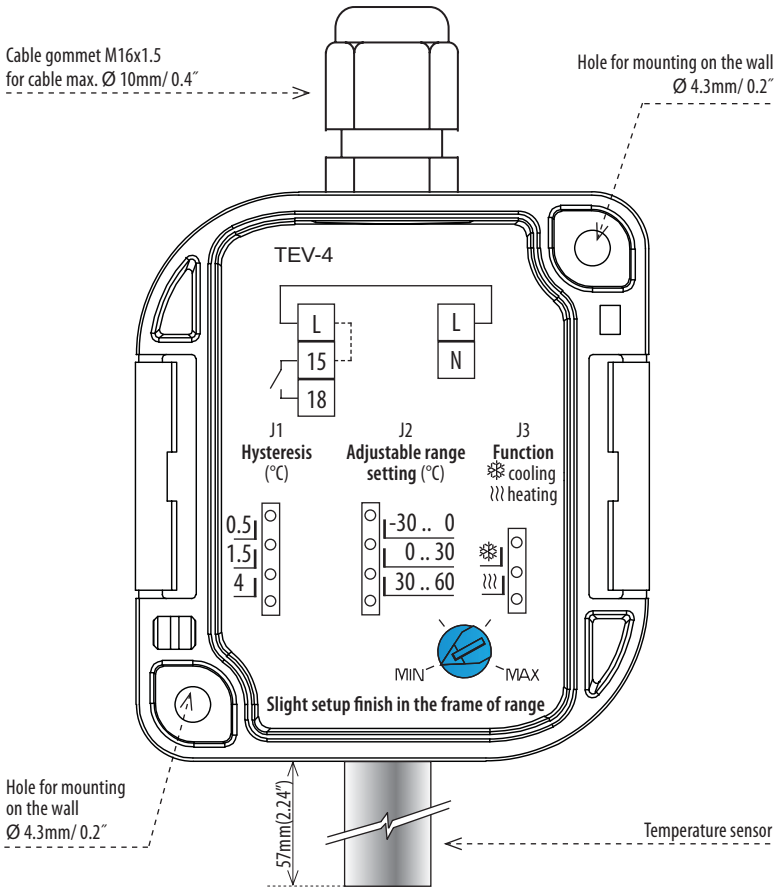
Technical parameters:

	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

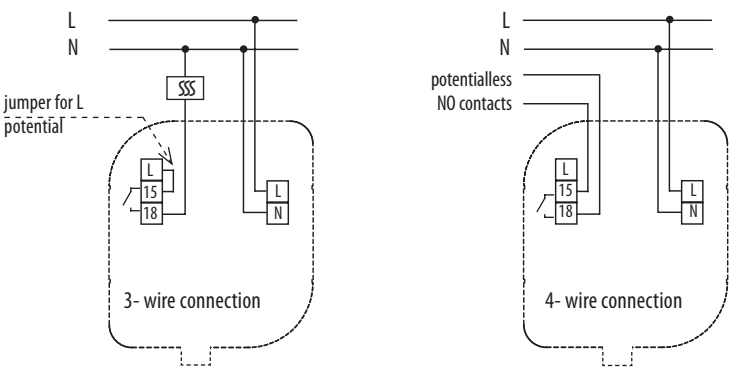
Function



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.

Hygro-thermostat RHT-1

1M

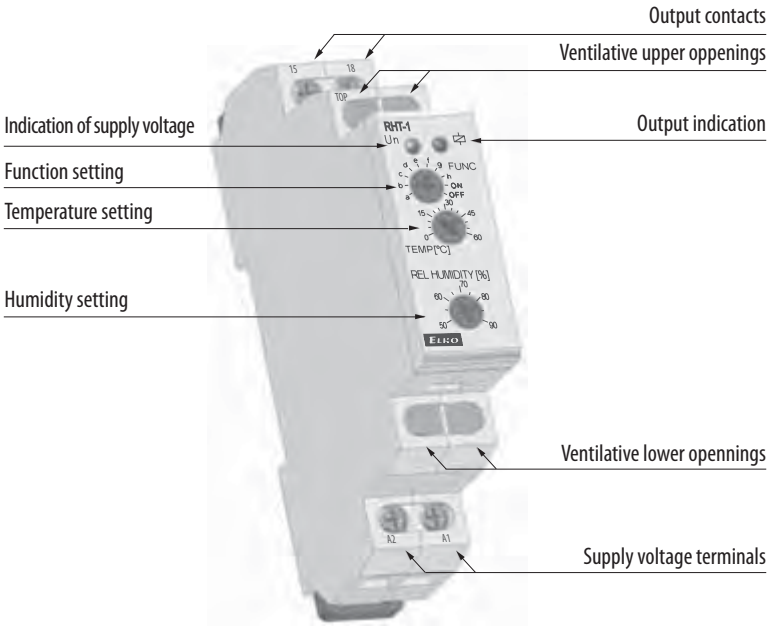
EAN code
RHT-1: 8595188137263

- 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 changeover/ SPDT 16A/250 V AC1
- In 1 module type, mounting onto a DIN rail

Technical parameters

	RHT-1
Function:	hygro-termostat
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 ($AgSnO_2$)
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 data:	
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.)
Applicable standards:	EN 60730-2-9, EN 61010-1

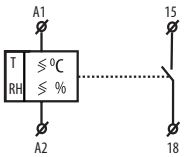
Device description:



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 falut, 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 i 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

Hygrostat RHV-1

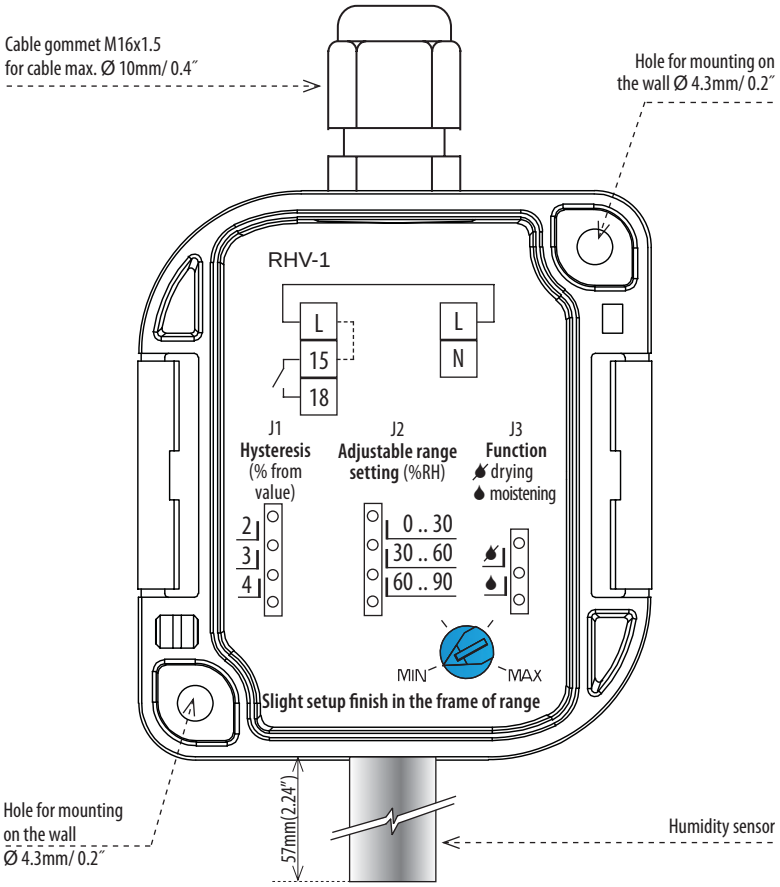
153x62x34
IP65

- Single point humidistat 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

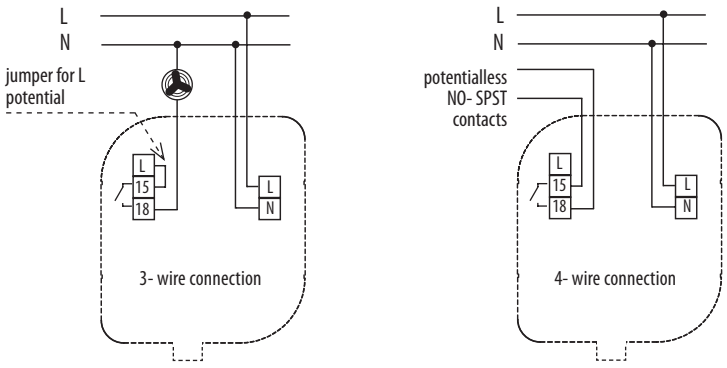
EAN code
RHV-1: 8595188140584

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

Description (proportion is accordant to real size)

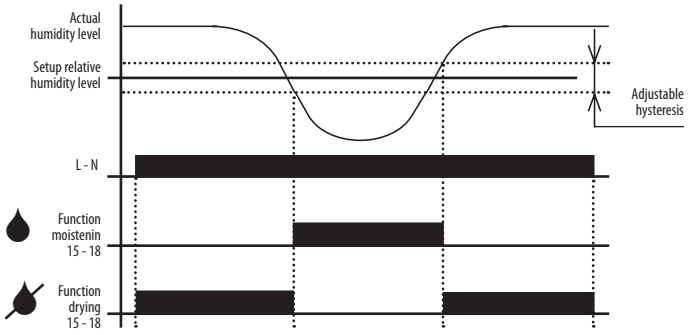


Connection



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

Function



Thermal sensors TC, TZ, PT100 - for Thermostats

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 V03SS-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:
  - TC-0 - 5 g (0.2 oz.)
  - TC-3 - 108 g (3.8 oz.)
  - TC-6 - 213 g (7.5 oz.)
  - TC-12 - 466 g (16.4 oz.)

  Weight of sensors TZ:
  - TZ-0 - 4.5 g (0.16 oz.)
  - TZ-3 - 106 g (3.74 oz.)
  - TZ-6 - 216 g (7.6 oz.)
  - TZ-12 - 418g (14.7 oz.)

  Weight of sensors PT100:
  - PT100-3 - 68 g (2.4 oz.)
  - PT100-6 - 149 g (5.3 oz.)
  - PT100-12 - 249 g(8.8 oz.)

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

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

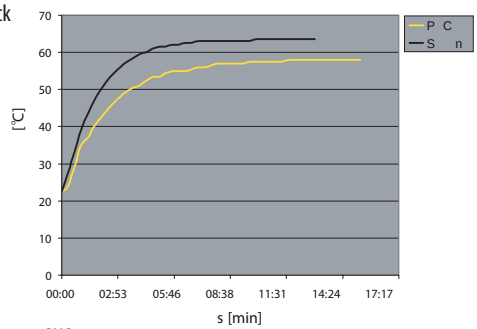
TZ: Thermal sensors for range -40 °C to +125 °C (-40 °F to 257 °F)

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

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

PT100-3 -Temperature senzor 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

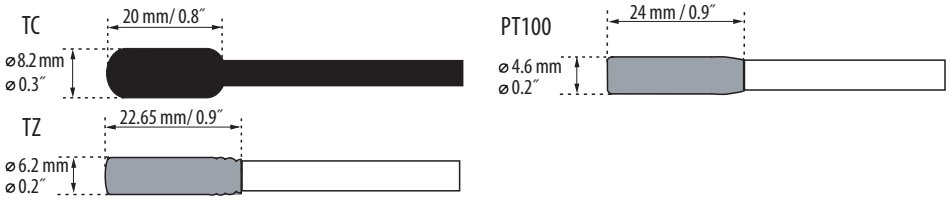
Diagramm of sensor warm up via air



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

Recomended installation box for wall mounting of THERMO thermostats

Type LKM- 45, dimensions: 98x98x45 mm, color: white
Reference number: 8595188130806

Technical information

Main instructions for correct use of ELKO EP products

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

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

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

3.) Elimination of disturbances on input circuits
- it is recommended to eliminate disturbances on control inputs of devices by suitable elements (R-C elements) and thus minimize creation of inductive voltage on incoming wires
- pay attention when connecting control inputs and 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, agressiv 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

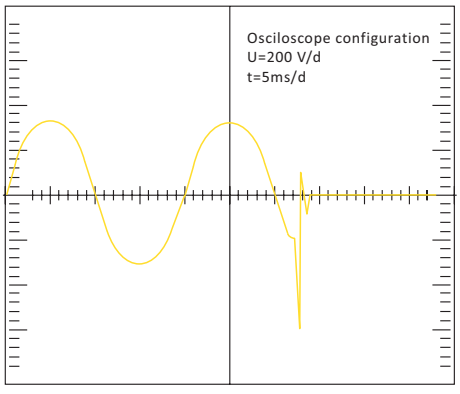
5.) Device handling and using
- input terminals do not fill-in with high power (for serial terminals max 0,5 N/m), do not give excessive pressure to carrier terminal parts to avoid demage of inner device construction
- protect the device before falls and excessive vibrations that could demage relays 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

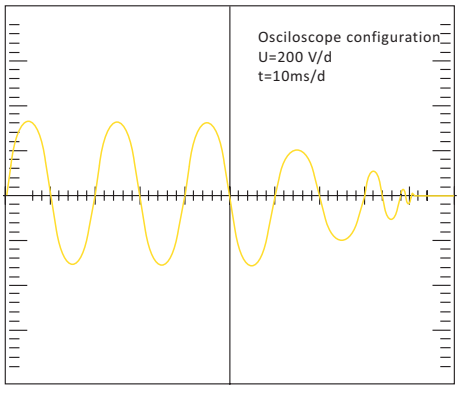
All time and monitoring relays from our assortment are equiped with protective elements (varistors) against possible overvoltage in supply main. Limit voltage of used varistors is 275 V. At short-time overvoltage in supply main varistor decrease its leak resistor and accumulate arosen overvoltage. When 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 diagramms bellow you can see oscilographic running of disconnecting of loads (contactors) and reaction of protective elements to arosen voltage pikes

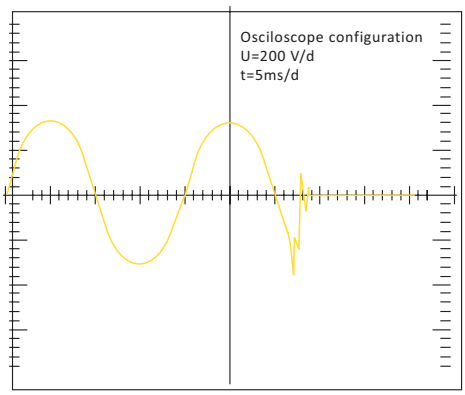
Process of disconnection of contactor with coil on 230V/AC without R-C member



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 loadability

RFJA-12B; RFSA-62B; RFSA-66M; SOU-2, RFSTI-11G																		
Type of load	cos φ ≥ 0.95 AC1	AC2	AC3	AC5a uncompensated	AC5a compensated	HAL.230V AC5b	AC6a	AC7b	AC12	AC13	AC14	AC15	DC1	DC3	DC5	DC12	DC13	DC14
contact material $AgSnO_2$ contact 8A	250V / 8A	250V / 5A	250V / 4A	x	x	250W	250V / 4A	250V / 1A	250V / 1A	x	250V / 4A	250V / 3A	30V / 8A	30V / 3A	30V / 2A	30V / 8A	30V / 2A	x

RHV-1; SOU-3; TEV-4																		
Type of load	cos φ ≥ 0.95 AC1	AC2	AC3	AC5a uncompensated	AC5a compensated	HAL.230V AC5b	AC6a	AC7b	AC12	AC13	AC14	AC15	DC1	DC3	DC5	DC12	DC13	DC14
contact material $AgSnO_2$ contact 12A	250V / 12A	250V / 3.7A	250V / 2.2A	230V / 2.2A (510VA)	230V / 2.2A (510VA) till max output C=14uF	1 120W	x	250V / 2.2A	250V / 7.5A	250V / 4.5A	250V / 4.5A	250V / 4.5A	24V / 12A	24V / 4.5A	24V / 3A	24V / 12A	24V / 1.5A	24V / 1.5A

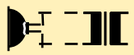
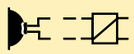
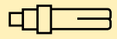
CRM-4; CRM-42; MR-41; MR-42; RFSA-11B; RFSA-61B; RFSA-61M; RFSTI-11B a RFDAC-71B , SHT-1; SHT-1/2; SHT-3; SHT-3/2; SMR-B; SOU-1; RHT-1; TER-3A; TER-3B; TER-3C; TER-3D; TER-3E; TER-3F; TER-3G; TER-3H ; VS116K; VS116U; VS316/24V; VS316/230V																		
Type of load	cos φ ≥ 0.95 AC1	AC2	AC3	AC5a uncompensated	AC5a compensated	HAL.230V AC5b	AC6a	AC7b	AC12	AC13	AC14	AC15	DC1	DC3	DC5	DC12	DC13	DC14
contact material $AgSnO_2$ contact 16A	250V / 16A	250V / 5A	250V / 3A	230V / 3A (690VA)	230V / 3A (690VA) till max output C=14uF	1000W	x	250V / 3A	x	x	250V / 6A	250V / 6A	24V / 10A	24V / 3A	24V / 2A	24V / 6A	24V / 2A	x

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; TER-9																		
Type of load	cos φ ≥ 0.95 AC1	AC2	AC3	AC5a uncompensated	AC5a compensated	HAL.230V AC5b	AC6a	AC7b	AC12	AC13	AC14	AC15	DC1	DC3	DC5	DC12	DC13	DC14
contact material AgNi contact 8A	250V / 8A	250V / 3A	250V / 2A	230V / 1.5A (345VA)	x	300W	x	250V / 1A	250V / 1A	x	250V / 3A	250V / 3A	24V / 8A	24V / 3A	24V / 2A	24V / 8A	24V / 2A	x

HRH-6																		
Type of load	cos φ ≥ 0.95 AC1	AC2	AC3	AC5a uncompensated	AC5a compensated	HAL.230V AC5b	AC6a	AC7b	AC12	AC13	AC14	AC15	DC1	DC3	DC5	DC12	DC13	DC14
contact material AgNi contact 10A	250V / 10A	250V / 3A	250V /2A	230V / 2A (460VA)	x	500W	x	250V / 2A	250V / 6A	250V / 3.8A	250V / 3.8A	250V / 3.8A	24V / 10A	24V / 3.8A	24V / 2.5A	24V / 10A	24V / 1.3A	24V / 1.3A

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

Product loadability - dimmers

type of load (symbols) / products	bulbs, halogen lamps	low-voltage el.bulbs 12-24V wound transform.	low-voltage el.bulbs 12-24V electronic. transfor.	LED lamps	ekonomic fluorescent lamps	switching management	
							
	R	L	C	dimmable	dimmable	incline edge	descending edge
DIM-2	●	●	x	x	x	●	x
DIM-5	●	●	x	x	x	●	x
DIM-6	●	●	●	x	x	●	●
DIM-10	●	●	x	x	x	●	x
DIM-14	●	●	●	x	x	●	●
DIM-15	x	x	x	●	●	x	●
RFDA-11B	●	●	●	x	x	●	●
RFDA-71B	●	●	●	x	x	●	●
RFDW-71	●	●	●	x	x	●	●
SMR-S	●	●	x	x	x	●	x
SMR-U	●	●	●	x	x	●	●

Demonstrated symbols are informative

Expandatory

Dimmer with designated load:
R - RESISTIVE
L - INDUCTIVE
C - CAPACITIVE

IPxx protection by normal conditions- as a normal conditions are ment conditions of running of electrical device, installation and supply mains, for which is device designated, manufactured and installed.
By these normal conditions of using and normal maintaining must be all protective means active for entire expected product life.

Product loadability

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 use: 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
	Note: Category AC 15 replaces formerly used category AC 11	
DC current, t = L/R (s)		
DC-1	Non-inductive or low inductive load, resistive furnaces	60947-4
DC-3	Shunt motors: start-up, braking by backset, reversion, resistive braking	60947-4-1
DC-5	Series motor: start-up, braking by backset, reversion, resistive braking	60947-4-1
DC-6	Non-inductive or low inductive loads, resistive furnaces – el. bulbs	60947-4-1
DC-12	Management of resistive loads and fixed loads with insulation by opto-electric element	60947-5-1
DC-13	Switching of electromagnets	60947-5-1
DC-14	Switching of electromagnetic loads in circuits with limiting resistor	60947-5-1
DC-20a(b)	Switching and breaking without load(a: frequent switching ,b: occasional switching)	60947-3
DC-21a(b)	Switching ohmic loads including limiting overloading (a: frequent switching ,b: occasional switching)	60947-3
DC-22a(b)	Switching of compound ohmic and inductive loads including limited overloads (e.g. shunt motors) (a: frequent switching, b: random switching)	60947-3
DC-23	Switching of highly inductive loads (e.g. series motors)	60947-3

How can you distinguish for which load is our product (relay) designated?
Our company record this information on a products and also in our catalogue, instruction manual and other promotional and technical material (web-site 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 record 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)- it is used for "improving" contacts for low currents/ voltages , prevents oxidation.

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

Electromagnetic compatability (EMC) is a new scientific field which was founded in the 60s last century. It had been known only to a small number of specialists working in a military and cosmic research.
Electromagnetic compatability EMC is defined as an ability of a device, system or a machine to show the correct operation even in an environment in which tehe 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.

SOURSE OF ELECTROMAGNETIC DISTURBANCES	→	ENVIRONMENT OF DISTRIBUTION, ELECTROMAGNETIC STRUCTURE	→	DISTURBED OBJECT, DISTURBING RECEIVER
motors, switches, relays, power distributions, semi-conducting alternators, luor tubess, 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, telecomunication 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 are controlled our products in case of short time pulse, what is apllicated as to input as to output circuits of divices, to switching inputs, sensing inputs,.. 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 coup .

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 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. Made according 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.

EMC - parameters

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
Dimmers			
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/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
HRN-1/230V	3	3	55022/A
HRH-1/24V	3	3	55022/A
HRN-1/110V	3	3	55022/A
HRN-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

Complementary information

Packing of 3-MODULE relay - 1 pcs
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 plug - in relays - 2 pcs
SHT-1, SHT-3, SHT-1/2, SHT-3/2, SOU-2, TER-9

Packing of plug - in relays - 2 pcs
PRM-91H/11, PRM-92H, PRM-2H

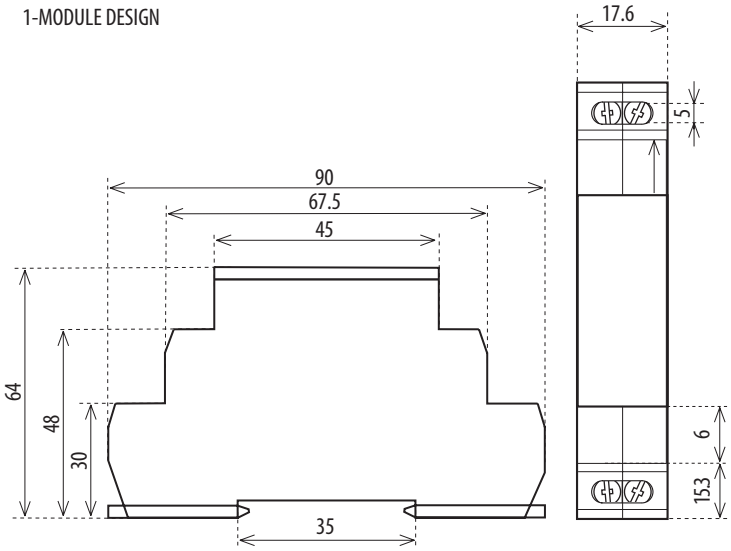
Packing of SMR-14 pcs
SMR-T, SMR-H, SMR-S, SMR-U

Packing of 1-MODULE relay with accessories
SOU-1, CRM-91HE , CRM-2HE

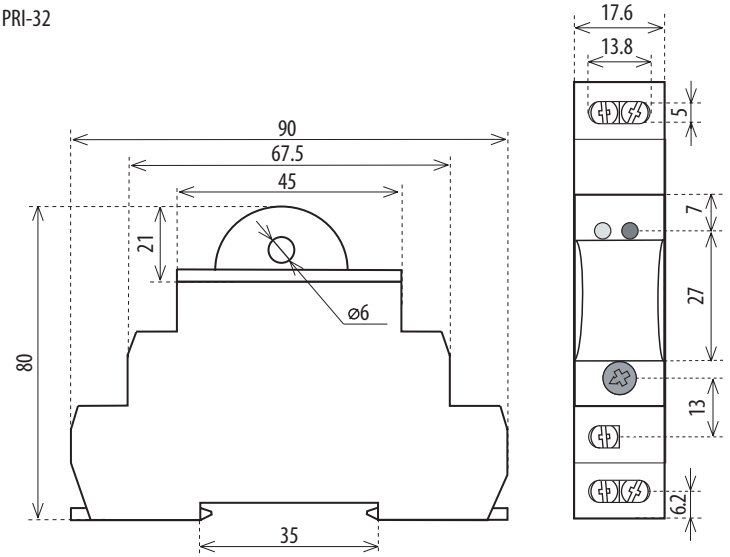
Packing of 1-MODULE relay - 12 pcs
VS116K, VS116U, VS308K, VS316/24, VS316/230,USS, VS

Packing of 1-MODULE relay - 10 pcs
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, DIM-15, HRH-5, HRN-33, HRN-34, HRN-35, HRN-51, HRN-52, HRN-54, MR-41, MR-42, PRI-31, PRI-51, SJR-2, TER-3, TER-7, HRN-56, HRN-63, HRN-64, HRN-67

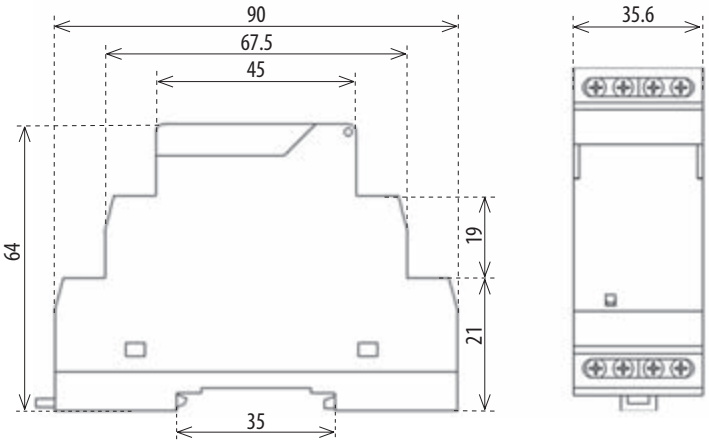
1-MODULE DESIGN



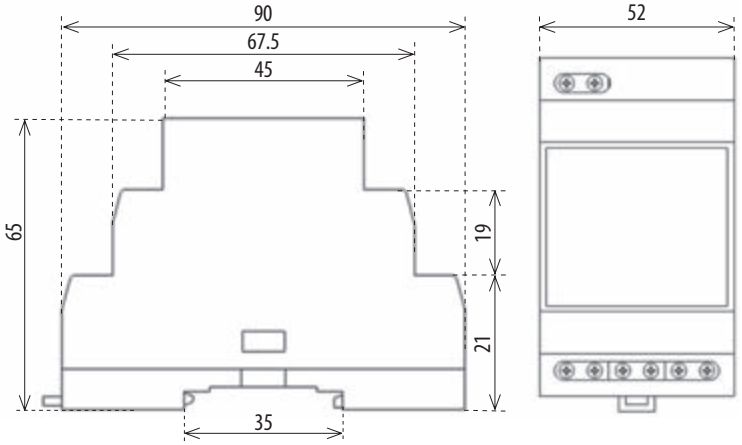
PRI-32



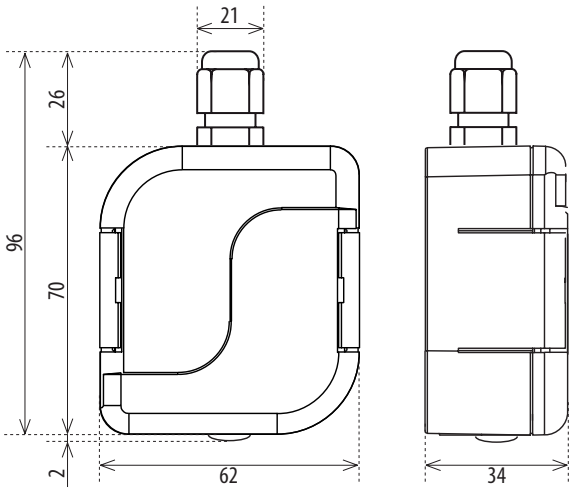
2-MODULE DESIGN



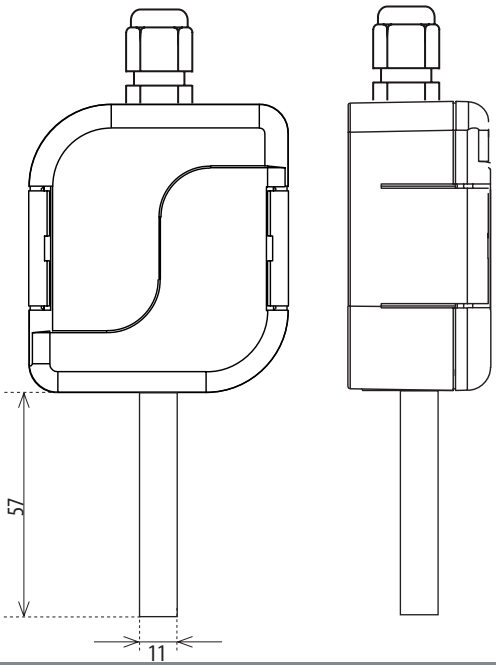
3-MODULE DESIGN



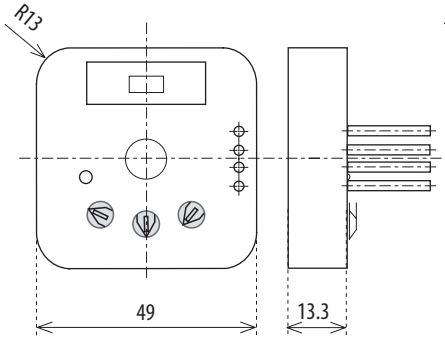
SOU-3



RHV-1, TEV-4



MINI
SMR-T, SMR-H



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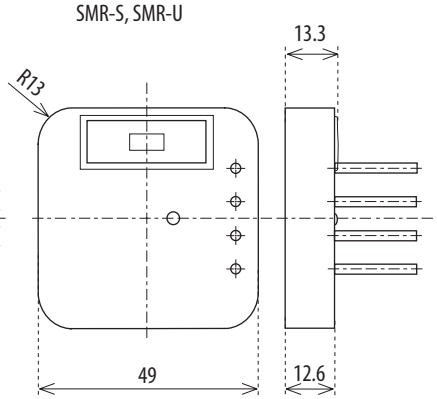
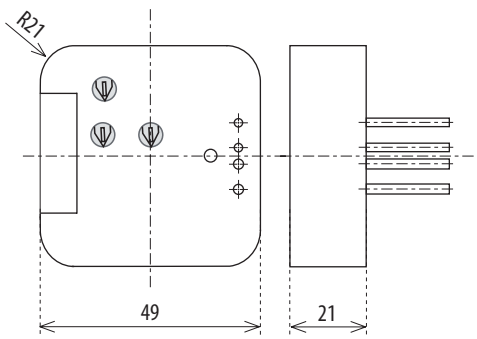
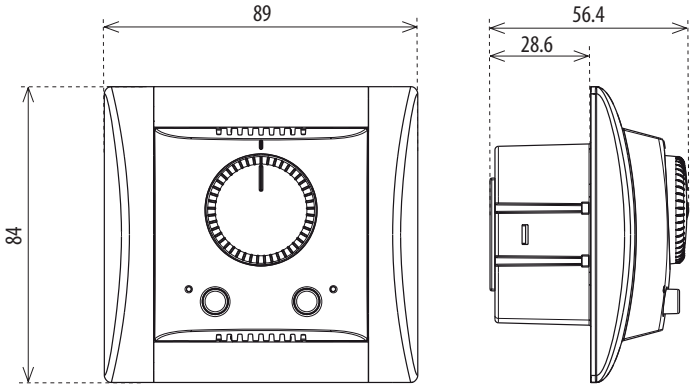
SMR-S, SMR-U



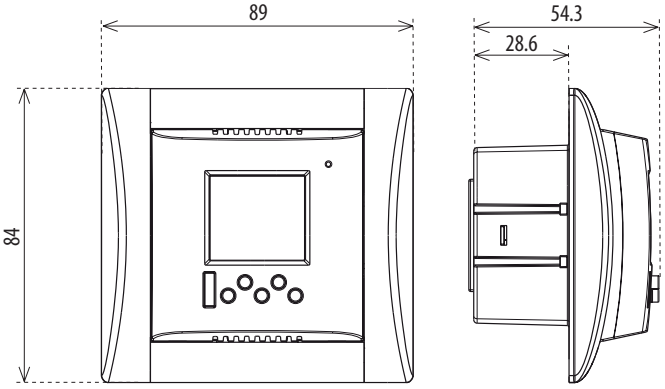
MINI
SMR-B



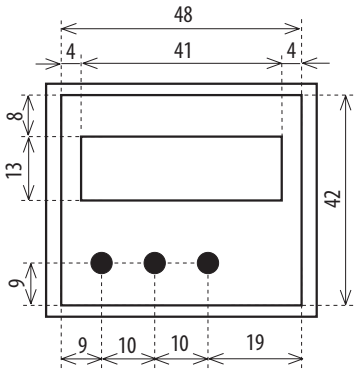
ATR, ATF, ATC



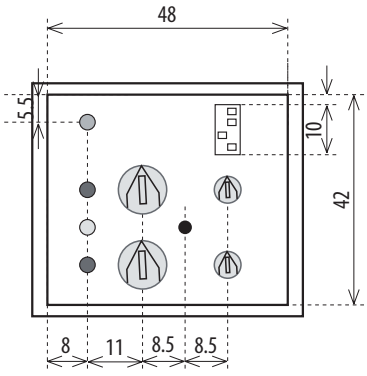
DTR, DTF, DTC



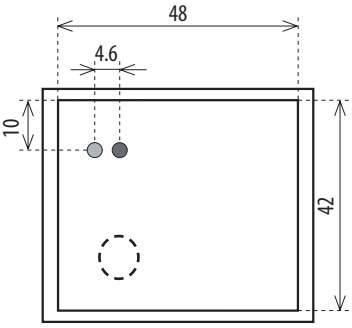
PANEL PDR-2/A, PDR-2/B



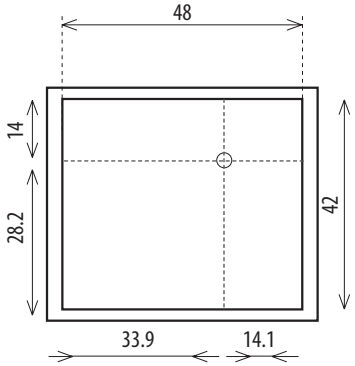
HRN-41, HRN-42, HRN-43,HRN-43N,
PRI-41, PRI-42, COS-1, HRH-1, TER-4



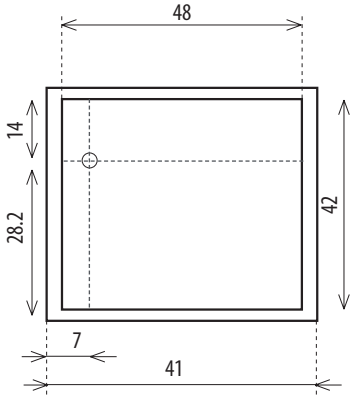
PANEL ZSR-30, PS-30-R, ZNP-10



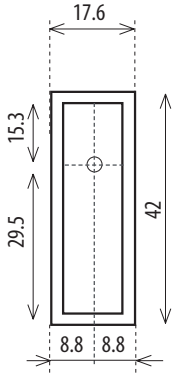
PS-100-12, PS-100-24



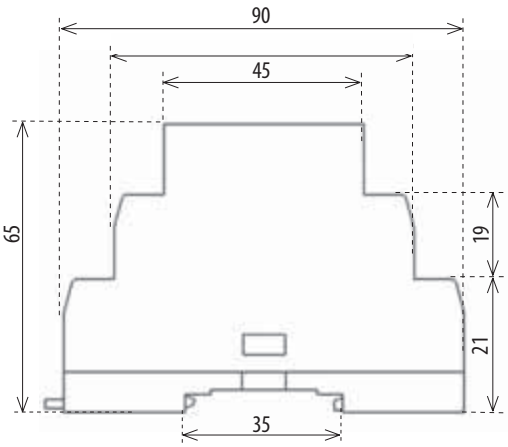
PS-30-12, PS-30-24

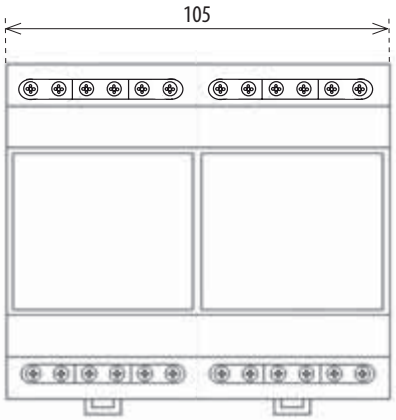


PS-10-12, PS-10-24

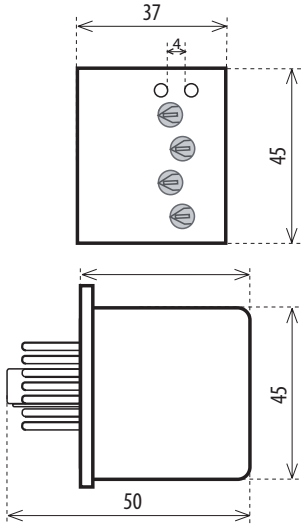


6-MODULE DESIGN



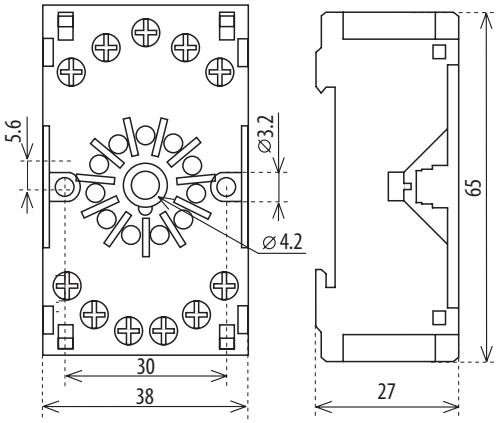


PRM-91H/11, PRM-91H/8 PRM-92H, PRM-2H



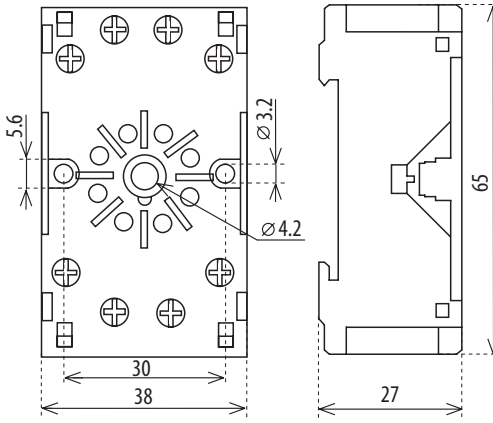
Socket for PRM-91H/ 11, PRM-92H, PRM-2H, 750

ES-11

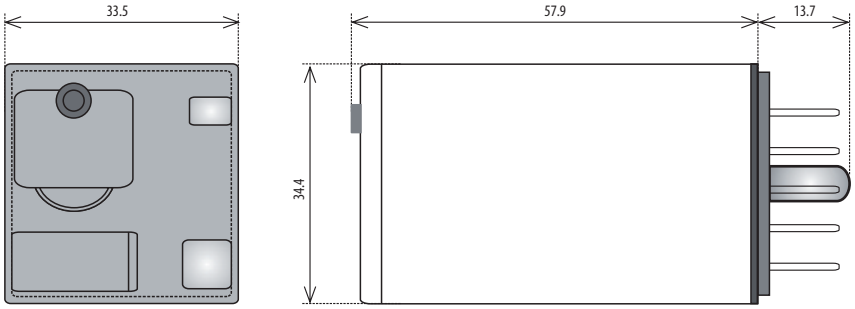


Socket for PRM-91/8

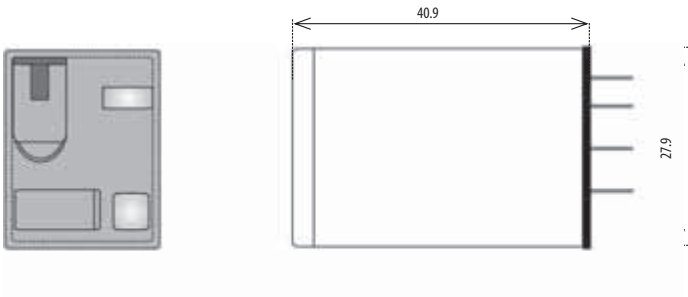
ES-8



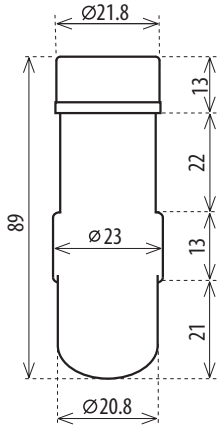
750



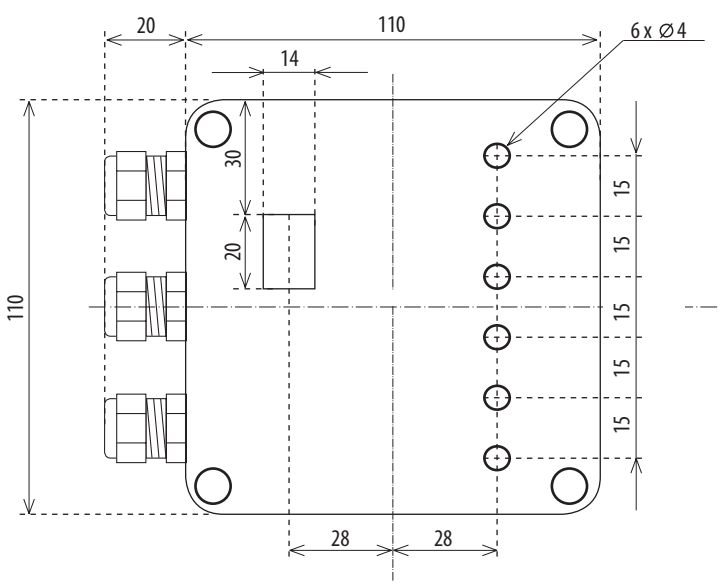
782

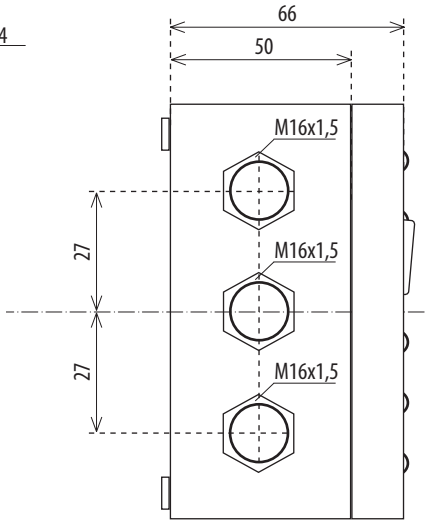


sensor for SOU-1, SOU-2

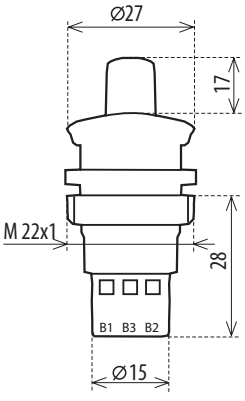


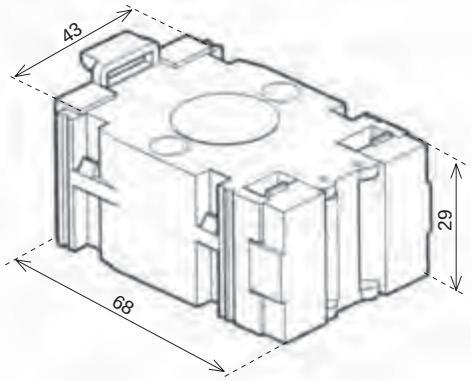
HRH-6



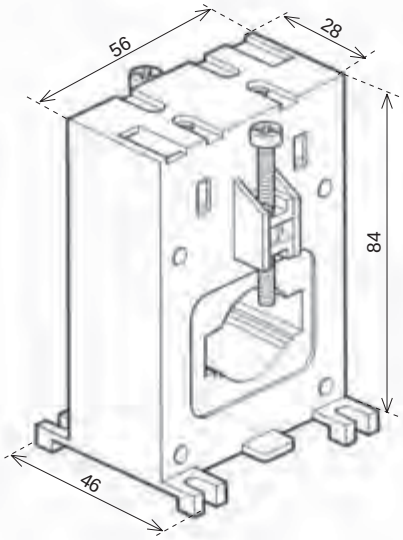


external potentiometr
for CRM-2HE, CRM-91HE

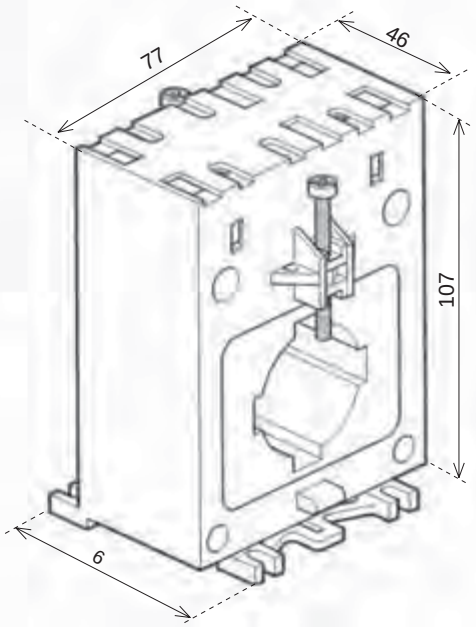




SR051; SR101; SR151

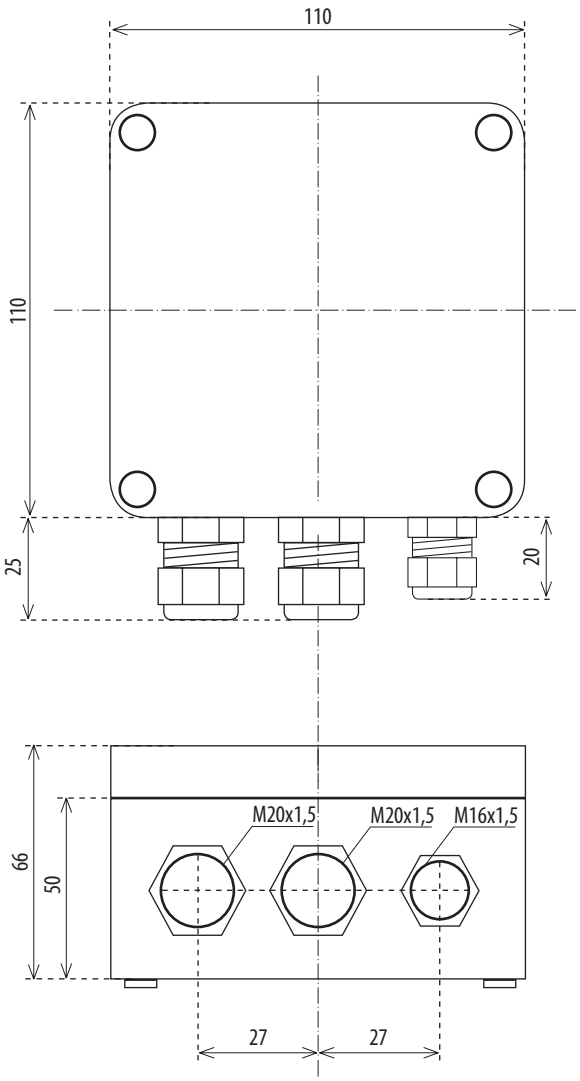


SR200; SR250

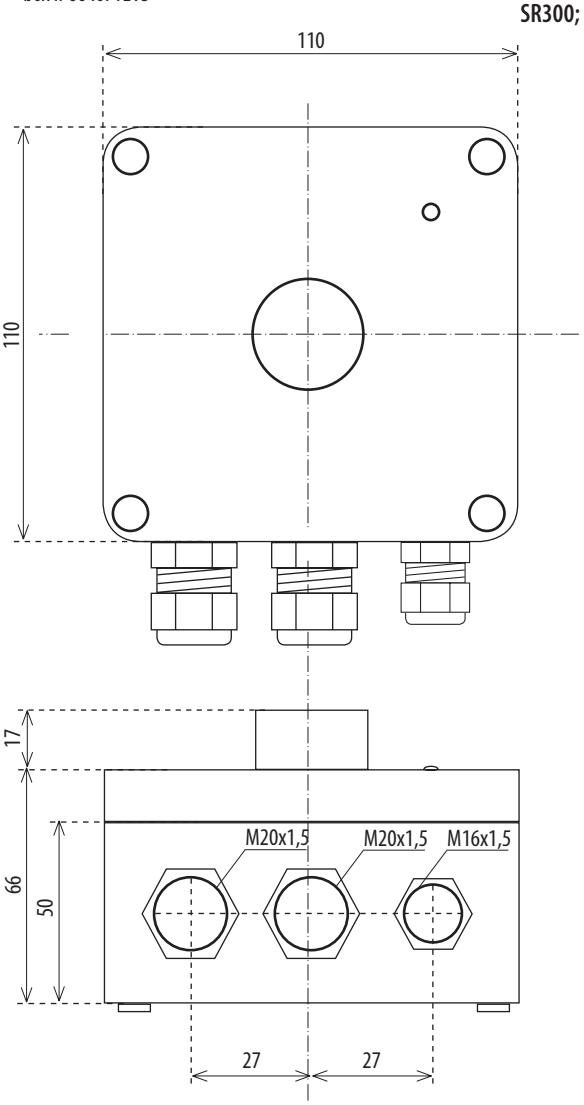


SR300; SR400; SR600

box IP66 for TEV1,2

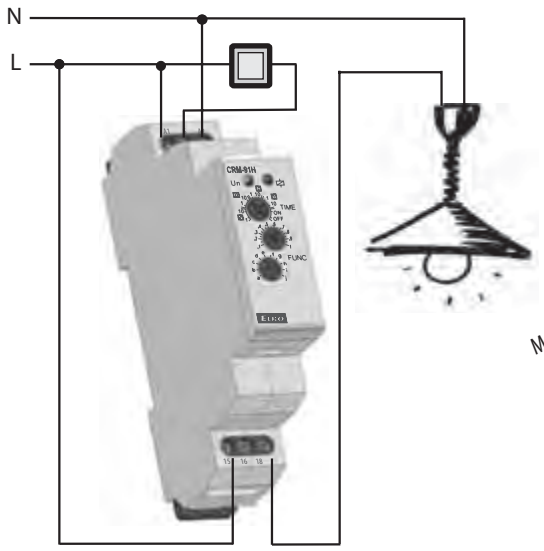


box IP66 for TEV3

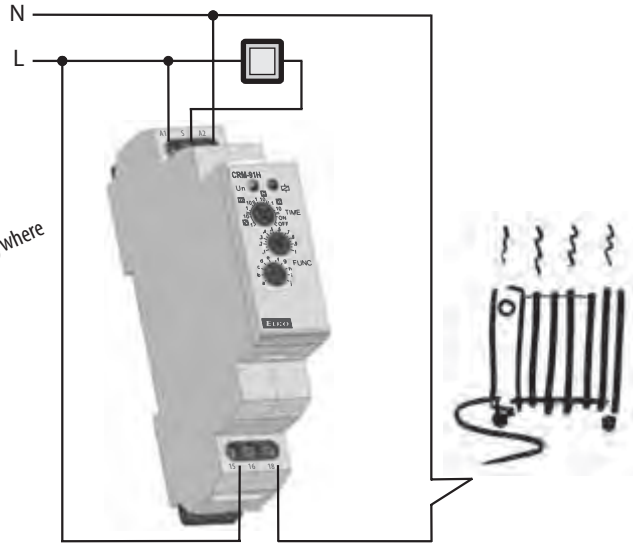


Multifunction time relay CRM-91H,CRM-93H

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

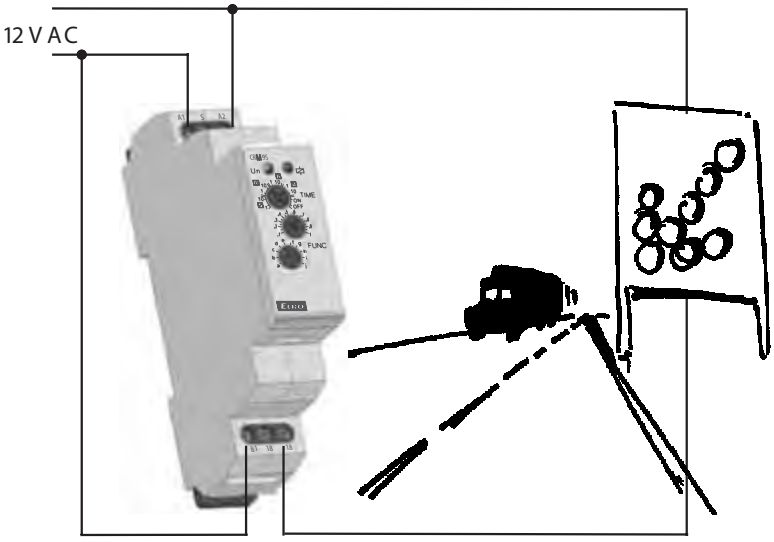


Multifunctionality always and everywhere



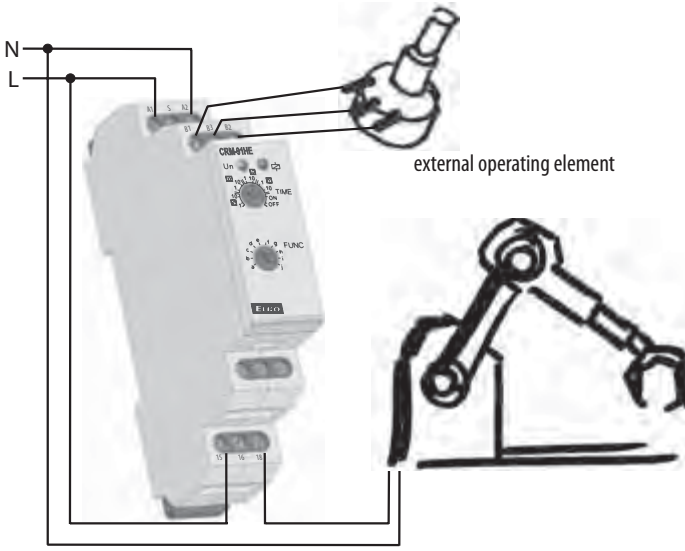
Multifunction time relay with contactless output CRM-9S

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



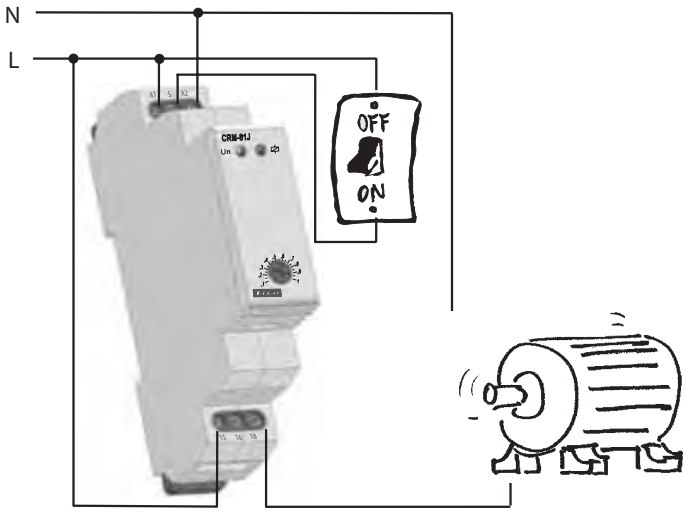
Multifunction time relay with external potentiometer CRM-91HE

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



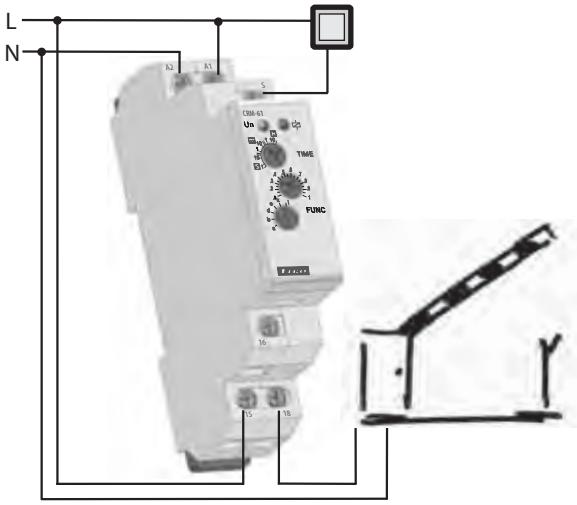
Singlefunction time relay CRM-81J

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

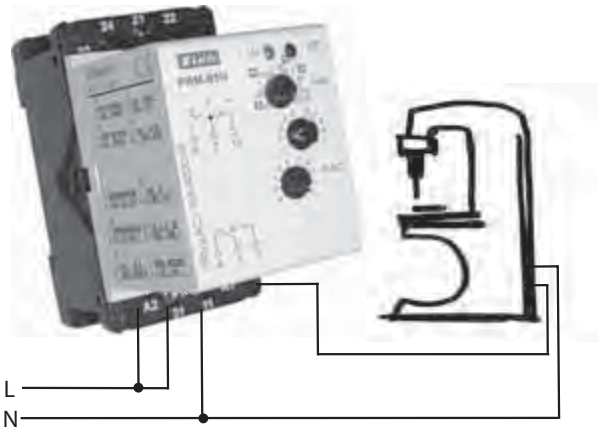


Multifunction time relay CRM-61

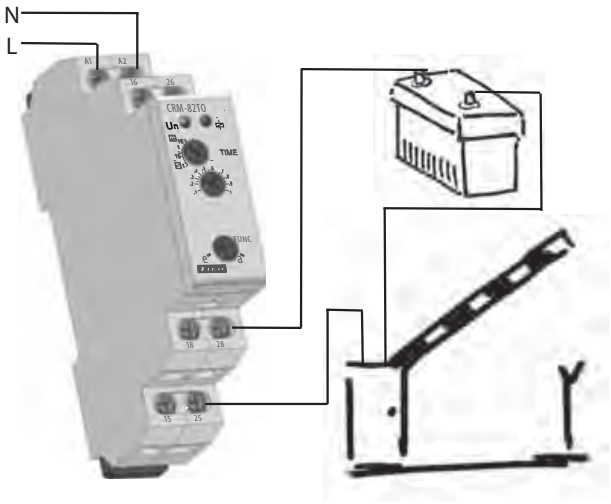
- for electronic appliances, light control, heating, motors, fans.....



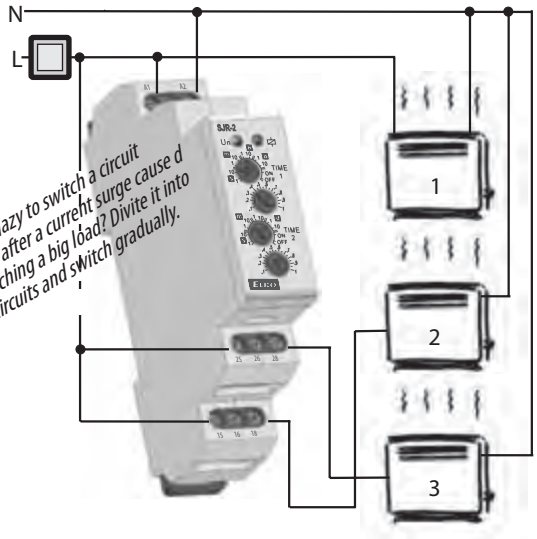
Time relay plug-in type PRM-91H, PRM-92H
- serves to control light signallization , heating, motor and fan control... etc.



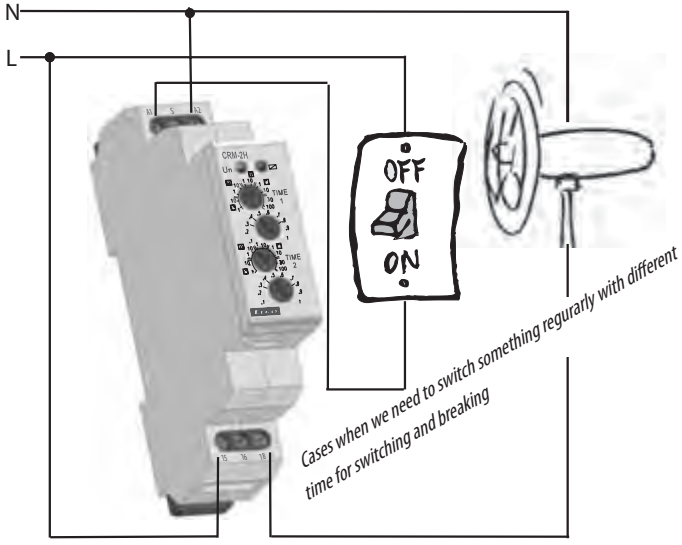
Delay OFF without supply voltage CRM-82TO
- delayed back-up switch off at current failure (emergency illumination, emergency respirator)



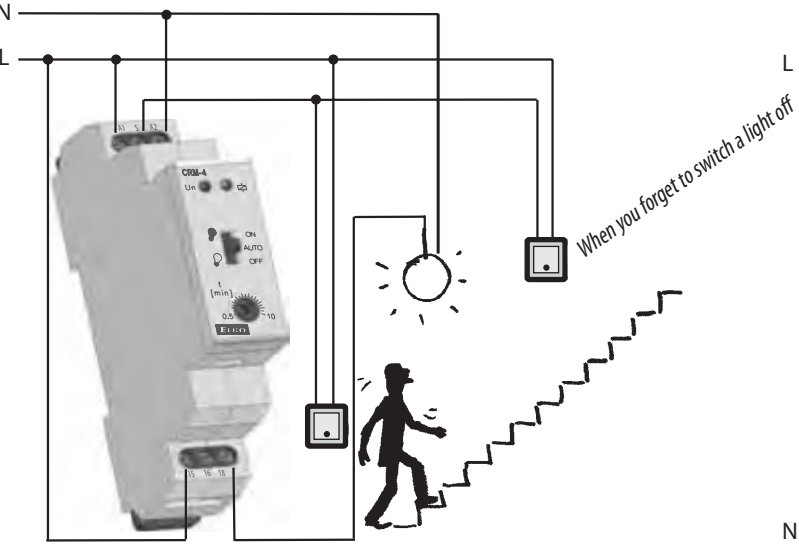
Doublestage delay unit SJR-2
- for sequential load switching, electric furnaces, heaters....



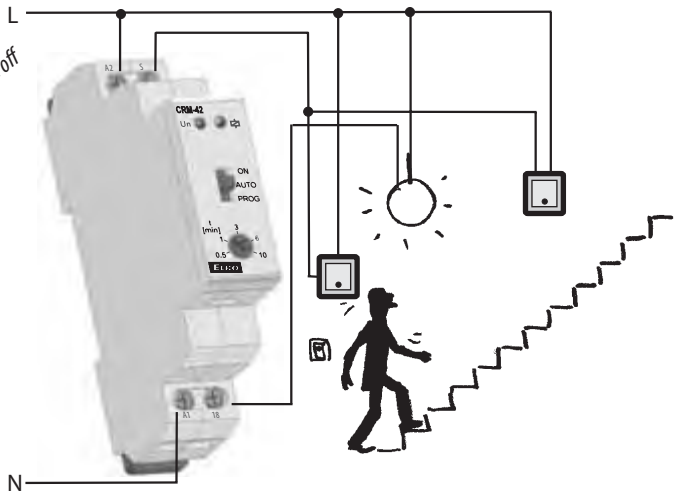
Asymmetric cycler CRM-2H
- regular rooms ventilation, cyclic humidity exhaustion, illumination controlling, circulation pump, flash, warning appliances, regular pump down, regular irrigation via electromagnetic valve



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

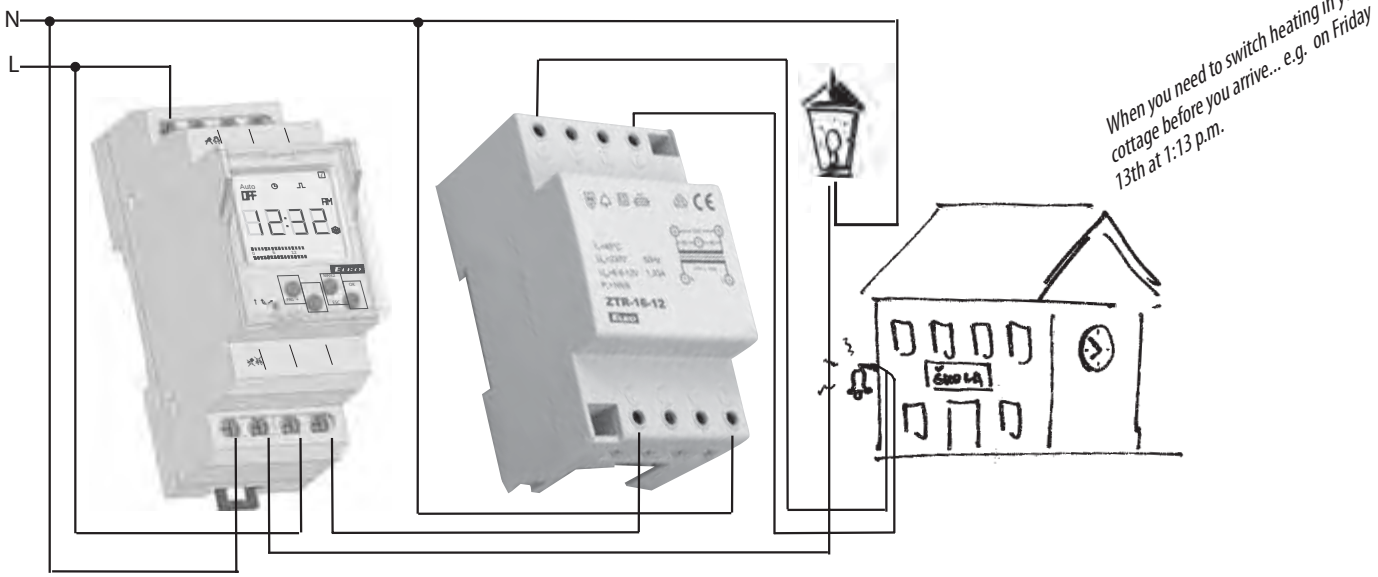


Progammable staircase automat with signalling before switch off CRM-42
- starcaise illumination operation
- on-comming switch off signalling (flash = comfort + safety together)



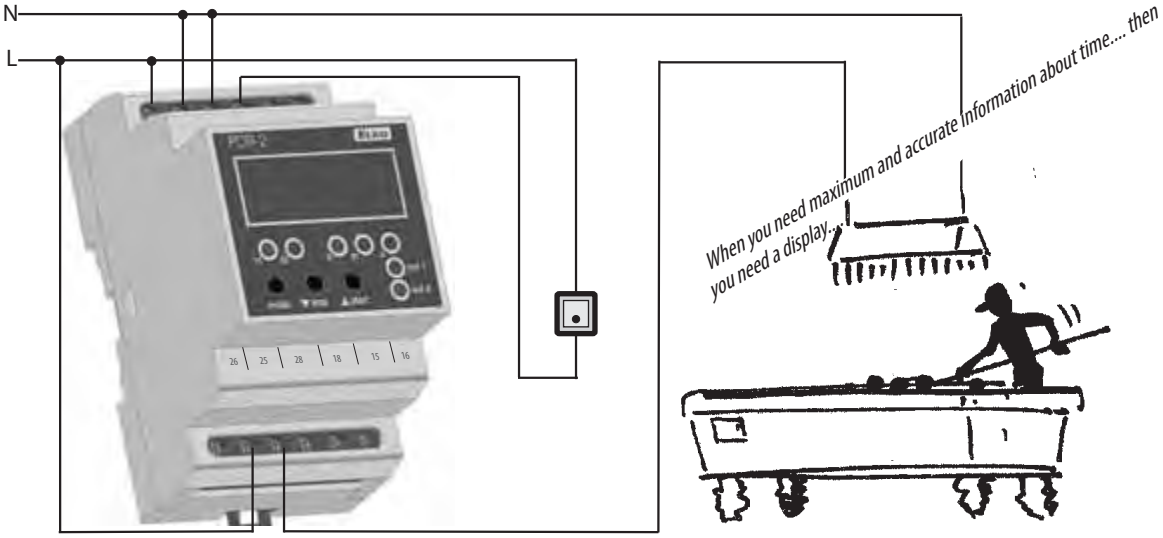
Digital time switch SHT-1/2

- 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 in school or in church...)



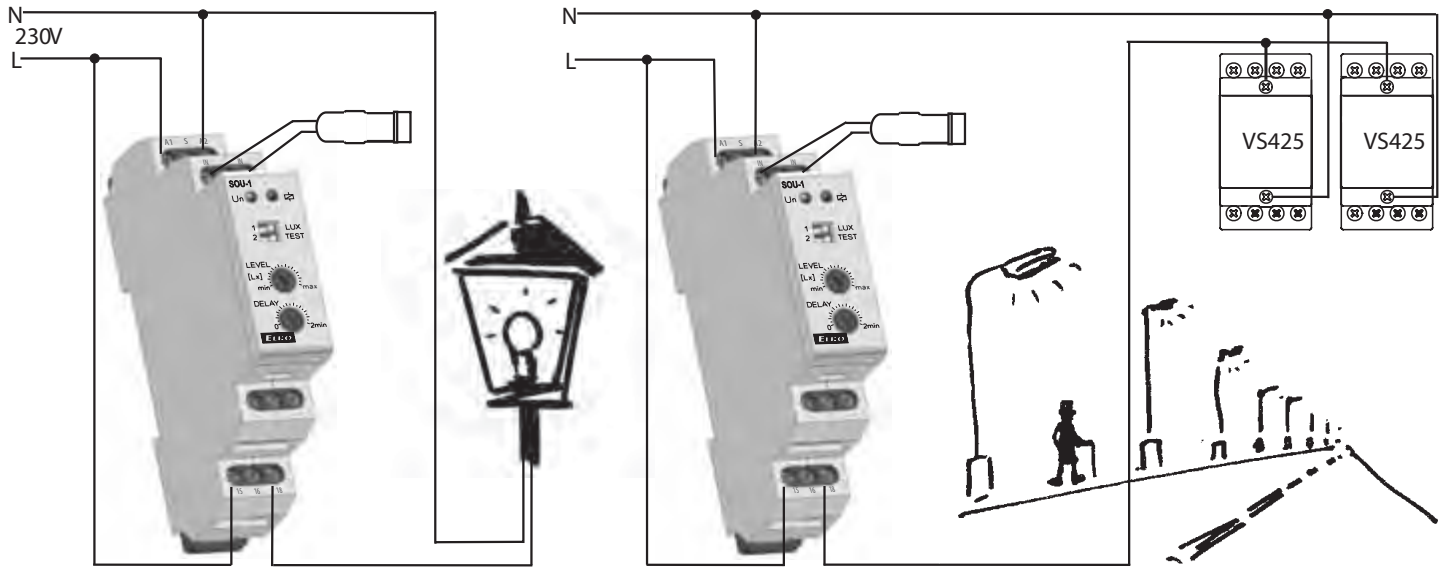
Programmable digital relay PDR-2

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



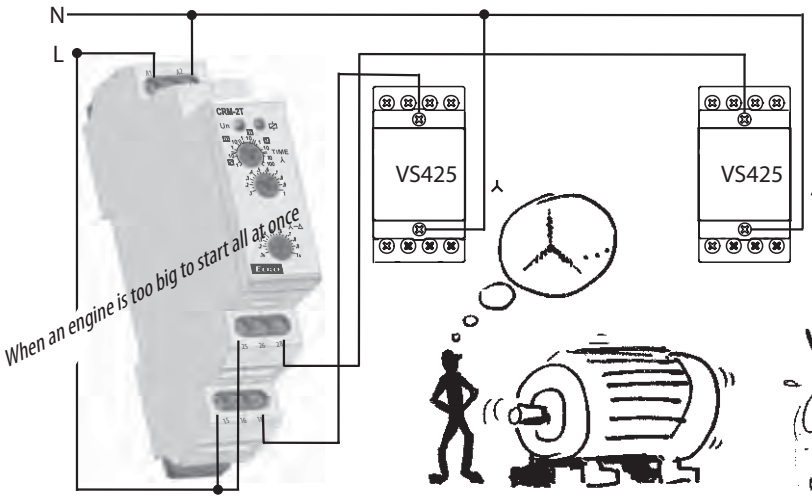
Twilight switch SOU-1

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



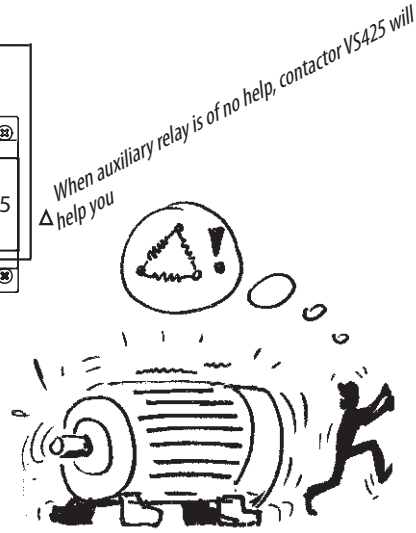
Delay on star/delta CRM-2T

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



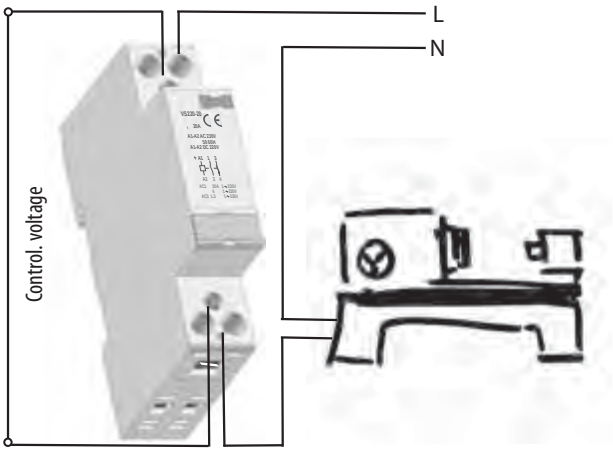
Mini contactor VS425

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



Modular contactor VS120, VS220, VS420, VS425

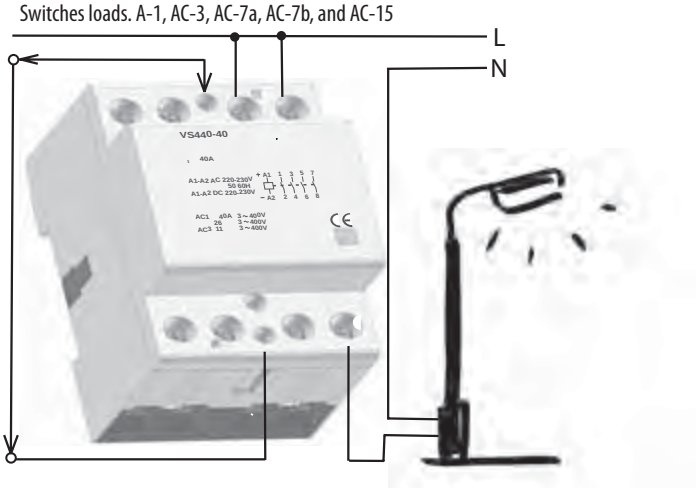
- to switch circuits for supply and control of heating, lights, air-conditioning and other el. devices. Switches loads AC-1, AC-3, AC-7a, AC-7b, AC-15



Modular contactors VS440, VS463

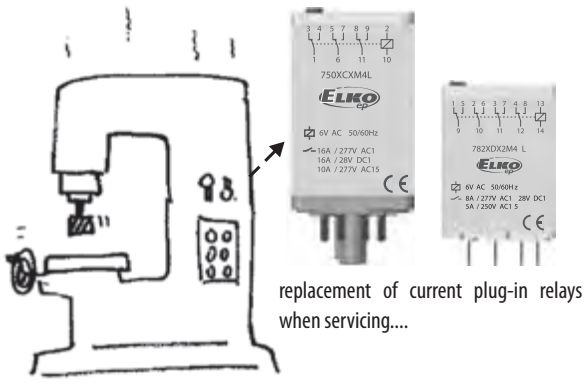
- to switch supply and control circuits for heating, air-conditioning and other el. devices, switching 3-phse motors

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



Auxiliary plug-in relays 750, 782

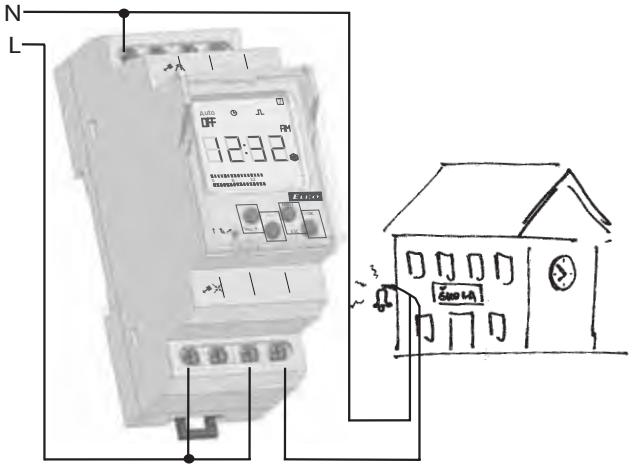
- to switch bigger output (load)



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

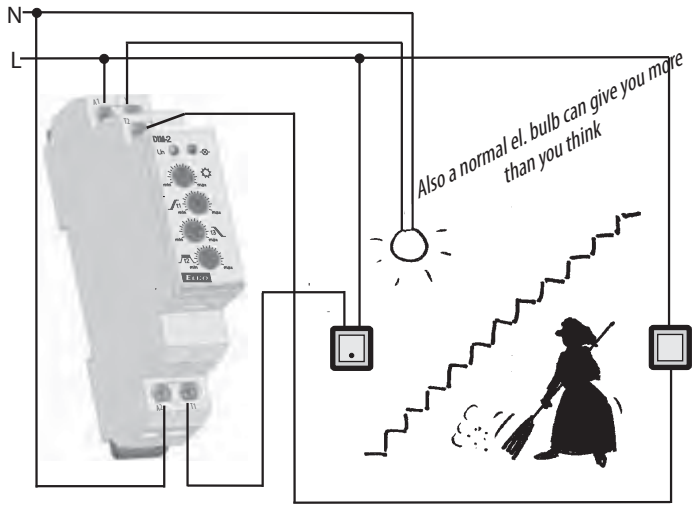
Digital time switch SHT-1, SHT-1/2

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



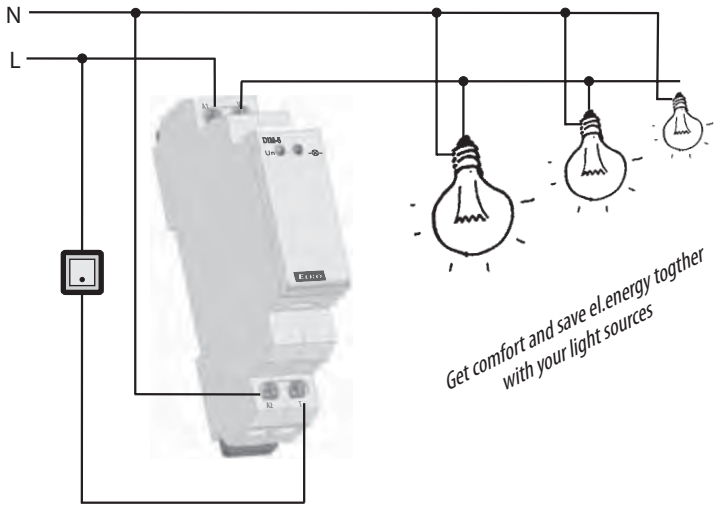
Staircase automat with dimming DIM-2

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



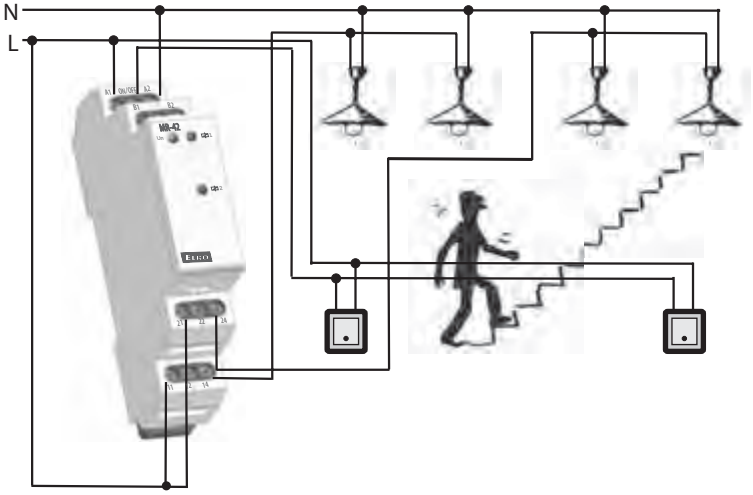
Controlled dimmer DIM-5

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



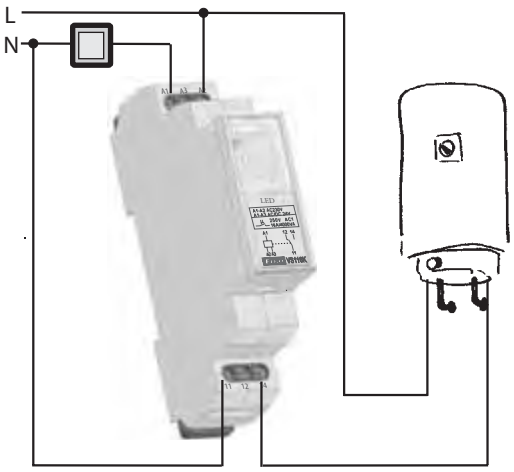
Memory relay MR-41, MR-42

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



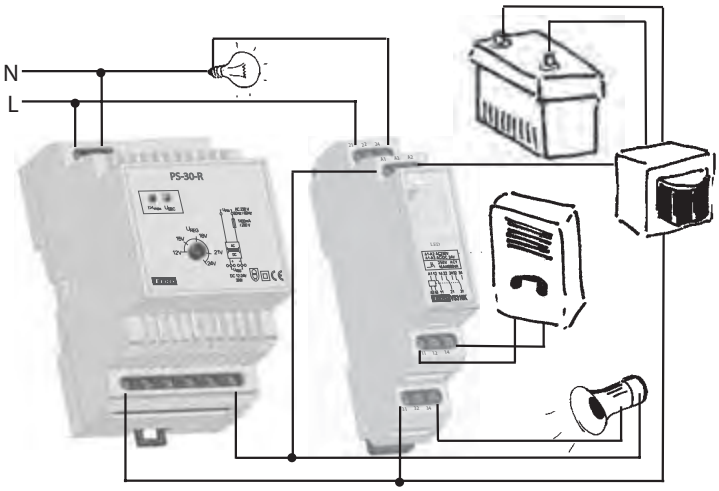
Power relays VS

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



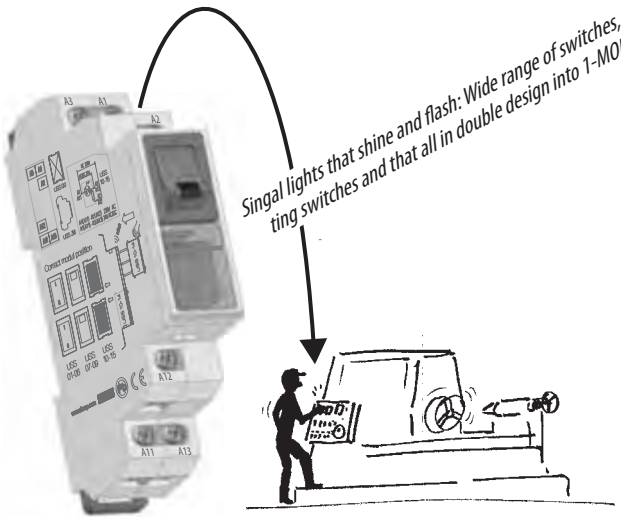
Switching power supply PS-R

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

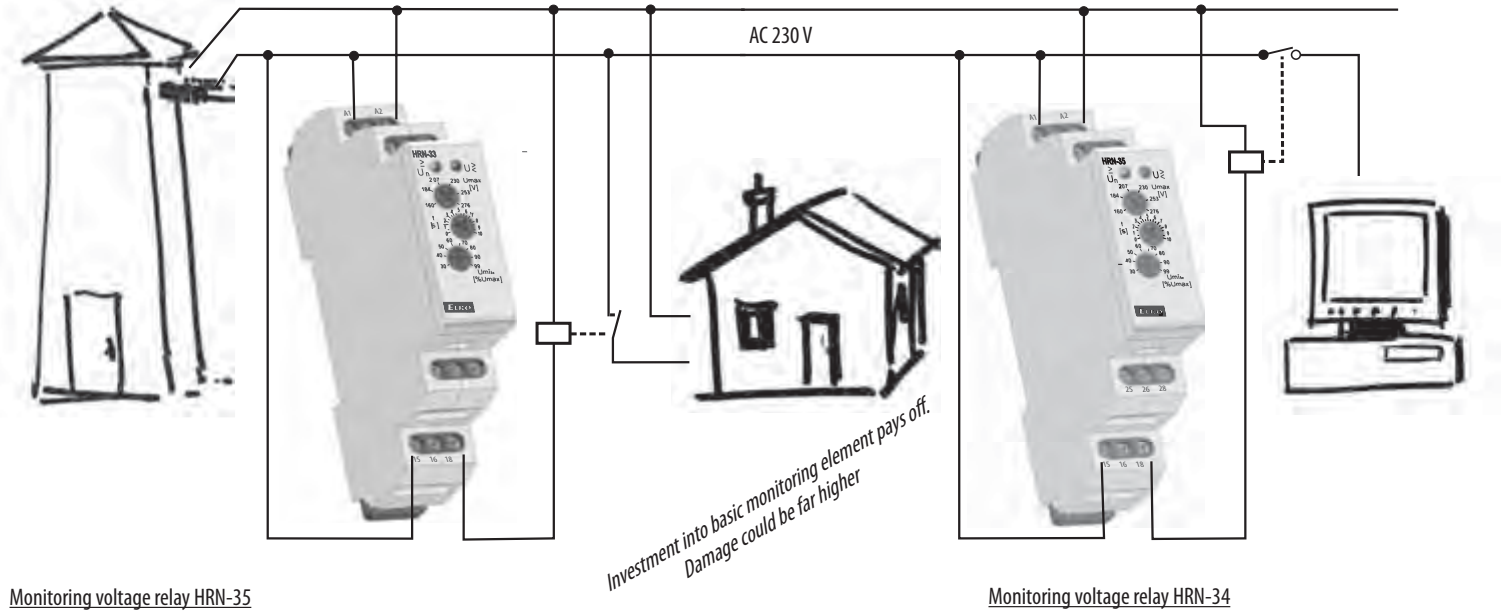


Controlling and signalling units USS

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

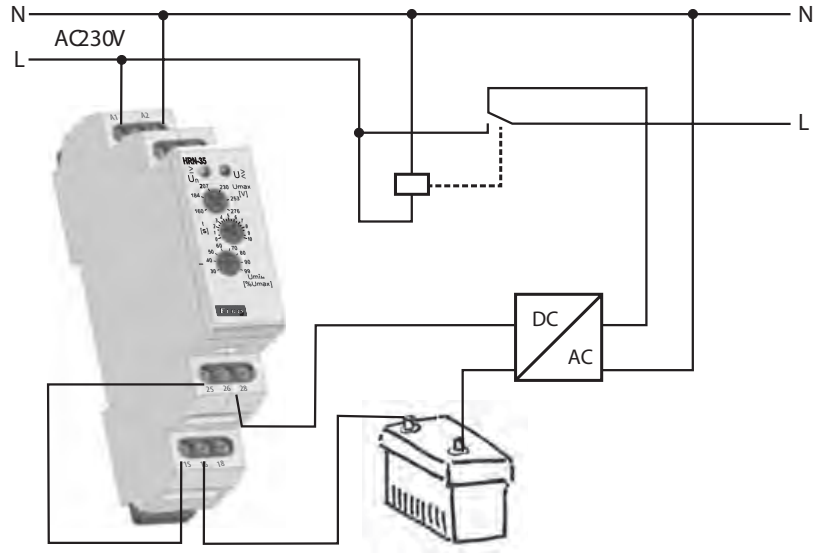


Monitoring voltage relay HRN-33 (35)
- monitoring of mains voltage for appliances inclinable to supply tolerance

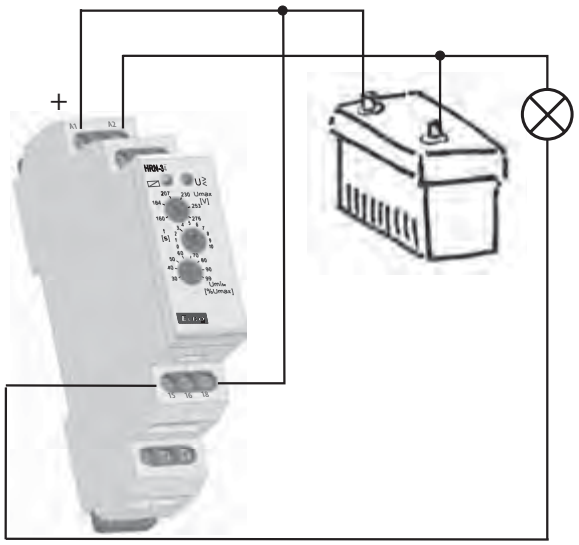


Monitoring voltage relay HRN-33 (35)
- protection of appliances against under-/overvoltage

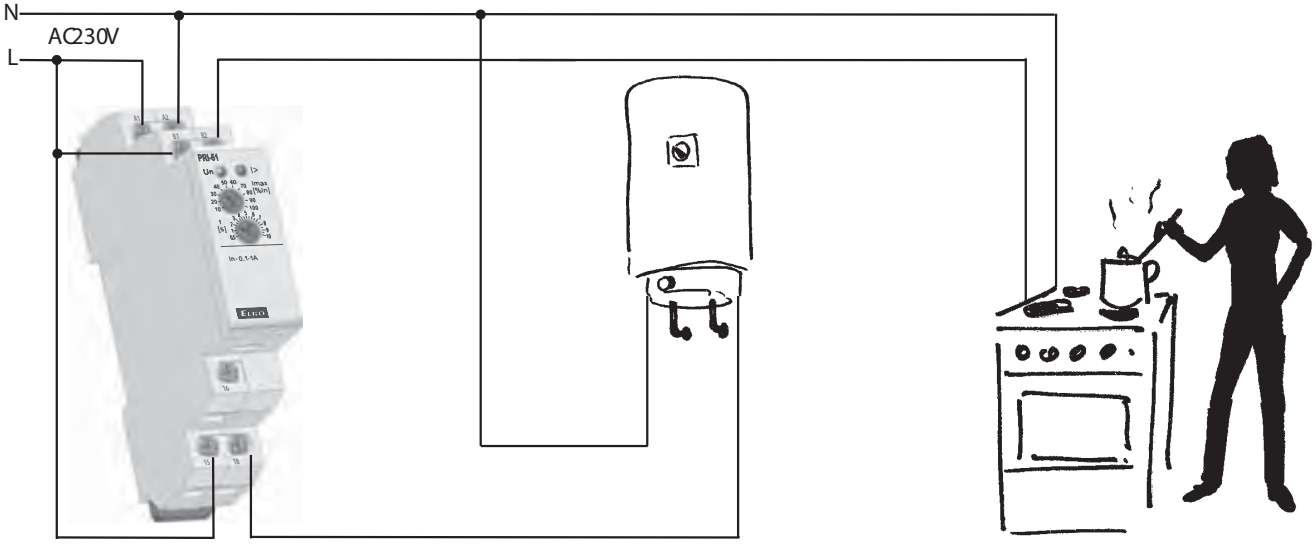
Monitoring voltage relay HRN-35
- start of back-up supply in case of failure



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

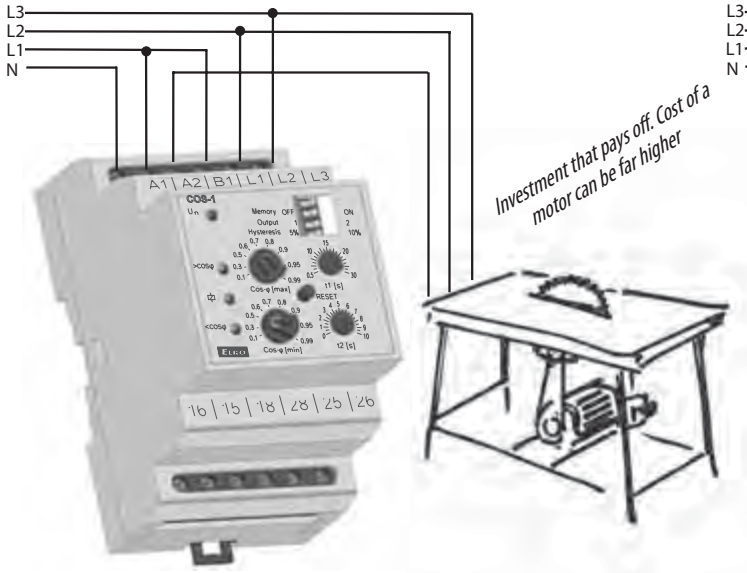


Monitoring current relay PRI-51, PRI-32
- current-limiting relay (on one branch two appliances, which never work together), controlling systems, motors, heating, current indication, controlling of 1-phase motor run down, during the installation of main housing switchboard could be controlled via eye,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

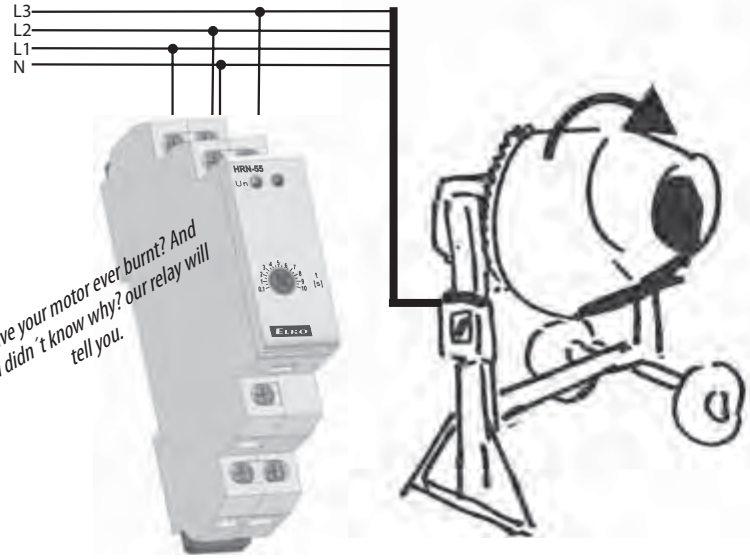


Monitoring voltage relay HRN-43

- control of voltage from generator, water el. plants, 3-phase control int he main
- monitors and protects main´s quality

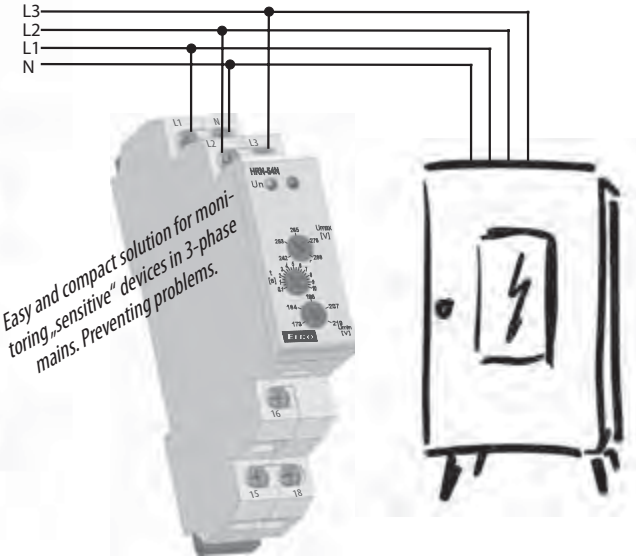
Relay monitoring sequence and failure of phases HRN-55, HRN-55N

- monitoring of proper motor rotation, electric drive, etc.



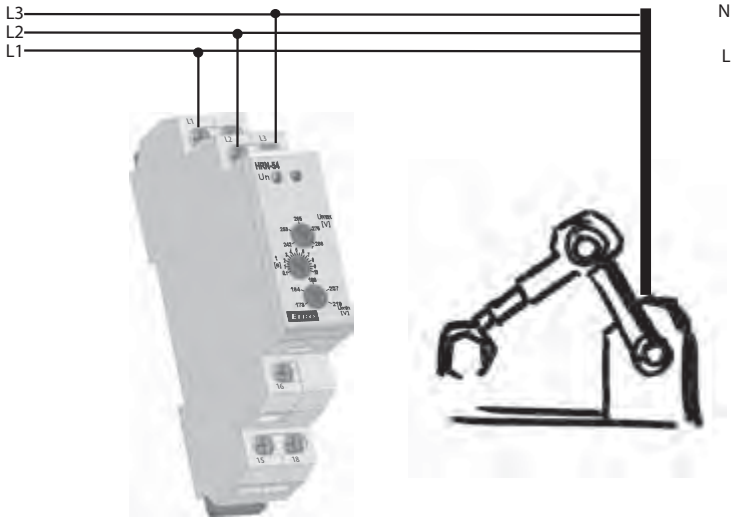
Relay monitoring over-/undervoltage in 3-phase mains HRN-54N

- monitoring voltage in switchboard, protection of appliances



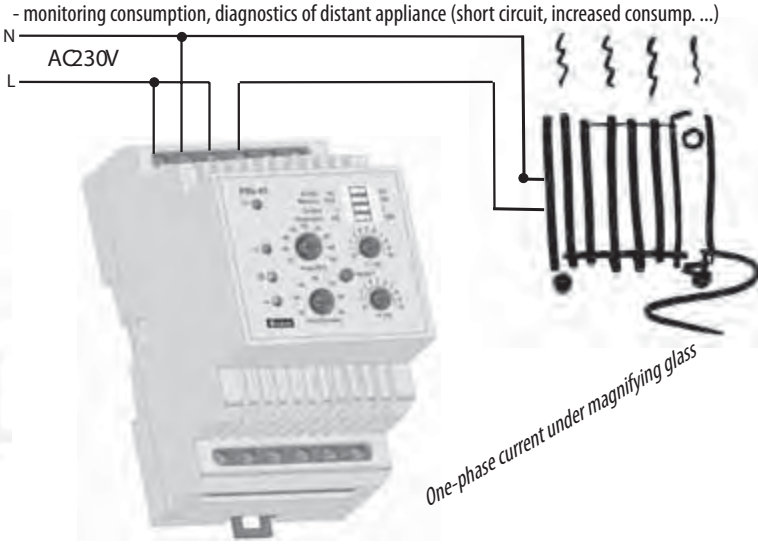
Monitoring voltage relay for under/vervoltage for 3-phase mains HRN-54

- confortable monitoring of 3-phase mains

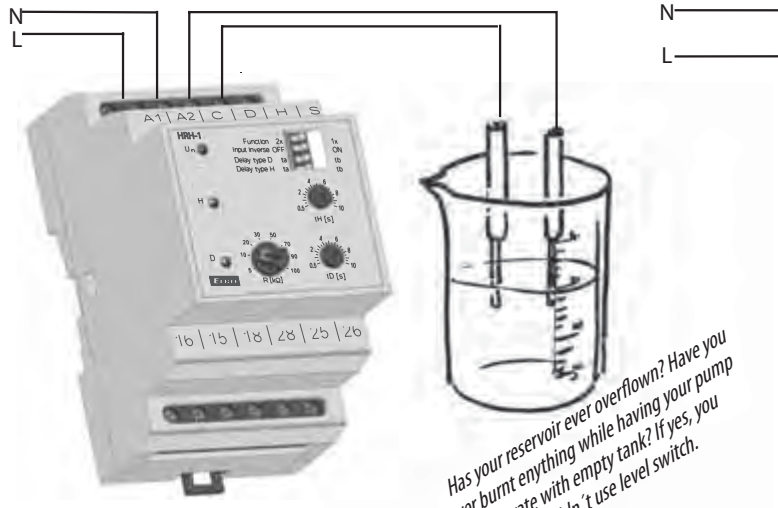


Monitoring current relay PRI-41 (PRI-42)

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

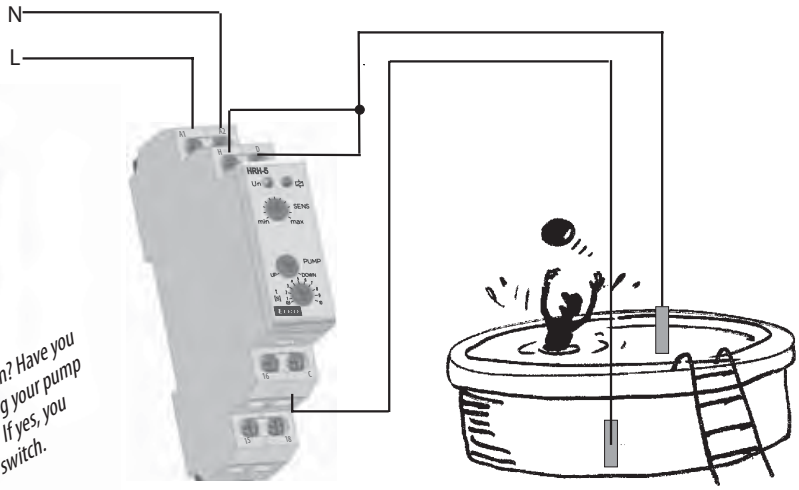


Level switch HRH-1
- monitoring level in wells, tanks, pools, etc.

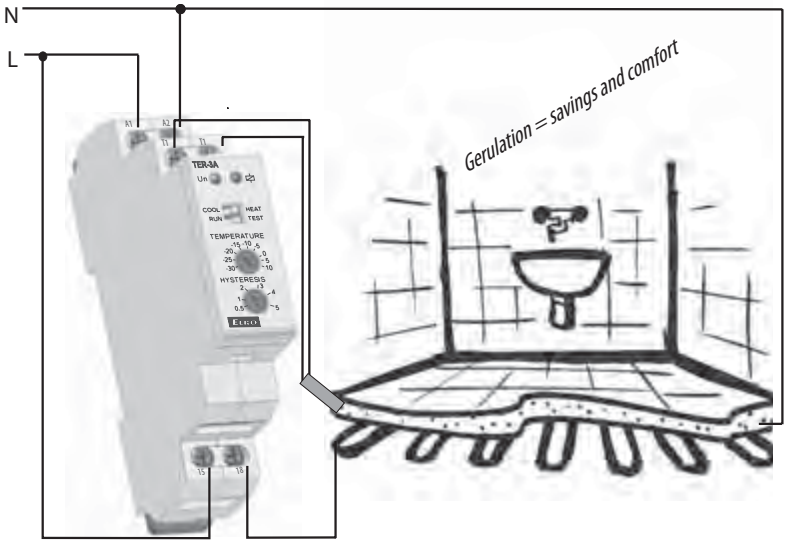


Has your reservoir ever overflown? Have you ever burnt enything while having your pump to operate with empty tank? If yes, you probaly didn´t use level switch.

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



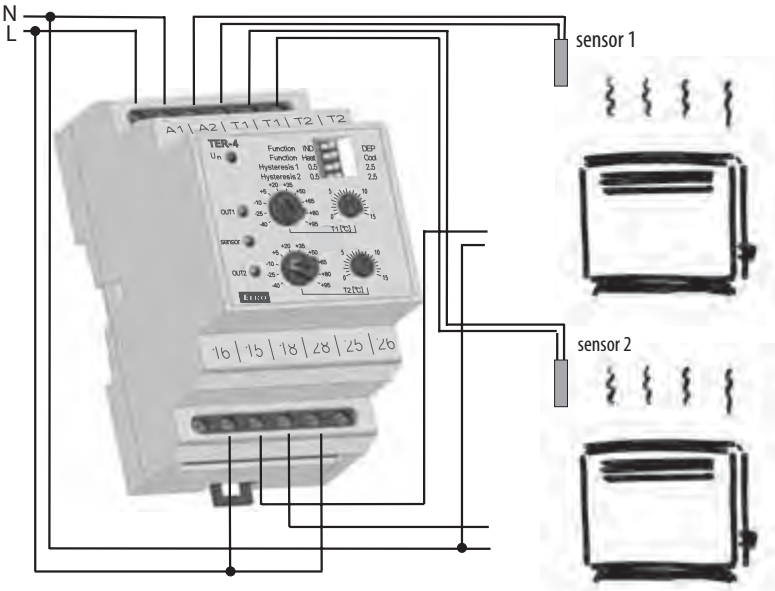
Thermostat TER-3 with external sensor
- control of temperature of floor heating



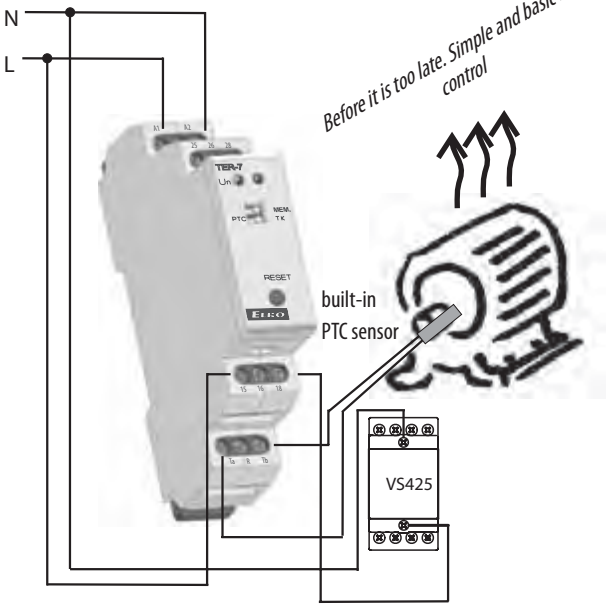
Gerulation = savings and comfort

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

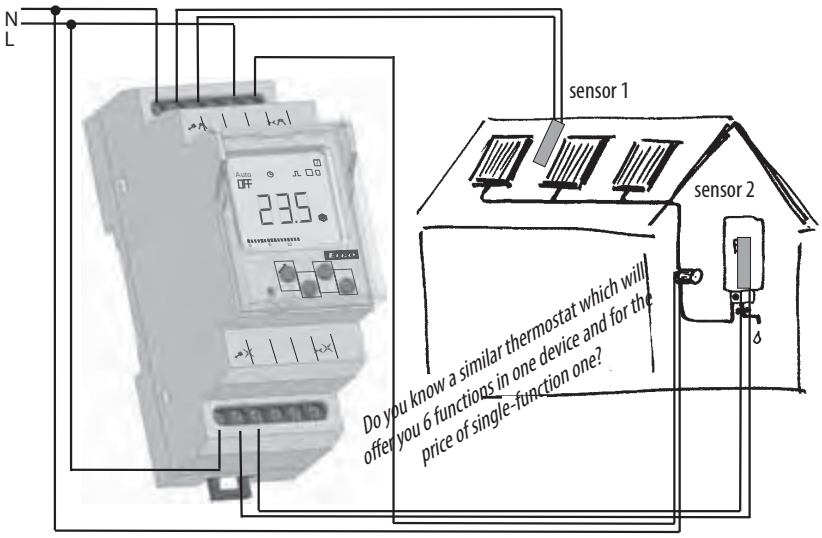


Thermostat for thermal protection of motors TER-7
- protection of motors against thermal overload



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?

Products in house coming from us!

relay

TER-9
Regulating of temperature depending on 2 temp.

SMR-B
Delayed control of lights

SMR-U
Twilight point button lights

SOU-3
Twilight and light switch - serves as control of the device on the basis of ambient light intensity (blinding – shutters)

CRM-91
Multifunction relays with 10 most commonly used functions

HRN-33
Overvoltage protection of high-tech equipments

PS-30-12
Power supply of alarm system

COS-1
For monitoring overload/unloading of motors

TEV-1
Two-level thermostat -20..+20°C used as protection against freezing (gutters, pavements, drives, pipes, etc.)

SMR-T
After you switch OFF the light, the ventilator switches OFF with delay

DIM-15
Dimmer for LED bulbs and dimmable fluorescent lamps

HRH-5
Level switch - pumping water from the tank.

SHT-1
Used to control various appliances in real time; with daily, weekly, monthly, and yearly settings

VSM -220
Installation contactors with manual control

HRH-4
Set of level switch HRH-5 and a contactor VS425

CRM-2H
Ensure water circulation at regular intervals: 1x 1 h. for 5 min.

MR-42
Memory relay - memory (impulse) switches, controlled by buttons for light switching from multiplelocations

DIM-2
Slowly dims down when you sleep

CMR-4
Staircase switch for automatic switching of door-light and anti-lock buttons.

USS
Controlling and signalling modules - "Do It Yourself"

TER-3A
Monitoring temperature for defreezing of foot-path

ZTR-15-12
Power supply for door-phone

TEV-4
Thermostat for monitoring and regulation of temperature in demanding enviroments (IP65)

SOU-2
Serves for control of lights on the basis of ambient light intensity and real time - blocking function of a twilight switch in case lights are not economical to be on (night hours, weekends, etc.).

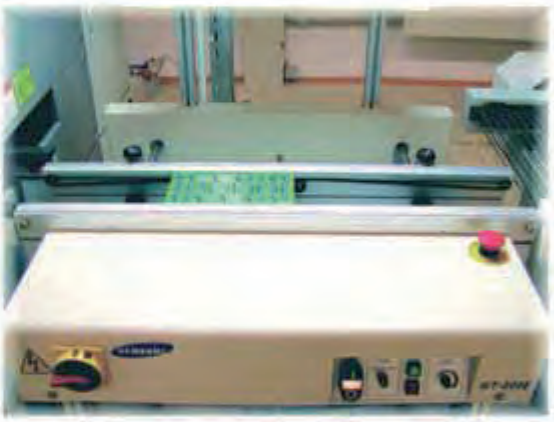
Production technology

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.

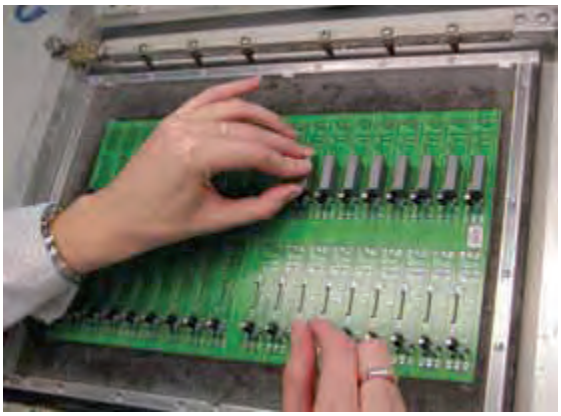
3)
SMD components are mounted by pick-up machines. Three heads with laser alignment can place up to 15,000 components an hour. This machine replaces approximately 100 workers.



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.



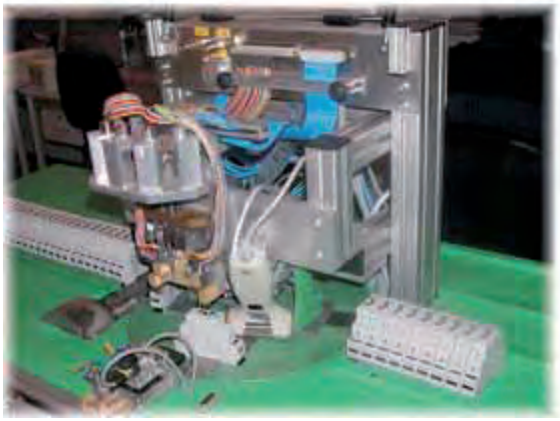
7)
After the classic components are manually mounted by experienced workers.

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 final assembling into enclosures is executed. The actual state of completion is monitored by bar codes during the whole production process.



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.

Support of project design

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

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

Project programs

ecscad

ELCAD

ePLAN electric P8

PCschematic

CADdy++ elektrotechnika

CADELEC

TECHNOMAT SPAC START

Award programs

VeroX

Obis

OCEP SELPO Broumy

DTB ELKO EP XLS

ELKO ep XLS

MARKS AND SYMBOLS DWG

DWG

Autodesk

TRAINING
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INFOLINE
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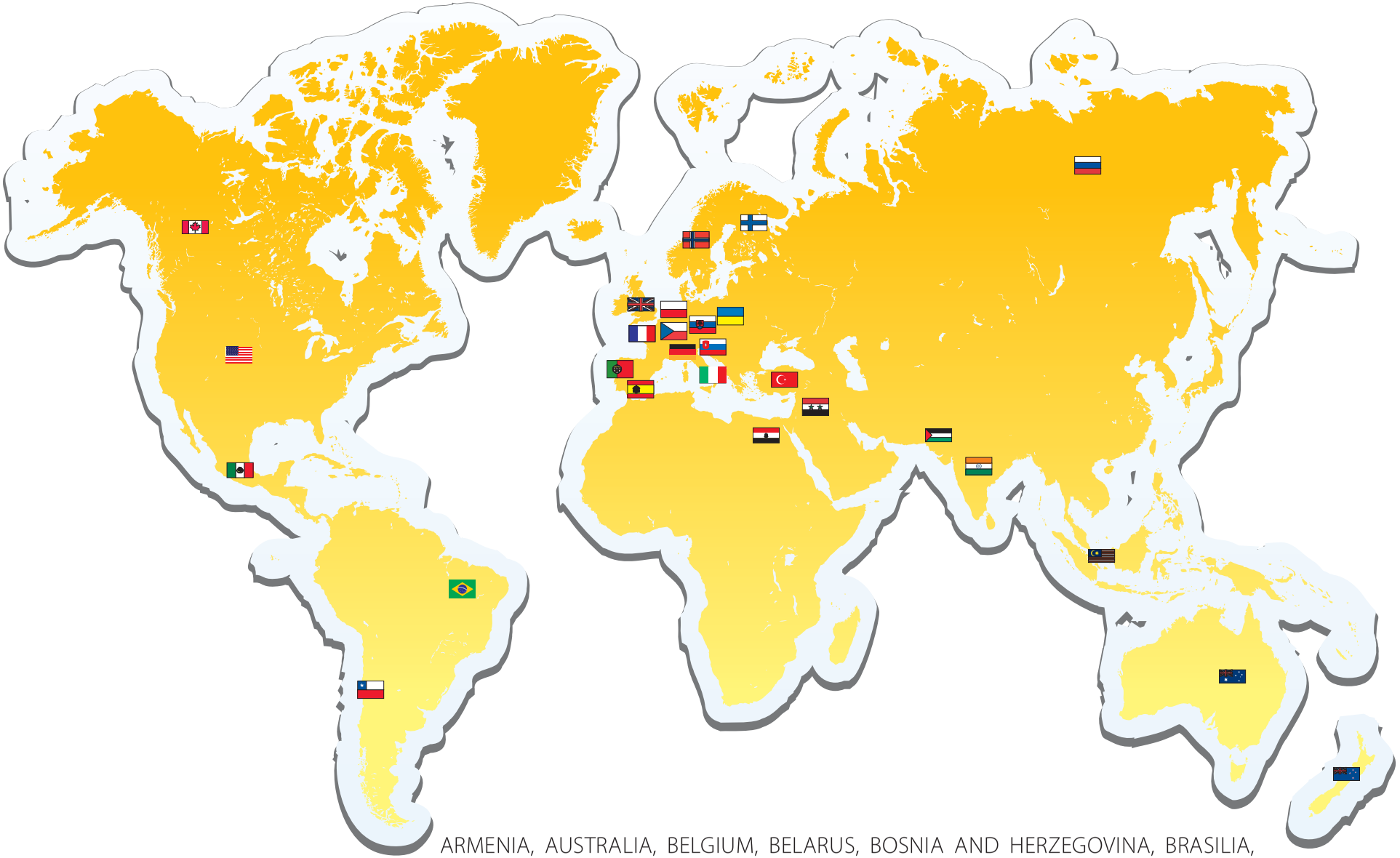

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