Pictograms of the table head

U_m Nominal control voltage	U_{ON} Turn ON voltage	U_{OFF} Turn OFF voltage	ΔU Voltage drop
U_{IN} Control voltage	U_{OUT} Load voltage	U_h Hysteresis voltage	I_e Nominal operational current
I_c Leakage current or continuous operation current	t_{resp} Response time	Adjusting time	Sensitivity
U_{up} Upper voltage protection level	I_{up} Upper current protection level	U_{down} Lower voltage protection level	I_{down} Lower current protection level
L1 L2 L3 Phase sequence control	A (L1,L2,L3) Adjustable range (asymmetry)	VDC VAC A Electric data of contacts	Display (number of digits) ×digit
Relay bases	×P Number of poles	m Weight	

Pictograms of the technical data

Utest 1min 1,5 kV Test voltage	Ui 400 V Rated insulation voltage	I_e (AC 1, 230 V) 10 A Nominal operational current	Pm 4 VA AC Self consumption
TEST "TEST" button	0 10 ha % Accuracy class	Electrical life ×10⁵	Mechanical life ×10⁶
Cam switch	DIP Dip-switch	0014 analog Meter with analog display	LCD Meter with LCD display
R max. 50 mΩ Resistance	R_OFF PTC 1600-2000 Ω Switch-off resistance (PTC):	R_ON PTC 1000-1400 Ω Switch-on resistance (PTC):	AUX 2×CO Auxiliary contacts
[mm²] 1-2,5 Connectable cable	To -20..+80°C Operation temperature	Ta -5..+40 °C Ambient temperature	IP 20 Protection degree
35×7.5 Can be install on mounting rail			
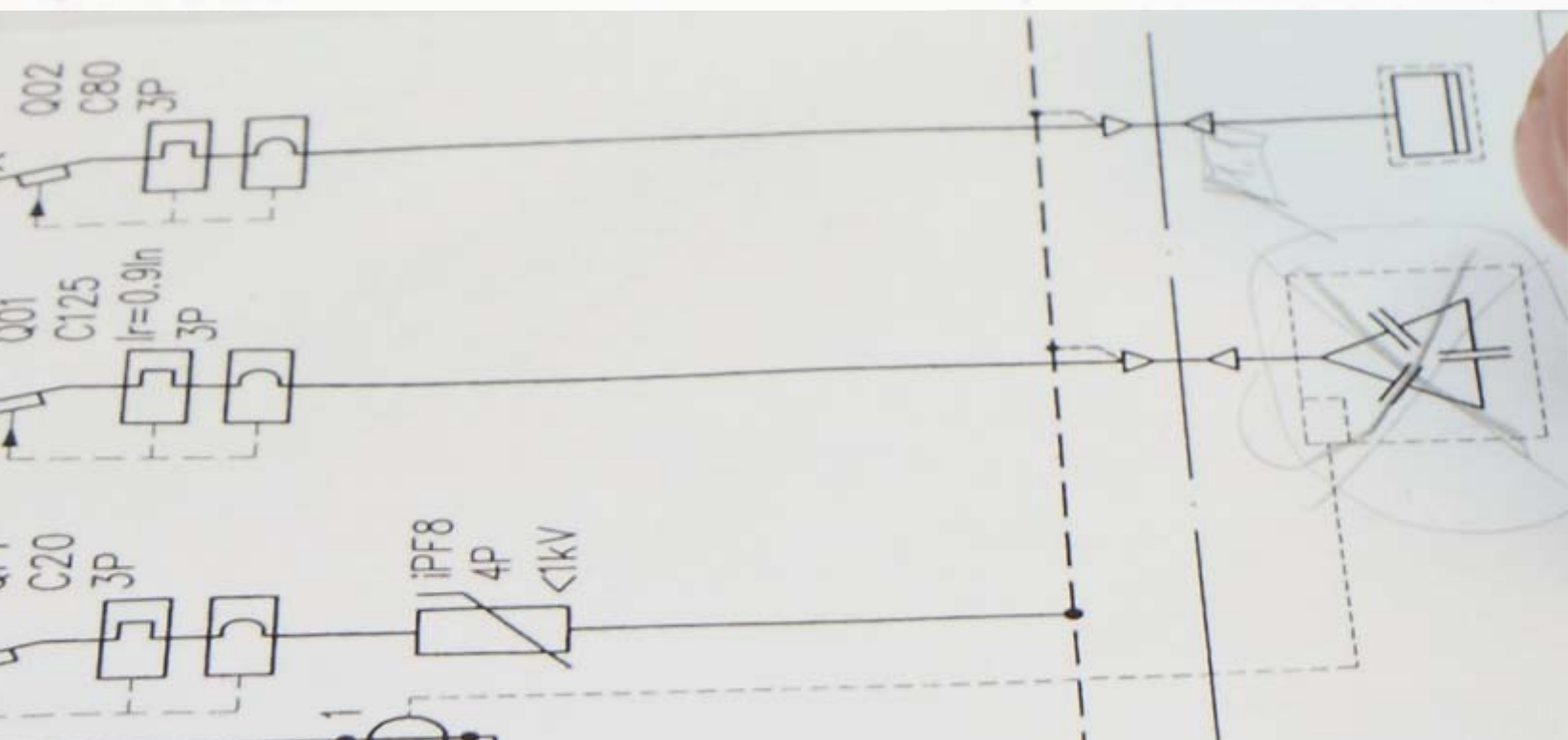
Industrial automation relays **2**	Miniature relays **3**	Industrial power relays **4**	Power relays **5**	Miniature power relays **6**
Print relays **7**	Relay bases **8**	One function (ON delay) time relay **10**	One function (OFF delay) time relay **10**	Delay OFF time relay with supply voltage **11**
Star-delta time relay **11**	Multifunction time relay (10 functions relay) **12**	Staircase time switch **13**	Time relays **14**	Digital time relay and flasher **15**
Selectable time relay **15**	Modular time relays **16**	Star-delta time relay **17**	Flasher relays **18**	Auto reclose under- and overvoltage relay **19**
Voltage relay for three phases **20**	Voltage relay for three phase with adjustable asymmetry and overheat protection **21**	Voltage protection relay for three phase neutral-less lines **22**	Under voltage protection relay for one phase lines **22**	Compact voltage protection relay with delay adjustment **23**
Adjustable over/ under voltage protection relays for three phase lines **24**	Adjustable over/ under current protection relay **25**			
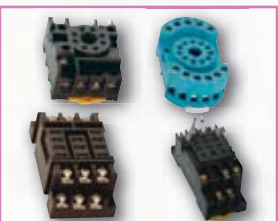
J

Industrial automation relays

| I_e (AC 1, 230 V) 3 A | P_m 2,5 VA AC | P_m 1,5 W DC | Utest 1min 1,5 kV | U_i 400 V | R max. 50 mΩ | ×10⁷ | ×10⁵ | TEST | Ta -40..+55°C | ? Pictograms | J/0 |

With two changeover contacts (2 × CO)

TRACON	U_m	VDC VAC A	m	
RM08-240AC	AC 230 V			
RM08-110AC	AC 110 V			
RM08-48AC	AC 48 V			
RM08-24AC	AC 24 V	3 A		
RM08-12AC	AC 12 V	230 V AC	75 g	RS90.22
RM08-110DC	DC 110 V	28 V DC		
RM08-48DC	DC 48 V			
RM08-24DC	DC 24 V			
RM08-12DC	DC 12 V			
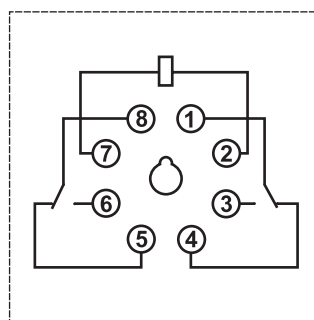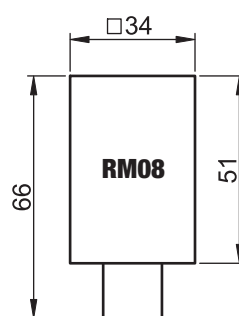
With three changeover contacts (3 × CO)

TRACON	U_m	VDC VAC A	m	
RM11-220AC	AC 230 V			
RM11-110AC	AC 110 V			
RM11-48AC	AC 48 V			
RM11-24AC	AC 24 V	3 A		
RM11-12AC	AC 12 V	230 V AC	75 g	PF11-3A RS90.23
RM11-110DC	DC 110 V	28 V DC		
RM11-48DC	DC 48 V			
RM11-24DC	DC 24 V			
RM11-12DC	DC 12 V			

□34

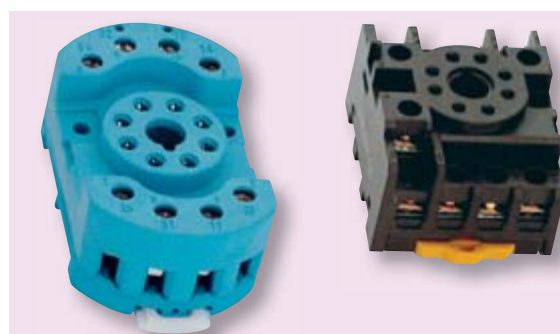66 RM08 51

RM08

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□34

66 RM11 51
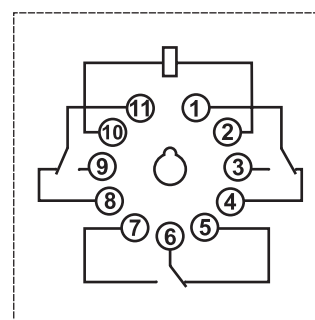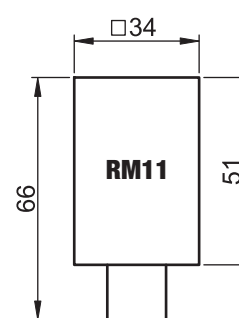
RM11

These plug-in relays are protected by a transparent, dustproof cover. The relays are provided with 2 or 3 switchover contacts and 8- or 11-leg plug contacts. A "TEST" button is also provided for checking the proper operation of the circuits to be switched by the contacts.

RM11

RM08

J/8

Our range of products is continuously and quickly expanding. Our catalogue shows our products as of October 2017. Check our website to stay up-to-date.

Miniature relays

| I_e (AC 1, 230 V) **3 A** | P_m **1,2 VA AC** | P_m **0,9 W DC** | **Utest 1min 1,5 kV** | ⚡U_i **250 V** | R **max. 50 mΩ** | ×10^7 | ⚡×10^5 | **TEST** | **Ta -40..+55°C** | ❓ Pictograms | **J/0** |

With two changeover contacts (2 × CO)
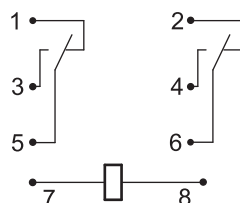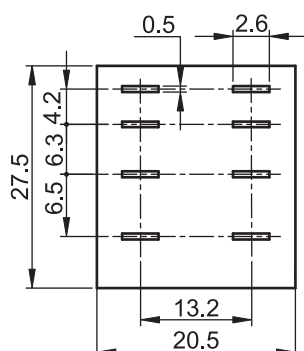
TRACON	U_m	VDC VAC A	m	
RM09-240AC	AC 230 V			
RM09-110AC	AC 110 V			
RM09-48AC	AC 48 V			
RM09-24AC	AC 24 V			
RM09-12AC	AC 12 V	3 A 230 V AC 28 V DC	35 g	**RSPYF-08A**
RM09-110DC	DC 110 V			
RM09-48DC	DC 48 V			
RM09-24DC	DC 24 V			
RM09-12DC	DC 12 V			

With three changeover contacts (3 × CO)
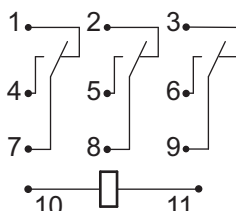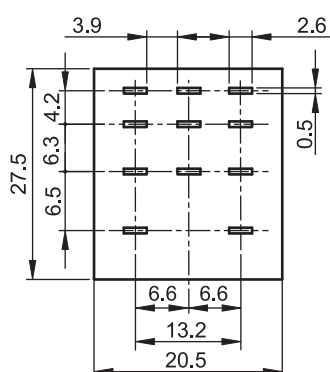
TRACON	U_m	VDC VAC A	m	
RM12-240AC	AC 230 V			
RM12-110AC	AC 110 V			
RM12-48AC	AC 48 V			
RM12-24AC	AC 24 V			
RM12-12AC	AC 12 V	3 A 230 V AC 28 V DC	35 g	**RSPYF-11A**
RM12-110DC	DC 110 V			
RM12-48DC	DC 48 V			
RM12-24DC	DC 24 V			
RM12-12DC	DC 12 V			

With four changeover contacts (4 × CO)
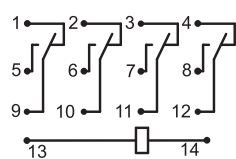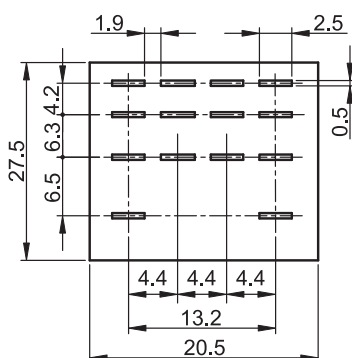
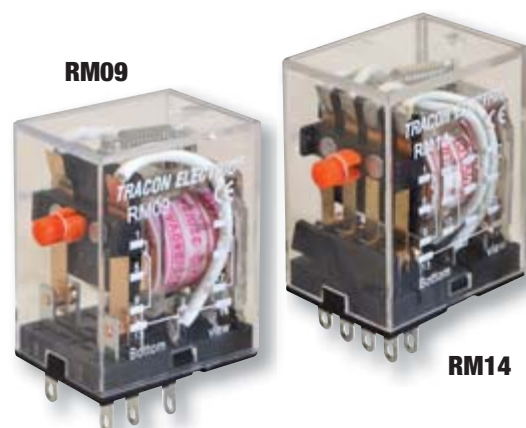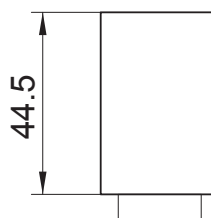| TRACON	U_m	VDC VAC A	m	
RM14-220AC	AC 230 V			
RM14-110AC	AC 110 V			
RM14-48AC	AC 48 V			
RM14-24AC	AC 24 V			
RM14-12AC	AC 12 V	3 A 230 V AC 28 V DC	35 g	**PYF14A RSPMF-14**
RM14-110DC	DC 110 V			
RM14-48DC	DC 48 V			
RM14-24DC	DC 24 V			
RM14-12DC	DC 12 V			

These relays have 2, 3 or 4 protection contacts and they can be contacted to the relay socket with their 8-, 11-, or 14-leg plug. A "TEST" button is also provided for checking the proper operation of the circuits to be switched by the contacts.

J/8-9

RM09

RM14

Industrial power relays

| I_e (AC 1, 230 V) 10 A | P_m 3,5 VA AC | P_m 2 W DC | Utest 1min 1,5 kV | U_i 400 V | R max. 50 mΩ | ×10⁷ | ×10⁵ | TEST | T_a -40..+55°C | ❓ Pictograms | J/0 |

With two changeover contacts (2 × CO)

TRACON	U_m	VDC VAC A	m	⊙
RT08-240AC	AC 230 V			
RT08-110AC	AC 110 V			
RT08-48AC	AC 48 V			
RT08-24AC	AC 24 V	10 A 230 V AC 28 V DC	80 g	RS90.22
RT08-12AC	AC 12 V			
RT08-110DC	DC 110 V			
RT08-48DC	DC 48 V			
RT08-24DC	DC 24 V			
RT08-12DC	DC 12 V			
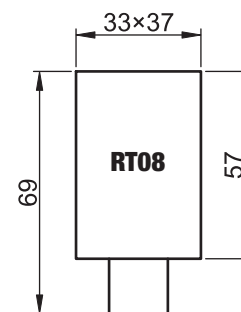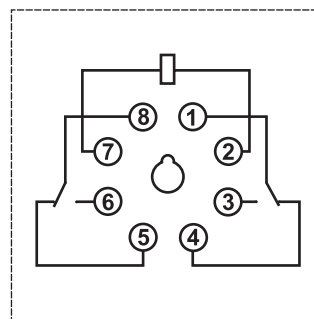
RT08

With three changeover contacts (3 × CO)

TRACON	U_m	VDC VAC A	m	⊙
RT11-240AC	AC 230 V			
RT11-110AC	AC 110 V			
RT11-48AC	AC 48 V			
RT11-24AC	AC 24 V	10 A 230 V AC 28 V DC	80 g	RS90.23 PF11-3A
RT11-12AC	AC 12 V			
RT11-110DC	DC 110 V			
RT11-48DC	DC 48 V			
RT11-24DC	DC 24 V			
RT11-12DC	DC 12 V			
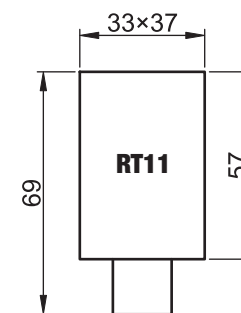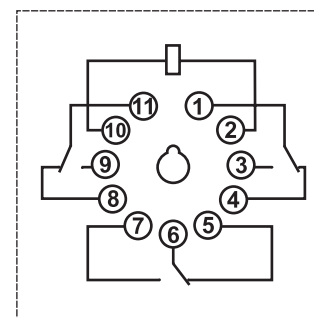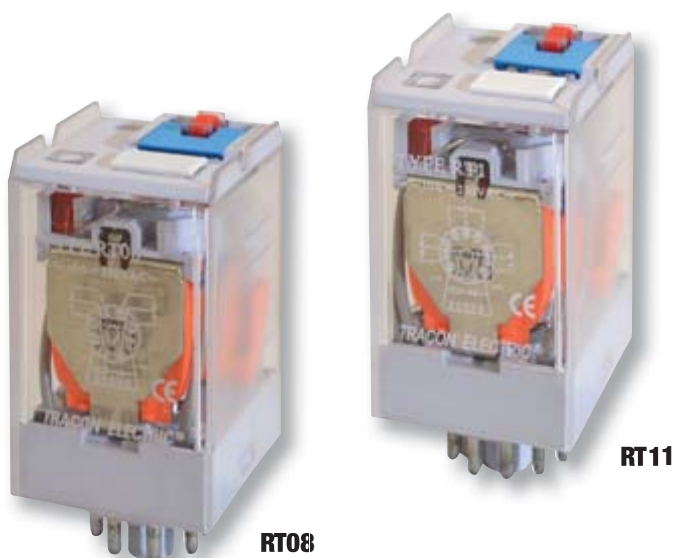
RT11

The relays have two or three switchover contacts and LED or mechanical status indicators. The LED shows the status of the operating coil and the mechanical status indicator shows the ON position of the contacts. By the "TEST" handle placed on the front side of the relay, the contacts can be put into position according to excited state of the coil. The handle – in contradiction to the "TEST" button of the RM types – keeps the contacts in ON position till one does not shift the handle back to its normal position. The resistive LED - wired parallel to the operating coil - attenuates the voltage shock associated with switching-off the circuit of the coil, in order to prevent any trouble in the electronic, operation circuit.

RT11

RT08

RELEVANT STANDARD
EN 61810

RELEVANT STANDARD
EN 60947-5-1

J/8

Power relays

I_e (AC 1, 230 V) 30 A	P_m 4 VA AC	P_m 2,5 W DC	Utest 1min 2,5 kV	U_i 400 V	R max. 50 mΩ	×10⁶	×10⁵	Ta -40..+55°C

With two changeover contacts (2 × CO)
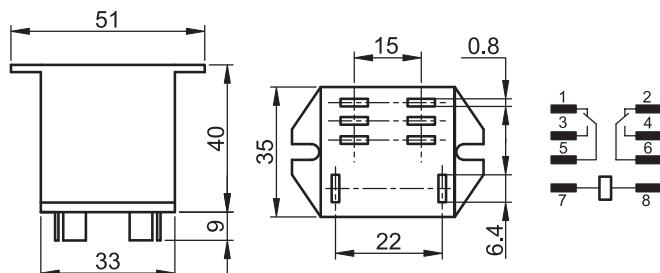
TRACON	U_m	VDC VAC A	m	
RJ08-240AC	AC 230 V	30 A 230 V AC 25 A 28 V DC	130 g	–
RJ08-110AC	AC 110 V			
RJ08-48AC	AC 48 V			
RJ08-24AC	AC 24 V			
RJ08-12AC	AC 12 V			
RJ08-110DC	DC 110 V			
RJ08-48DC	DC 48 V			
RJ08-24DC	DC 24 V			
RJ08-12DC	DC 12 V			

With three changeover contacts (3 × CO)
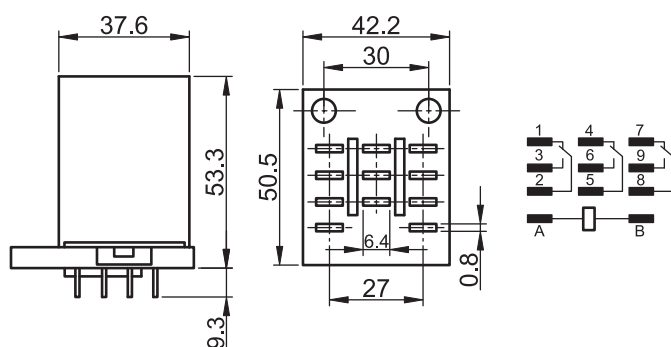
TRACON	U_m	VDC VAC A	m	
RJ11-240AC	AC 230 V	40 A 120 V AC 30 A 230 V AC 25 A 28 V DC	130 g	**RSJQX-38FS**
RJ11-110AC	AC 110 V			
RJ11-48AC	AC 48 V			
RJ11-24AC	AC 24 V			
RJ11-12AC	AC 12 V			
RJ11-110DC	DC 110 V			
RJ11-48DC	DC 48 V			
RJ11-24DC	DC 24 V			
RJ11-12DC	DC 12 V			

The RJ type power relays have two or three switchover contacts. The large size contacts enable the equipment to conduct and switch high currents. The three-contact version can be plugged into the RSJQX-38FS code socket – having screw contacts, or can be wired with 6,3 × 0,8 mm size quick connection female. At this kind of installation the relay can be fixed by M4 screws at the gap cut into the mounting plate (see diagram).
The two-contact version can be fixed by screws onto the mounting plate, 6,3 × 0,8 mm size quick connection females should be used for wiring.

RJ11

RJ08

RELEVANT STANDARD
EN 61810

RELEVANT STANDARD
EN 60947-5-1

J/9

Miniature power relays

| I_e (AC 1, 230 V) 10 A | P_m 2,5 VA AC | P_m 1,5 W DC | Utest 1min 1 kV | U_i 250 V | R max. 50 mΩ | ×10⁷ | ×10⁵ | T_a -40..+55°C | | Pictograms | J/0 |

With two changeover contacts (2 × CO)

TRACON	U_m	VDC VAC A	m	
RL08-240AC	AC 230 V			
RL08-110AC	AC 110 V			
RL08-48AC	AC 48 V			
RL08-24AC	AC 24 V	10 A 230 V AC 24 V DC	50 g	RSPTF-08A
RL08-12AC	AC 12 V			
RL08-110DC	DC 110 V			
RL08-48DC	DC 48 V			
RL08-24DC	DC 24 V			
RL08-12DC	DC 12 V			
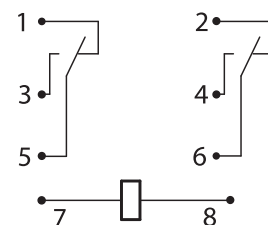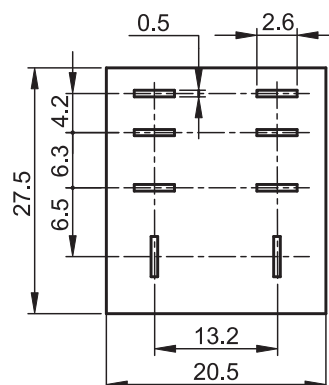
With three changeover contacts (3 × CO)

TRACON	U_m	VDC VAC A	m	
RL11-240AC	AC 230 V			
RL11-110AC	AC 110 V			
RL11-48AC	AC 48 V			
RL11-24AC	AC 24 V	10 A 230 V AC 24 V DC	50 g	RSPTF-11A
RL11-12AC	AC 12 V			
RL11-110DC	DC 110 V			
RL11-48DC	DC 48 V			
RL11-24DC	DC 24 V			
RL11-12DC	DC 12 V			
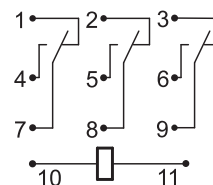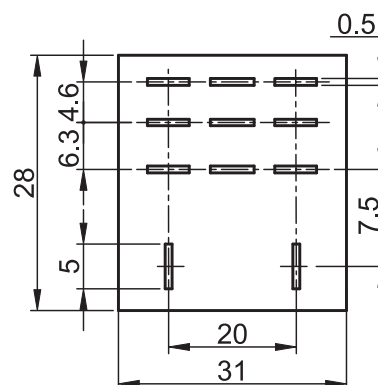
With four changeover contacts (4 × CO)

TRACON	U_m	VDC VAC A	m	
RL14-240AC	AC 230 V			
RL14-110AC	AC 110 V			
RL14-48AC	AC 48 V			
RL14-24AC	AC 24 V	10 A 230 V AC 24 V DC	50 g	RSPTF-14A
RL14-12AC	AC 12 V			
RL14-110DC	DC 110 V			
RL14-48DC	DC 48 V			
RL14-24DC	DC 24 V			
RL14-12DC	DC 12 V			

RL14

RL08

J/9

Print relays

| P_m 0,5 W DC | Utest 1min 1 kV | U_i 250 V | R max. 50 mΩ | ×10⁷ | ×10⁵ | T_a -40..+55°C |
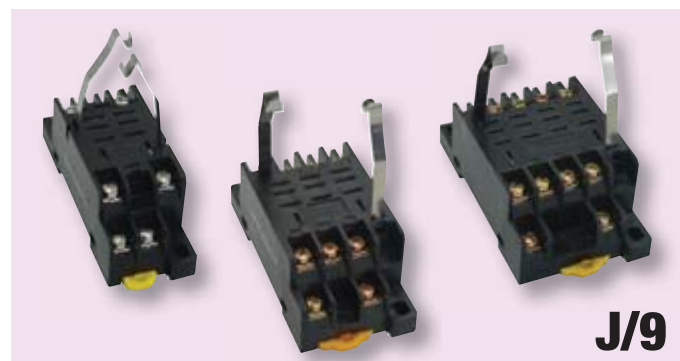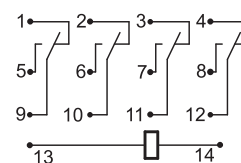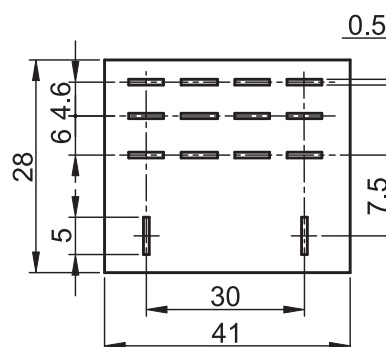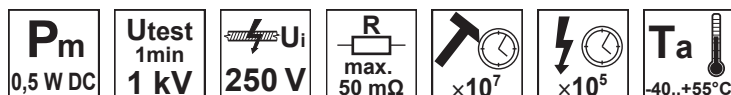
With one changeover contacts 10 A (1 × CO)
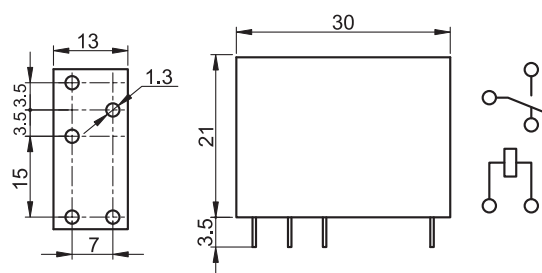
TRACON	U_m	VDC VAC A	m	
PR110-1V10A	110 V DC			
PR48-1V10A	48 V DC	10 A 230 V AC 30 V DC	50 g	RSPSF--08AE
PR24-1V10A	24 V DC			
PR12-1V10A	12 V DC			

With two changeover contacts 5 A (2 × CO)
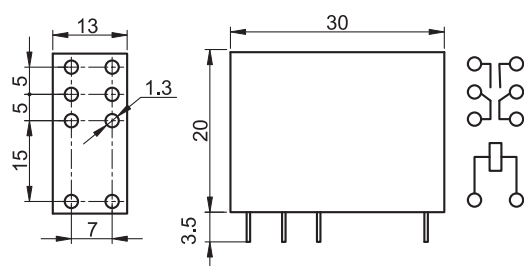
TRACON	U_m	VDC VAC A	m	
PR110-2V	110 V DC			
PR48-2V	48 V DC	5 A 230 V AC 30 V DC	50 g	RSPSF--14AE
PR24-2V	24 V DC			
PR12-2V	12 V DC			

With one changeover contacts 10 A (1 × CO)
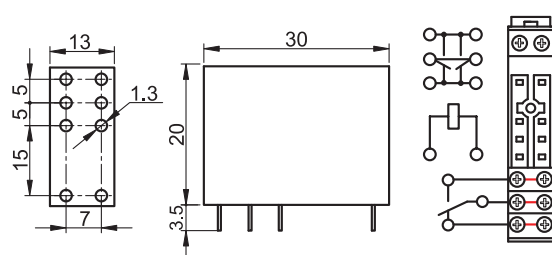
TRACON	U_m	VDC VAC A	m	
PR110-1V16A	110 V DC			
PR48-1V16A	48 V DC	16 A 230 V AC 30 V DC	50 g	RSPSF--14AE
PR24-1V16A	24 V DC			
PR12-1V16A	12 V DC			

For 16 A versions, the terminals of the alternate contacts have to be connected in parallel, as shown in the scheme below!

The so-called print relays are primarily designed to be used in printed panels for electronic control, e.g. boiler automatic, household water supply equipment, water circulation and filling-up equipment of household swimming pools, automatic washing machines, etc. The construction is appropriate to be used as protective separation. The relays are tested at 4000 V for 1 minute, applied between their operation coil and contacts. They also afford the 8 mm tracking current way and air-gap between their active parts. Along conventional soldering to the printed panel application these relays can be fixed onto rail or used with screw contact sockets. The relays are provided with 1 or 2 switchover contacts.
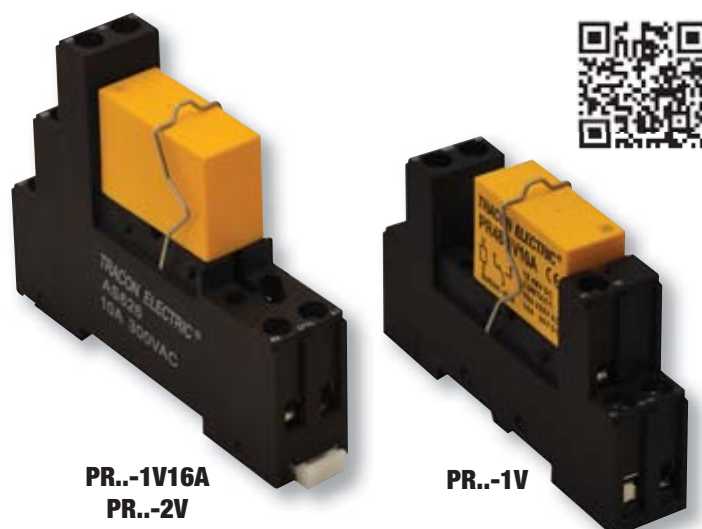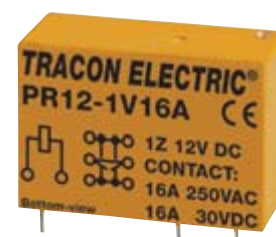

PR..-1V16A
PR..-2V

PR..-1V

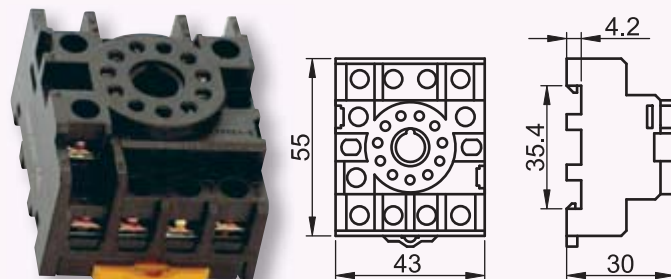RELEVANT STANDARD
EN 61810

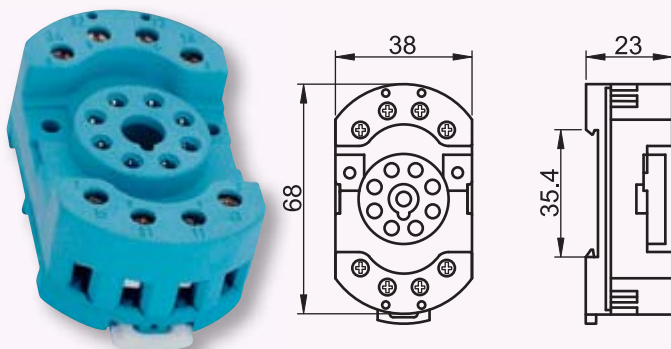RELEVANT STANDARD
EN 60947-5-1
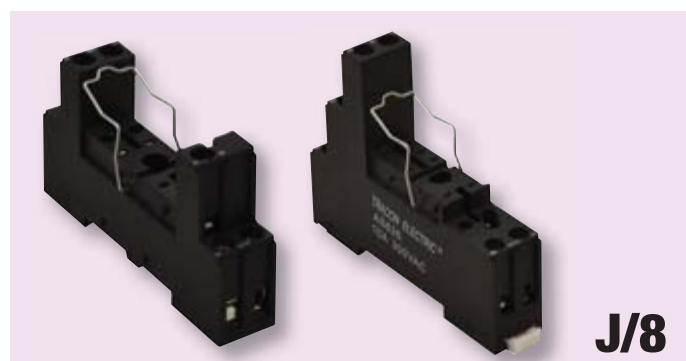
J/8

Relay bases

The relay bases can be fixed on mounting plate by screws, or on 35 × 7 mm size rail according to EN 50022. The screw terminals will accept 1 pc. 0,5 mm² or maximum 2 pcs 1,0 mm², or 1 pc 1,5 mm² cross section copper wire.
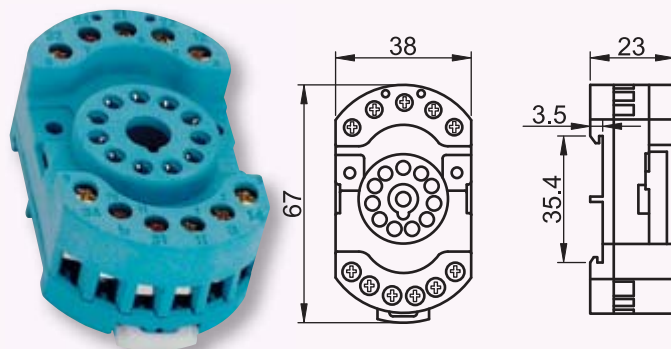The fixing spring for relay is included for sockets
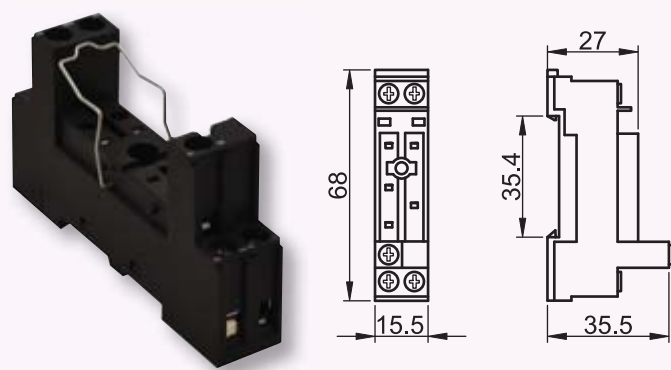

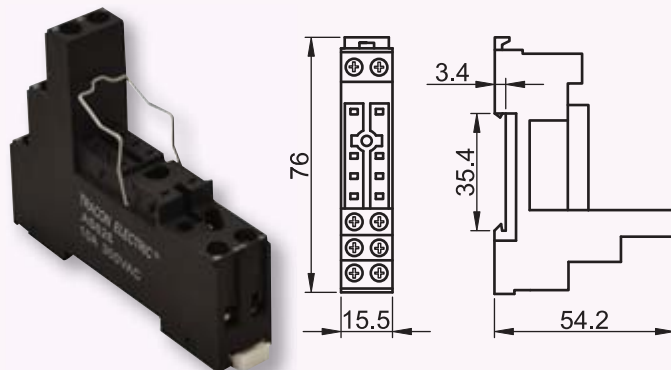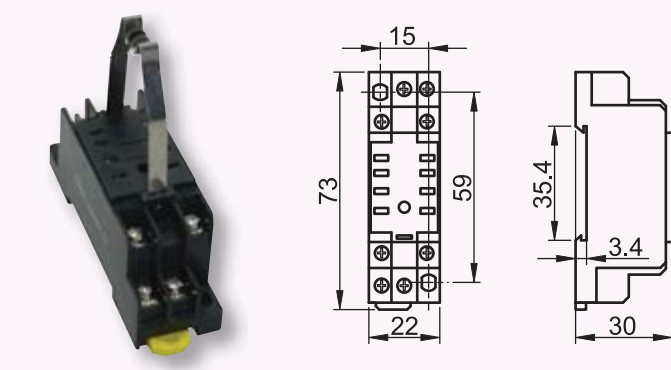## TRACON   PF11-3A

TRACON   RS90.22

TRACON   RS90.23

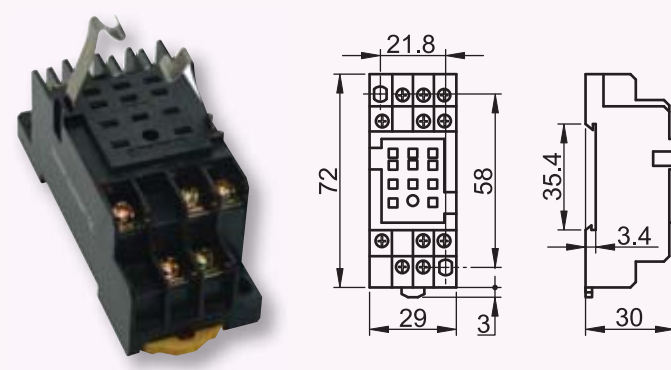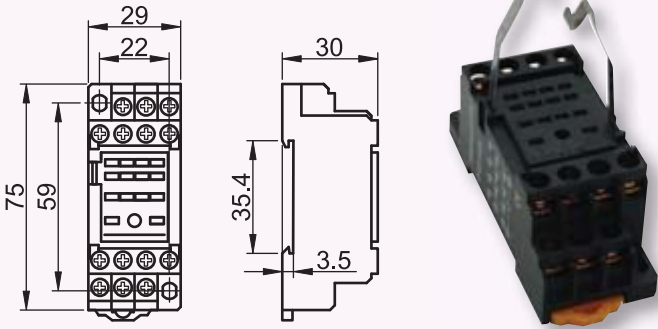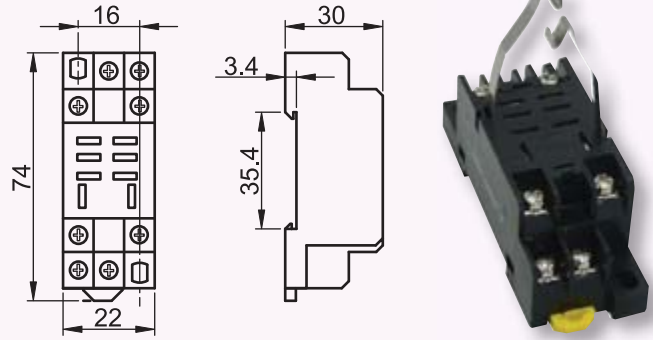## TRACON   RSPSF-08AE

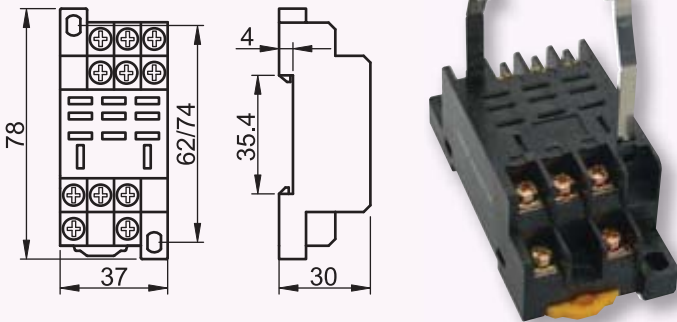## TRACON   RSPSF-14AE

TRACON   RSPYF-08A

TRACON   RSPYF-11A

TRACON PYF14A

TRACON RSPTF-08A
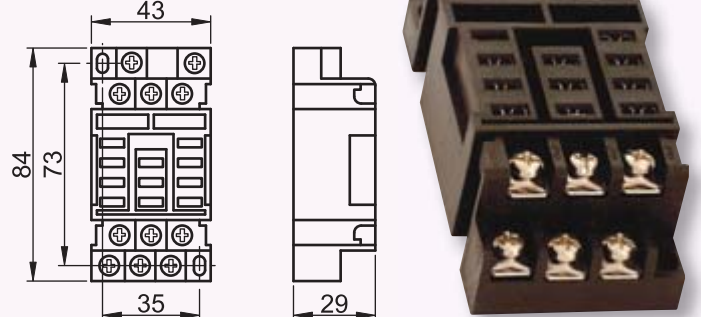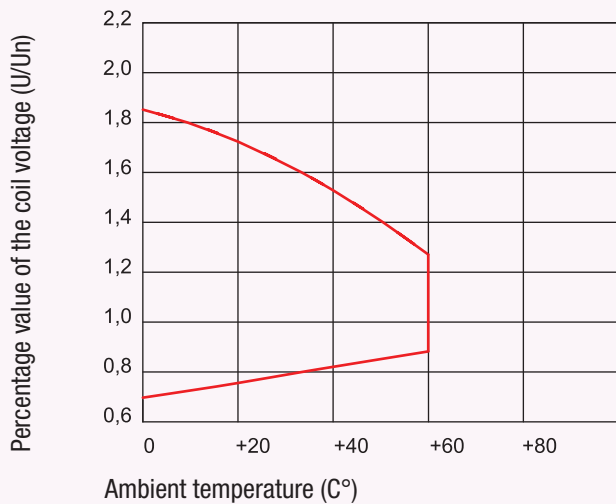

TRACON RSPTF-11A
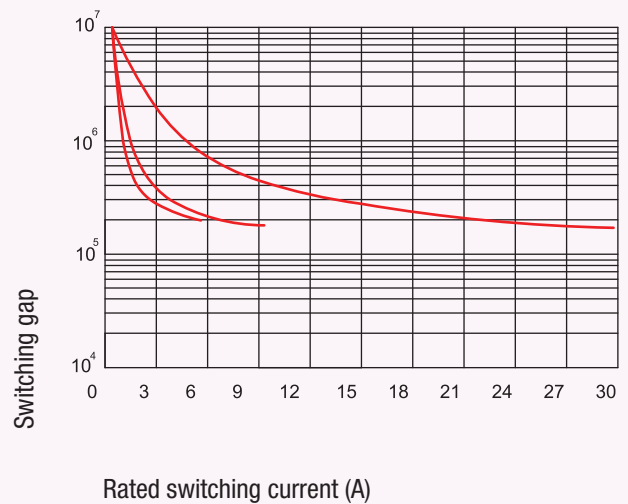

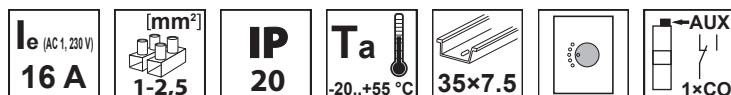## TRACON RSPTF-14A
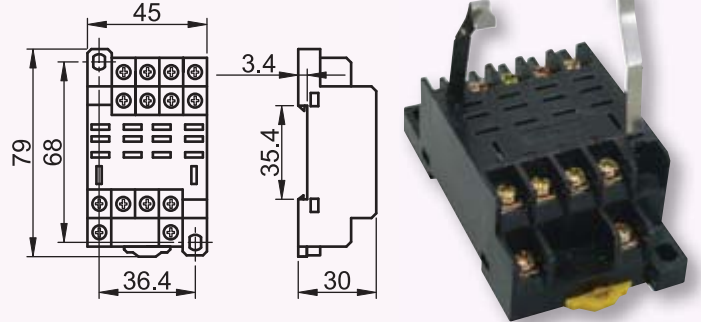
TRACON RSPMF-14
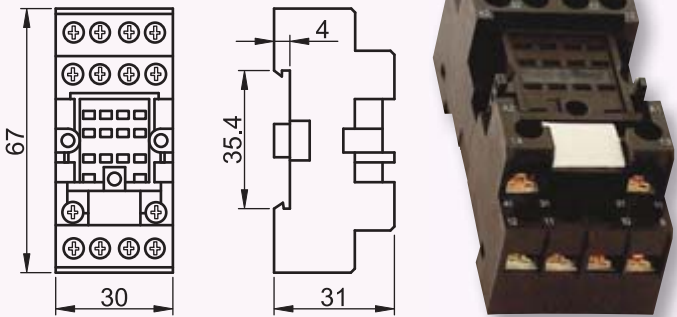
TRACON RSJQX-38FS

Operating range characteristic of DC coil

Percentage value of the coil voltage (U/Un)

Ambient temperature (C°)

Electric life characteristic

Switching gap

Rated switching current (A)

One function (ON delay) time relay

I_e (AC 1, 230 V) 16 A	[mm²] 1-2,5	IP 20	Ta -20..+55 °C	35×7.5		AUX 1×CO		Pictograms	J/0

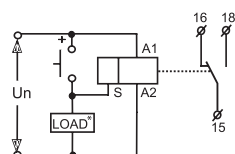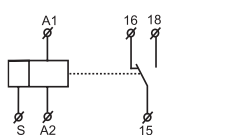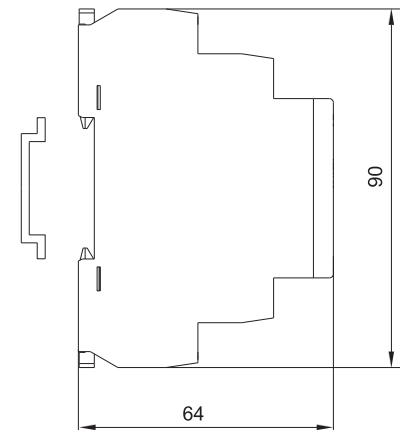| TRACON	U_m	VAC A ─⌐	0 10 ha %	ha %	🕐	m
NARIDON	AC/DC12V-240V	16 A 230 VAC	± 0,2%	± 5%	0,1 s - 10 h	62 g

Application:
- for tasks where the operation time depends on the switch ON of the device
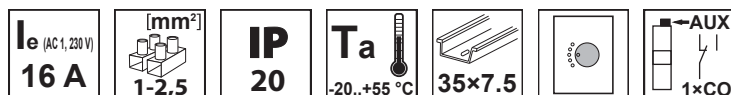- for pumps, heatings, ventillations, etc.

* Step button (impulse signal)

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One function (OFF delay) time relay

I_e (AC 1, 230 V) 16 A	[mm²] 1-2,5	IP 20	Ta -20..+55 °C	35×7.5		AUX 1×CO		Pictograms	J/0

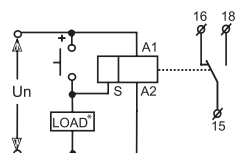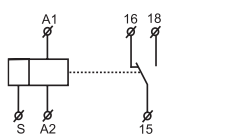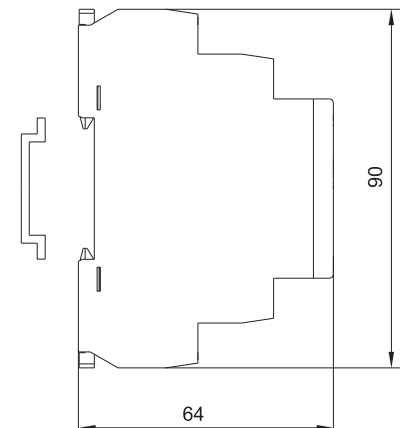| TRACON	U_m	VAC A ─⌐	0 10 ha %	ha %	🕐	m
NARIDOFF	AC/DC12V-240V	16 A 230 VAC	± 0,2%	± 5%	0,1 s - 10 h	62 g

Application:
- for tasks where the operation time is depends on the switch OFF of the device
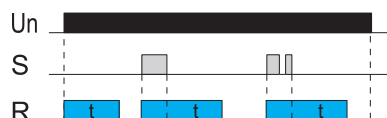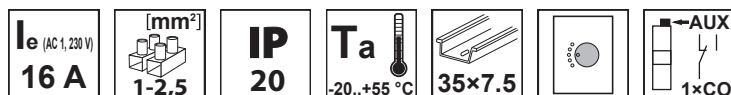- for pumps, heatings, ventillations, etc.

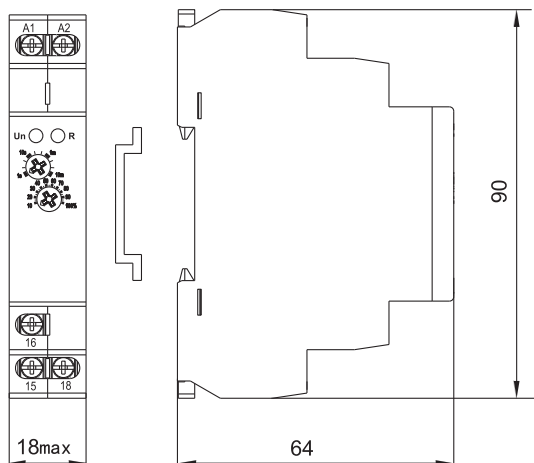* Step button (impulse signal)

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RELEVANT STANDARD
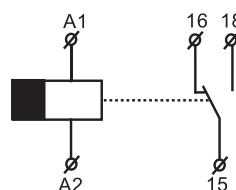**EN 60669-2**

Delay OFF time relay with supply voltage actuation

I_e (AC 1, 230 V) 16 A	[mm²] 1-2,5	IP 20	T_a -20..+55 °C	35×7.5		AUX 1×CO	Pictograms J/0

TRACON	U_m	VAC A	0 10 ha %	ha %		m
NARIDOFFS	AC/DC12V-240V	16 A 230 VAC	± 0,2%	± 5%	0,1 s - 10 min.	86 g

90

18max

64

Application:
- For emergency applications where the device must be operating in case of blackout.
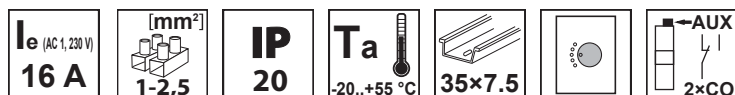
A1   16 18

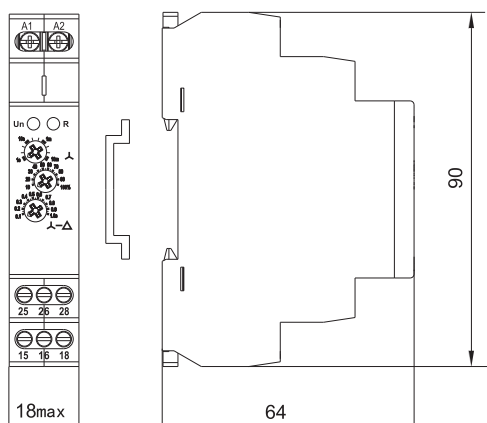A2   15

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Un

R   t

Star-delta time relay

I_e (AC 1, 230 V) 16 A	[mm²] 1-2,5	IP 20	T_a -20..+55 °C	35×7.5		AUX 2×CO	Pictograms J/0

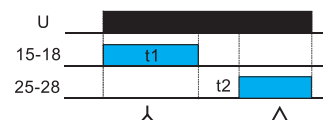| TRACON	U_m	VAC A	0 10 ha %	ha %	t_1	t_2	m
NARIST	AC/DC12V-240V	16 A 230 VAC	± 0,2%	± 5%	0,1 s - 10 min.	0,1 s - 1 s	86 g

90

18max

64

Application:
- Three phase electric motors with short circuit rotor need too much current during start procedure. To prevent damages, the supply voltage is first applied and the star contacts are closed. After the motor reaches its rated regime, relays commute back to triangle mode.
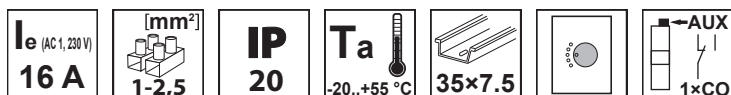
A1   16 18 26 28

A2   15   25

Start up of motor(λ-Δ)

(motor)

S1   S3   S2

L1

L2

L3

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U

15-18   t1

25-28   t2

λ   Δ

Multifunction time relay (10 functions)

I_e (AC 1, 230 V) 16 A	[mm²] 1-2,5	IP 20	Ta -20..+55 °C	35×7.5		AUX 1×CO		Pictograms	J/0
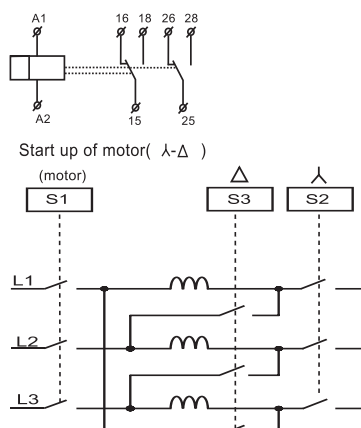
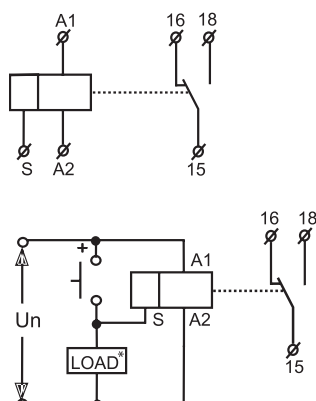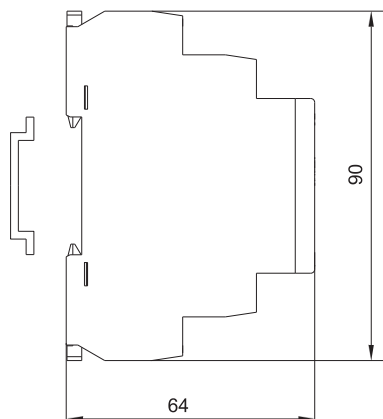| TRACON	U_m	VAC A	0 10 ha %	ha %	(clock)	m
NARIMF	AC/DC12V-240V	16 A 230 VAC	± 0,2%	± 5%	0,1 s - 10 d	64 g

Application
This multifunction time relay gives some wide range solutions for different time control tasks with only one device.

* Step button (impulse signal)

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A: ON delay

B: OFF delay

C: Flasher (starts OFF)

D: Flasher (starts ON)

E: OFF delay (S control signal pause)

F: OFF delay (S control signal, 1 tact)

G: One tact, control impulse for running edge (cannot restart in ON state)

H: ON and OFF delay

I: Impulse relay

J: Impulse generator

PULS = 0.5 s

Time range

0.1 - 1s	1 - 10s	6 - 60s	1 - 10min	6 - 60min	1 - 10hr	0.1 - 1day	1 - 10day	only ON	only OFF
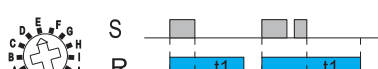
Staircase time switch
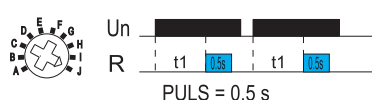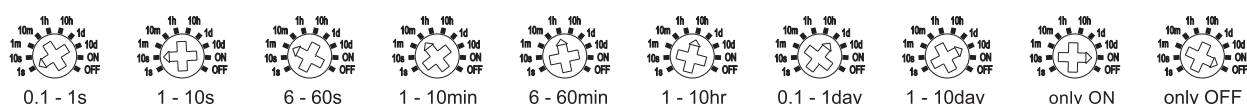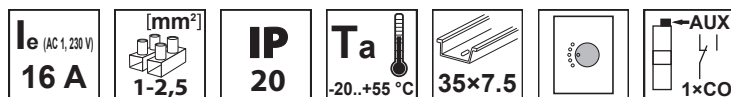
I_e (AC 1, 230 V) **16 A**	[mm²] **1-2,5**	**IP 20**	**T a** -20..+55 °C	**35×7.5**		←AUX 1×CO		? **Pictograms**	**J/0**

TRACON	🕐	**P$_s$**	**I$_n$**	L	Σ	**P$_{max}$**	
NARS	0,5 sec. - 20 min.	1.5 VA	16 A (cos φ = 1)	max. 250 m	× 50	max. 2.000 W	max. 400 W
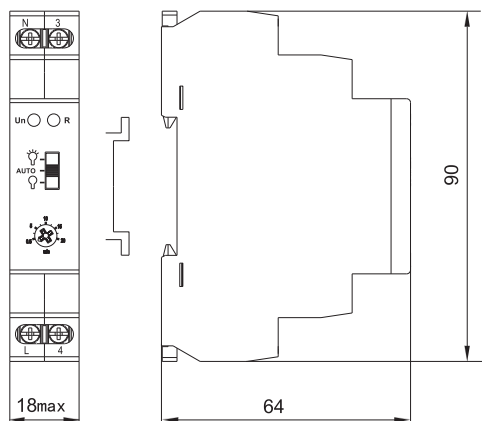
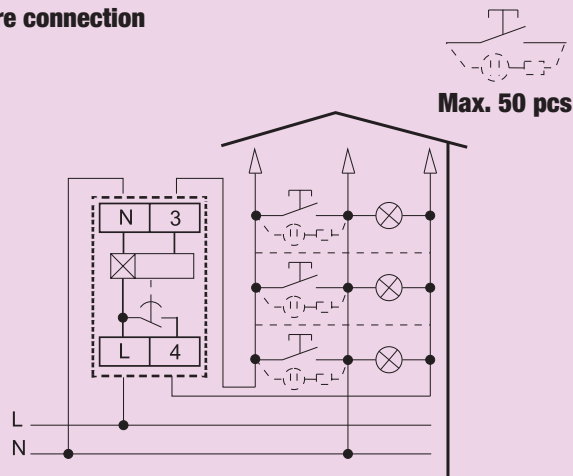Application
Can be used to control the time delay of staircases

90
18max   64

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L
3   N   4
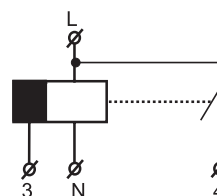
Connection diagram

3-wire connection

Max. 50 pcs

N   3
L   4
L
N

4-wire connection

Max. 50 pcs

N   3
L   4
L
N

Example

N

L

L-N
Switch   ATUO   ON   OFF
L/N ⟍ 3   3s 3s 3s
L-4   t   t   1h
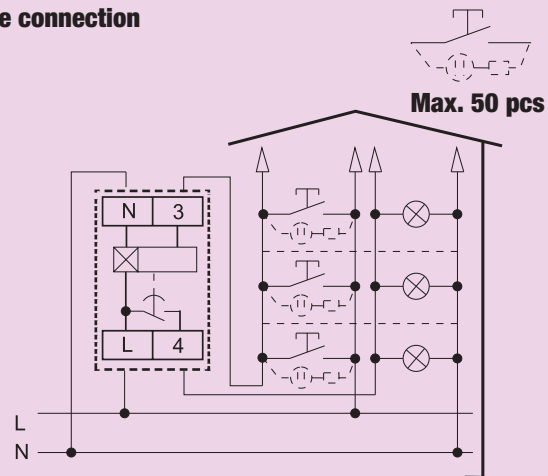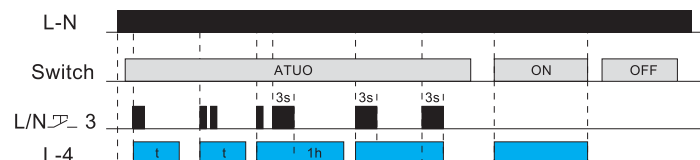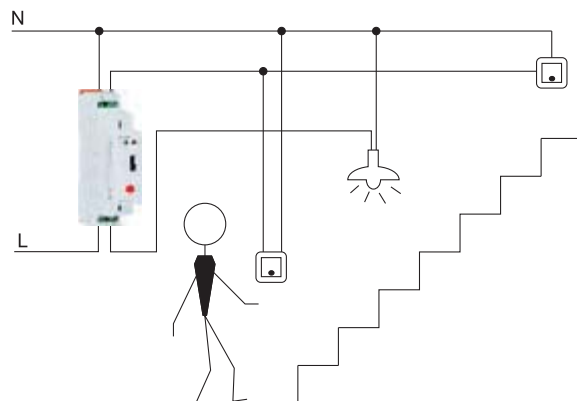
Light source types

Incandescent	2.000 W
Halogen 230 V	2.000 W
Compact fluorescent	400 W
LED	400 W

Time relays

The modular time relays are designed for distribution box installation and they control a pre-defined time procedure. The relay to be used shall be selected depending on the complexity of the control task paying attention to the network's parameters. The star-delta relay helps to start electric motors with short circuit rotor according to the pre-adjusted time delay.

Timing functions
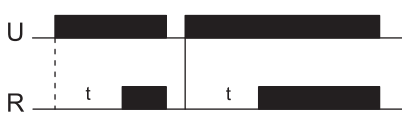
Switch-on delay: when supply voltage (U) is applied, the set time (t) starts running. After time t had been elapsed the output relay picks up. This state remains until the supply voltage is interrupted. If the supply voltage is interrupted before time t elapses, the elapsed time is deleted and restarted when the supply voltage is reapplied.

Switch-off delay: when supply voltage (U) is applied, the output relay picks up and the set time (t) starts running. After time t has elapsed, the output relay drops out. This state remains until the supply voltage is interrupted. If the supply voltage is interrupted before time t has elapsed, the output relay drops out. The elapse time is deleted and restarted when the supply voltage is reapplied.

Flasher, beginning with the pause: when supply voltage (U) is applied, the set time (t) starts running. After time t has elapsed, the output relay picks up and the set time is starts running again. After time t has elapsed, the output relay drops out. This cyclic process is working, until the supply voltage is applied.

Flasher, beginning with the pulse: when supply voltage (U) is applied, the output relay picks up and the set time (t) starts running. After time t has elapsed, the output relay drops out and the set time t starts running again. This cyclic process is working, until the supply voltage is applied.
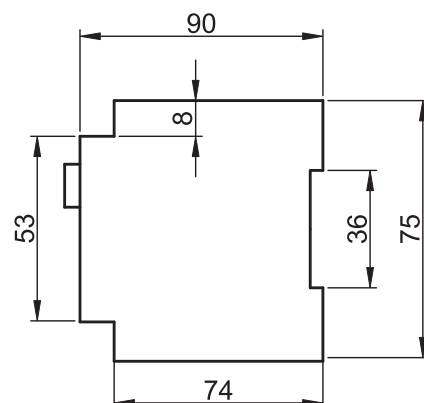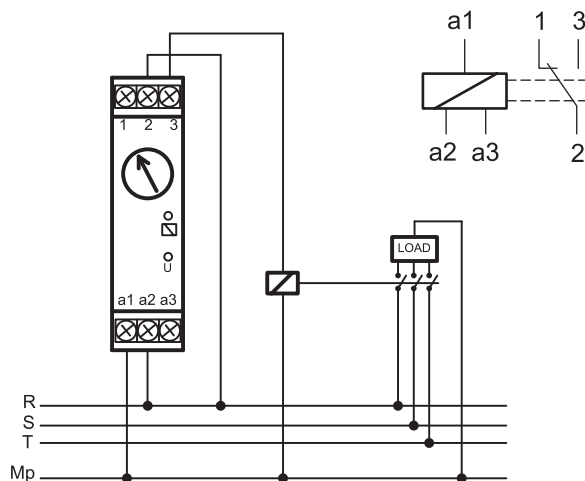
## One function (ON delay) time relay

| I_e (AC 1, 230 V) 5 A | [mm²] 1-2,5 | IP 20 | Ta -40..+55°C | 35×7.5 | | AUX 1×CO | | Pictograms | J/0 |

TRACON	U_m		VDC VAC A	0 10 ha %		m
	a_2-a_1	a_3-a_1				
TIR-01	220-240 V AC	24 V AC-DC		±1 %	0,1-12 sec.	
TIR-02	220-240 V AC	24 V AC-DC	5 A 230 V AC	±1 %	0,1-3 min.	75 g
TIR-03	220-240 V AC	24 V AC-DC		±1 %	1-30 min.	
TIR-04	220-240 V AC	24 V AC-DC		±1 %	2-60 min.	

Digital time relay and flasher

I_e (AC 1, 230 V) 5 A	[mm²] 1-2,5	IP 20	Ta -40..+55°C	35×7.5	00878 LCD	AUX 1×CO		Pictograms	J/0
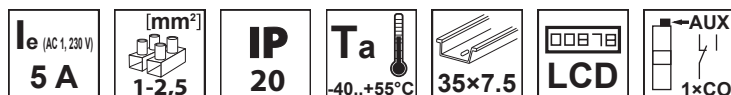
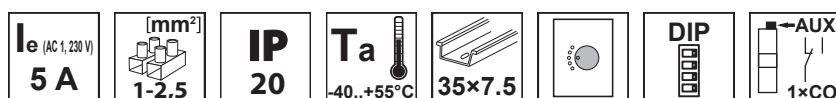| TRACON	U_m		VDC VAC A	×digit	ON OFF		m
	a_2-a_1	a_3-a_1					
TIR-05	220-240 V AC	24 V AC-DC	5 A 230 V AC	× 7	0,01 sec. 1 sec.	0,01 sec. – 99 min. 1 sec. – 99 h	75 g
TIR-06	220-240 V AC	24 V AC-DC					

This is a microcontroller based device with four selectable operating modes: ON-DELAY timer; OFF-DELAY timer; ON-START flasher; OFF-START flasher (the relay switching times (t_{on} and t_{off}) are adjustable separately).
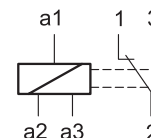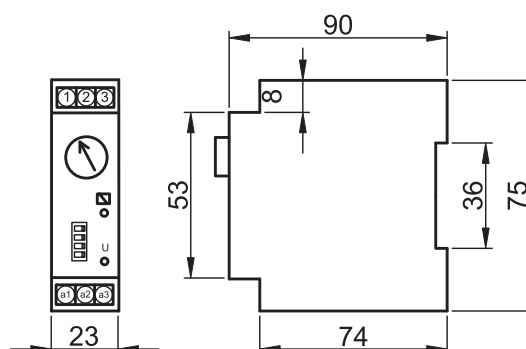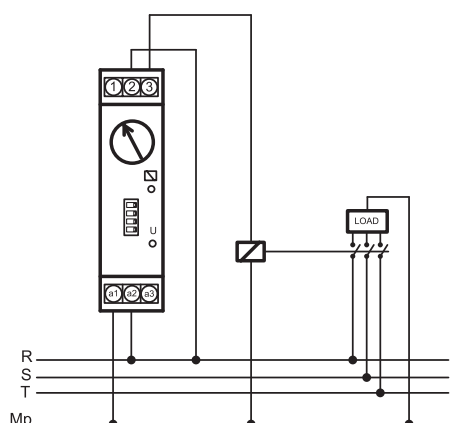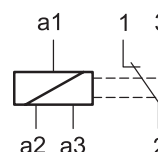
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a1   1   3
a2 a3   2

90
8
53
36
75
23
74

R
S
T
Mp
LOAD

Selectable time relay

I_e (AC 1, 230 V) 5 A	[mm²] 1-2,5	IP 20	Ta -40..+55°C	35×7.5		DIP	AUX 1×CO		Pictograms	J/0
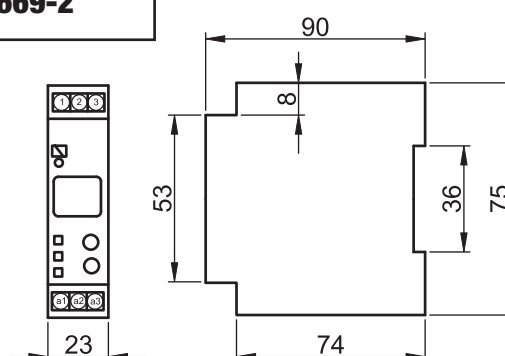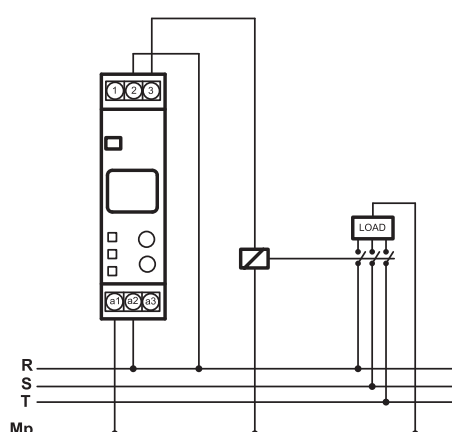
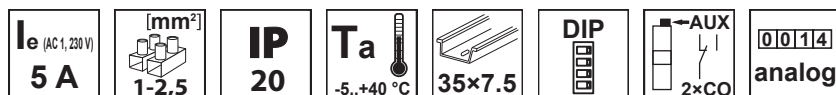| TRACON	U_m		VDC VAC A	0 10 ha %	12 9 3 6	m
	a_2-a_1	a_3-a_1				
TIR-MF2	220-240 V AC	24 V AC-DC	5 A 230 V AC	±1 %; ±0,1 %	0 sec. – 60 h	75 g

This is a unique and multi-time selectable on-off delay time relay with 8 different time segment options being adjustable via four selector switches from 1 sec to 60 hours. You can select the function (ON or OFF delayed) with the first switch and the time interval with the other ones. The time selection is possible within time interval with the dip-switch.

a1   1   3
a2 a3   2

90
8
53
36
75
23
74

R
S
T
Mp
LOAD

0-1 sec.
0-10 sec.
0-60 sec.
0-5 min.
0-10 min.
0-60 min.
0-10 h
0-60 h

TIR-MF2

Modular time relays

I_e (AC 1, 230 V) 5 A	[mm²] 1-2,5	IP 20	Ta -5..+40 °C	35×7.5	DIP	AUX 2×CO	0 0 1 4 analog		? Pictograms	J/O

TRACON	U_m		VDC VAC A	$\begin{array}{c}0 \quad 10 \\ \text{ha \%}\end{array}$	(clock)	m
	a_2-a_1	a_3-a_1				
TIR-M01	230 V AC	24 V AC/DC	5 A 230 V AC 5 A 30 V DC	±1 %	0,1 sec. – 99 h	70 g
TIR-M02	230 V AC	24 V AC/DC		±1 %	0,1 sec. – 99 h	100 g
TIR-M02A	230 V AC	-		±1 %	0,1 sec. – 999 h	100 g

These time relays can be used for modular applications, The ON or OFF delay is adjustable with DIP switch in various time rages between 0.1 second and 999 minutes.

The accurate time delay inside time ranges is adjustable with pushbuttons.

The device can be mounted on 7.5×35 mm size rails according to EN 50022 standard. The housing material is plastic.

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Adjusting of time range

M01	1 2 3	M02	M02A	1 2 3
0,1-9,9 s		0,1-9,9 s	0,1-99,9 s	
1-99 s		1-99 s	1-999 s	
10-990 s		10-990 s	10-9990 s	
0,1-9,9 m		0,1-9,9 m	0,1-99,9 m	
1-99 m		1-99 m	1-999 m	
10-990 m		10-990 m	10-9990 m	
0,1-9,9 h		0,1-9,9 h	0,1-99,9 h	
1-99 h		1-99 h	1-999 h	

Function selection

ON delay   OFF delay

TIR-M01   [ ] 4   [ ] 4

TIR-M02
TIR-M02A   [ ] 4   [ ] 4

Terminal markings

15	CO common contact	25	CO common contact
16	NC open	26	NC open
18	NO close	28	NO close
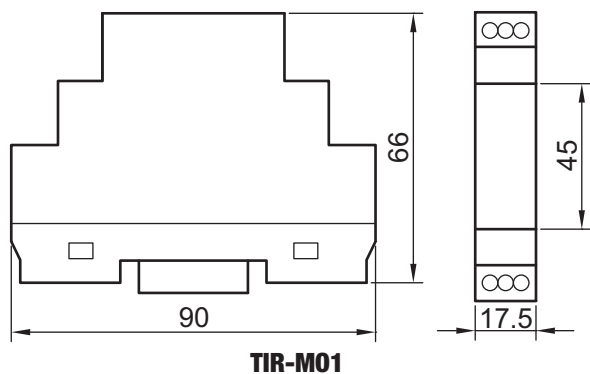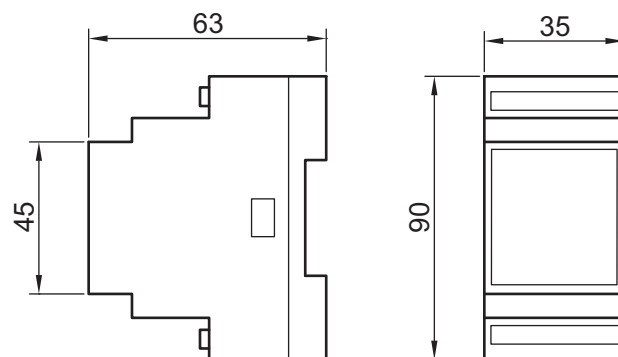
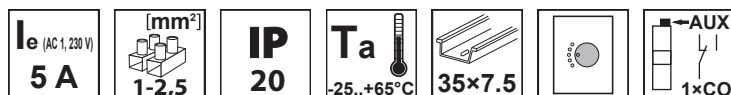**TIR-M01**

TIR-M02, TIR-M02A

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Star-delta time relay

I_e (AC 1, 230 V) 5 A	[mm²] 1-2,5	IP 20	Ta -25..+65°C	35×7.5		AUX 1×CO	? Pictograms	J/0

TRACON	U_m		VDC VAC A	0 10 ha %	t_1	t_2	m
	a_2-a_1	a_3-a_1					
TIR-SD2	220-240 V AC	–	5 A 230 V AC	±1 %	0,1 s – 12 s	0,5 s (fix)	160 g
TIR-SD3	220-240 V AC	24 V AC-DC		±1 %	0,1 s – 30 s	0,02 s – 1 s	95 g

Three phase electric motors with short circuit rotor need too much current during start procedure. To prevent damages, the supply voltage is first applied and the star contacts are closed. After the motor reaches its rated regime, relays commute back to triangle mode.
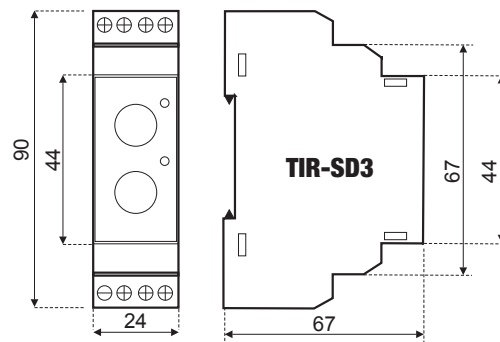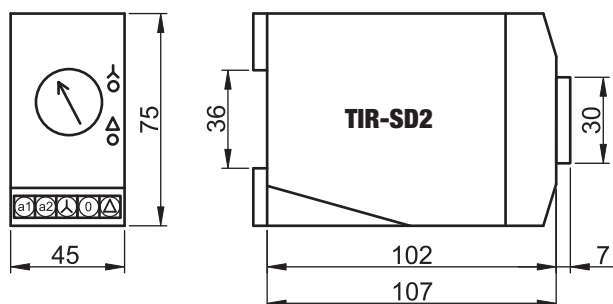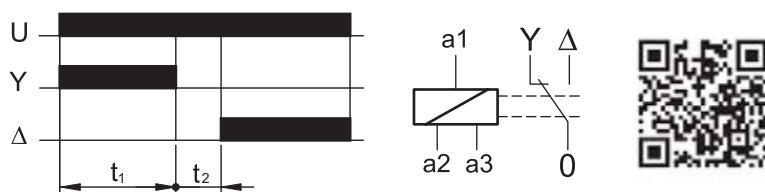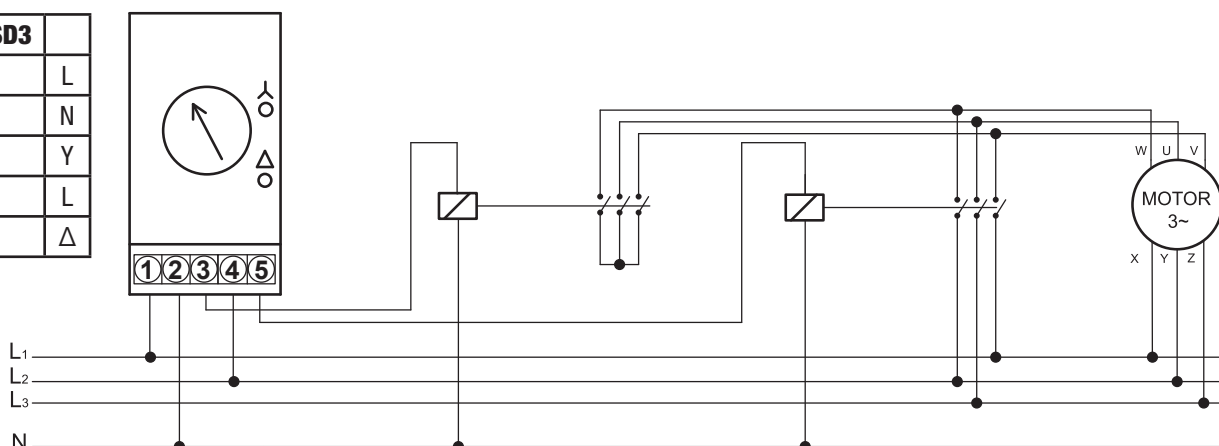

Operation

The contactor's star circuit coil has to be connected to the "Y" output, the delta circuit coil to the "Δ" output. When the supply voltage (U) is switched on, the contactor of the star circuit picks up, its contacts close and the motor starts. After the set delay time (t), the relay of the star circuit drops.
The relay of the delta circuit picks up after a delay of **t_2**, and maintains this state while the motor runs. When the motor is stopped, the relay of the delta circuit drops, the device is ready for a new motor start.
The LED-s placed on the front side of the device inform on the condition of the relay's output contactors.

	TIR-SD2	TIR-SD3	
1	a1	1	L
2	a2	13	N
3	Y	16	Y
4	0	15	L
5	Δ	14	Δ

Flasher relays

						Pictograms	J/0
I_e (AC 1, 230 V) **5 A**	[mm²] **1-2,5**	**IP 20**	**Ta** -25..+65°C	**35×7.5**			
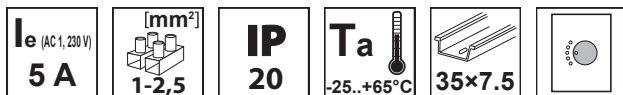
| TRACON	U_m a_2-a_1	VDC VAC A	0 10 ha %		AUX CO	m
TIR-FR1	220-240 V AC	5 A 230 V AC 10 A 24 V DC 10 A 24 V AC	±1 %	$t_0 = 0{,}5$ s (fix) $t_1 = 0 - 12$ s	×1	150 g
TIR-FR2	220-240 V AC		±1 %	$t_{on} = 2 - 60$ s $t_{off} = 2 - 60$ min.	×2	170 g

These relays are used as timing equipment in control of repetitive processes, such as ON/OFF switching of ad panels, etc. The active elements are housed in a plastic enclosure. The LED lights on the front panel inform on the state of the relay. The output of the **TIR-FR1** relay has one potential-free alternate contact. Once the supply voltage is on, the relay stays non-energized for the time span t_1, adjustable by the front side knob. At the end of this time, the relay energizes and the positions of the contacts change. After a time span of 0.5 s, the relay drops again.

This cycle is repeated until the power supply is cut down.

The **TIR-FR2** version is used to control two independent cyclic processes, by two potential-free alternate contacts. ON and OFF periods can be adjusted by the user. Once the supply voltage is on, the relay changes its state and maintains the new state for a t_{on} time span. At the end of this time, the relay drops and keeps this position for the time span t_{off}. At the end of this time, the relay energizes again. This cycle is repeated as long as the power supply stays on.

RELEVANT STANDARD
EN 60669-2

TIR-FR1

TIR-FR2

Auto reclose under- and overvoltage relay
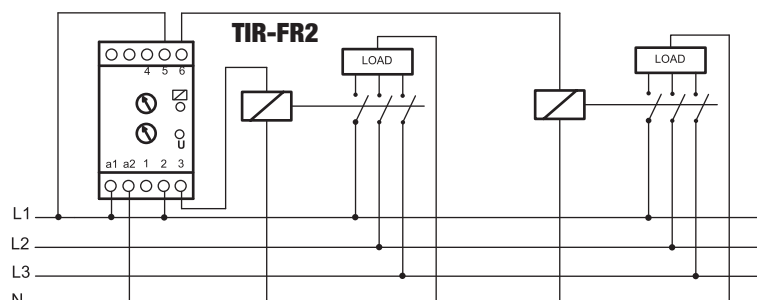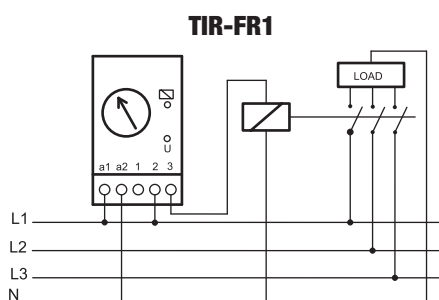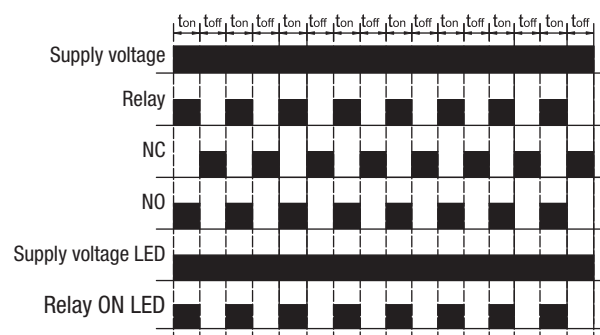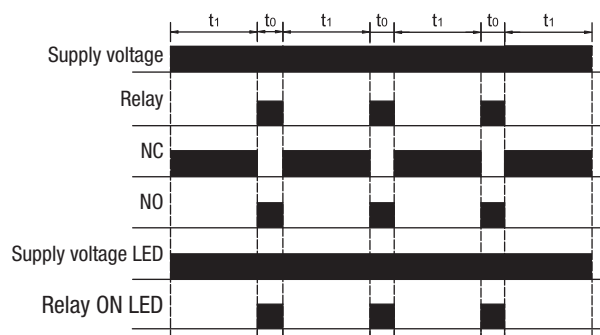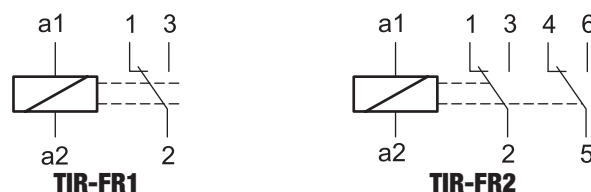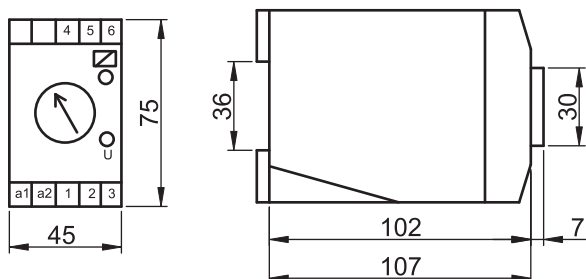
32 A gG	230/400 V AC	×4.000	IP 20	35×7.5	[mm²] 1,5-25	Ta -20..+55°C	Uᵢ 500 V		Pictograms	**J/0**

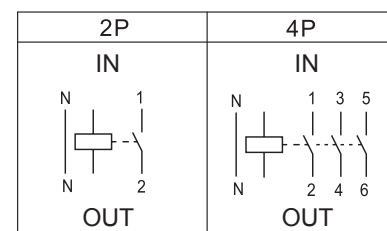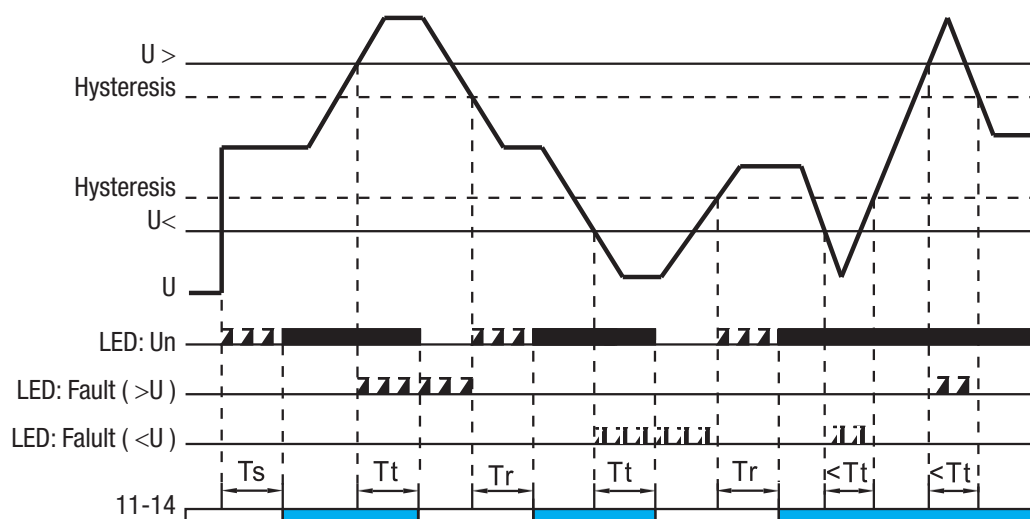|	TRACON	
	EVOU02	**EVOU04**
Rated voltage	230 V AC	230 V AC (L-N)
Rated frequency	50 Hz	
Rated current	40 A (AC 1)	
Self power consumption	AC max. 3 VA	
Upper protection level	265 V (fix)	265 V (L-N) (fix)
Upper reclosing level	257 V (fix)	257 V (L-N) (fix)
Lower protection level	175 V (fix)	175 V (L-N) (fix)
Lower reclosing level	180 V (fix)	180 V (L-N) (fix)
Switching time	1 s	
Switching delay	2 s	
Reclosing time	30 s	
Measuring accuracy	≤1%	
Weight	120 g	250 g
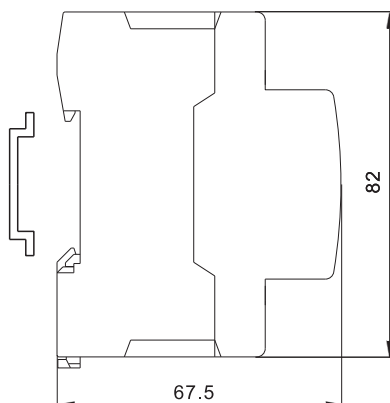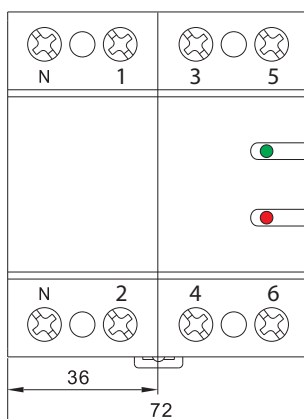
EVOU02   EVOU04
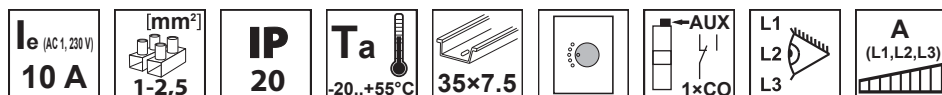
• Protection against over- and undervoltage for household devices
• Automaticly reclose after the voltage is restored
• LED status signalling

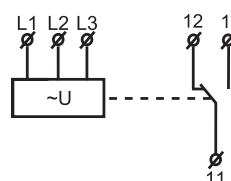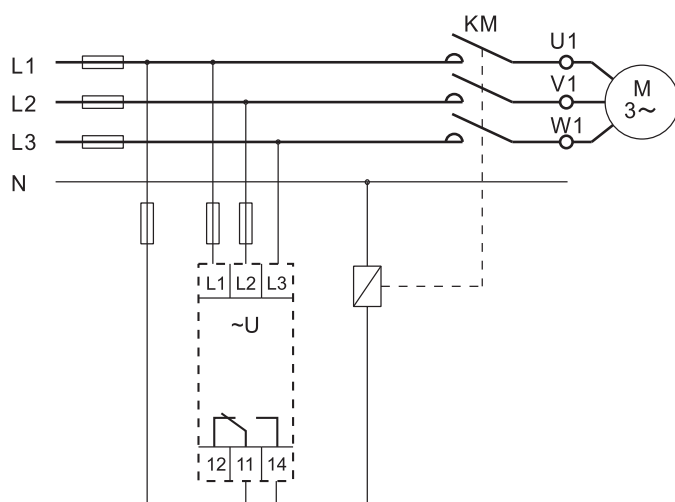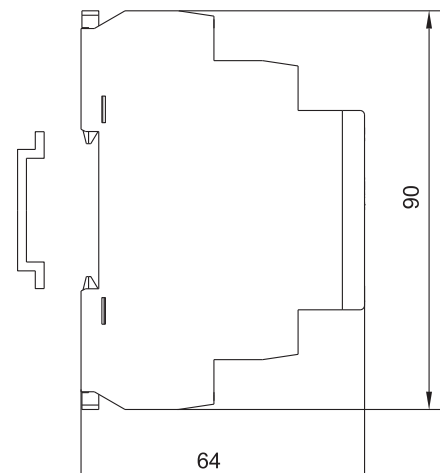Ts: Operation run-up time
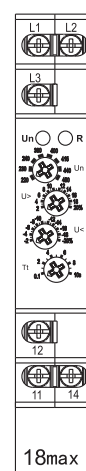Tt: Switch-OFF delay
Tr: Reset time

Voltage relay for three phases

I_e (AC 1, 230 V)	[mm²]	IP	Ta	35×7.5		AUX 1×CO	L1 L2 L3	A (L1,L2,L3)		? Pictograms	J/0
10 A	1-2,5	20	-20..+55°C								

TRACON	U_m	VDC VAC A	U_h	U_{down}	U_{up}	A (L1,L2,L3)		m
NARV	AC 220-460 V	10 A 230 VAC	2 %	-2 ... -20 %	+2 ... +20 %	8% (fix)	0,1 s - 10 s	86 g

Application
To protect three-phase electric motors against phase failure

90

18max   64

L1 L2 L3   12 14

~U

11

RELEVANT STANDARD
EN 61810

Phase failure and phase sequence diagram

Phase failure   Phase sequence

L1
L2
L3
LED : Un
LED : R
11 14 12
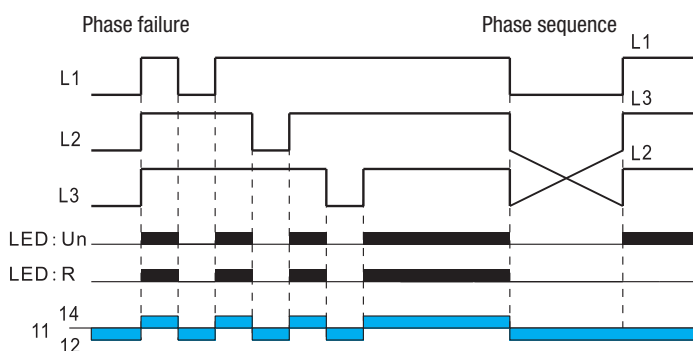
Phase rise and phase reduction diagram
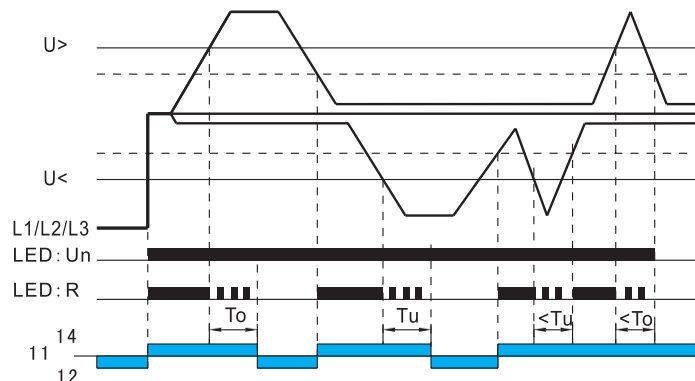
U>
U<
L1/L2/L3
LED : Un
LED : R
To   Tu   <Tu   <To
11 14 12

Voltage relay for three phase with adjustable asymmetry and overheat protection

| I_e (AC 1, 230 V) 5 A | [mm²] 1-2,5 | IP 20 | T_a -25..+65°C | 35×7.5 | | ■ AUX 1×CO | R_{ON} PTC 1000-1400 Ω | R_{OFF} PTC 1600-2000 Ω | ? Pictograms | **J/0** |

| TRACON	U_m	U_h	VDC VAC A	0 10 ha %	A (L1,L2,L3)	m
TFKV-04	3×230/400 V AC	max. 10 V	5 A 230 V AC	±1 %	±5% - ±25 % (L1-L2)	85 g

Designed to protect three phase motors from over voltage and overheat. The user can adjust the over voltage level with a potentiometer. If the L1, L2 and L3 phase voltages are normal the relay switches on. If any phase voltage is rising over the pre-adjusted value, the relay switches off and the motor stops. When the phase vol tage gets back in the nominal range, the relay switches on and the motor is able to start again. If the motor is provided with thermistor having PTC characteristics then the relay is able to protect the motor from overload. When the thermistor's resistance changes fixed into pictogram signed terminals the relay switches off the contactor and the motor stops. When the motor's temperature is falling back to nominal value the relay switches on and the motor is able to start again.

Description: if the overheat protection is not used, than the thermistor connection the relay terminals have to be short-circuited.
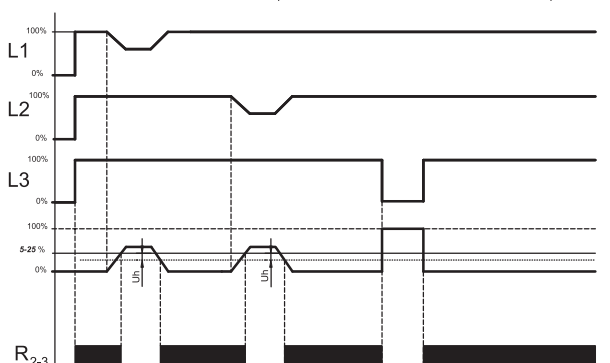
RELEVANT STANDARD
EN 60730


N   1   3
L1, L2, L3   2
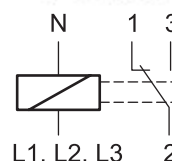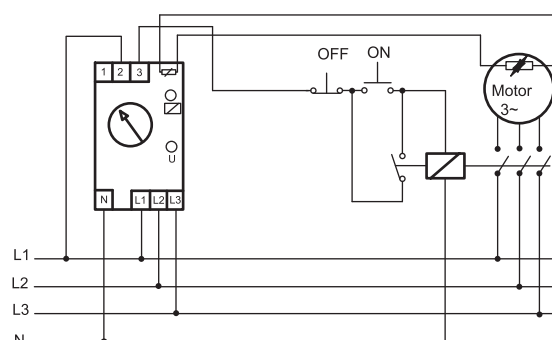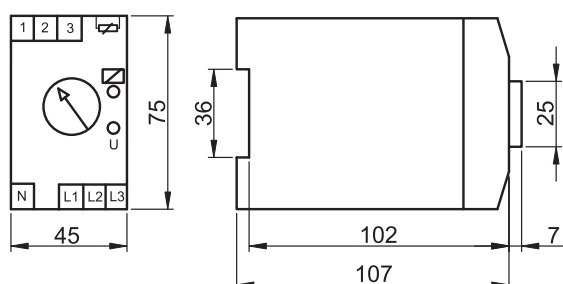
PTC thermistor for voltage protective relays with overheat protection

If the protected motor has no PTC thermistor, an external PTC thermistor can be connected to the **TFKV-04** type voltage protection relay, to the marked terminal, according to the wiring diagram above.

K/26-33

Voltage protection relay for three phase neutral-less lines

I_e (AC 1, 230 V) 5 A	[mm²] 1-2,5	IP 20	Ta -25..+65°C	35×7.5	AUX 1×CO		? Pictograms	J/0
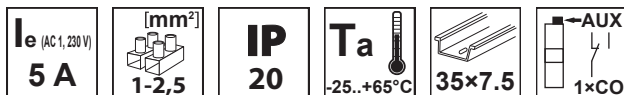
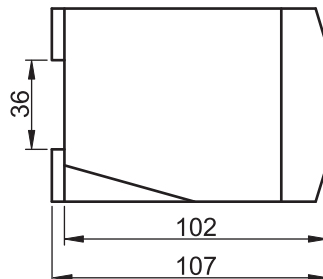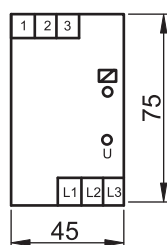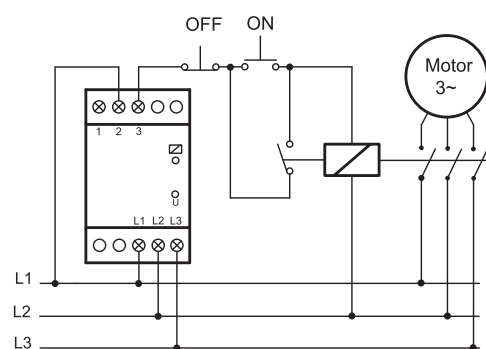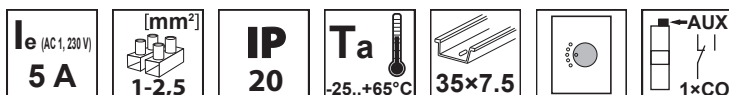| TRACON	U_m	VDC VAC A	0 10 ha %	U_{down}	U_{up}	m
TFKV-02	3×400 V AC	5 A 230 V AC	±1 %	0,7 U_n (fix)	1,2 U_n (fix)	285 g
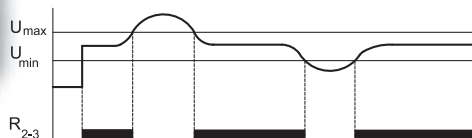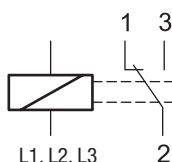
The device was designed to protect electric motors in three phase neutral-less lines. When L1 – L2 – L3 phase voltage values are normal then the relay switches on and the motor is able to start. If any of phase's voltage is falling under pre-adjusted value, or breaks then the relay switches off and the motor stops. If the abnormal phase voltage gets back back to the nominal value, then the relay switches on and the motor will be able to start.

Under voltage protection relay for one phase lines

I_e (AC 1, 230 V) 5 A	[mm²] 1-2,5	IP 20	Ta -25..+65°C	35×7.5		AUX 1×CO		? Pictograms	J/0

TRACON	U_m	U_h	VDC VAC A	0 10 ha %	U_{down}	U_{up}	m
TFKV-03	230 V AC	max. 15 V	5 A 230 V AC	±1 %	140-200 V AC	240 V AC (fix)	285 g
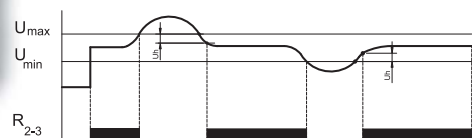
This relay was designed to protect one-phase electric motors. The under voltage threshold level can be adjusted between 140 – 200 V. Is the voltage within the adjusted interval, the LED signal lamp lights, the relay stays on, and the motor can be started. Falls t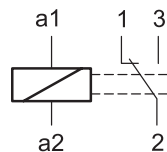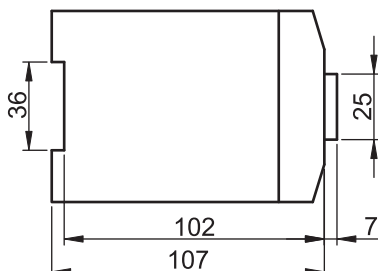he voltage under the adjusted level or rises above 240 V, the relay switches off, and the motor stops. When the voltage gets back into the nominal range, the signal lamp lights on, the relay switches on, and the motor can be started again.

Compact voltage protection relay with delay adjustment

I_e (AC 1, 230 V) 5 A	[mm²] 1-2,5	IP 20	Ta -25..+65°C	35×7.5		AUX 1×CO		Pictograms	J/0

TRACON	U_m		U_h	VDC VAC A	U_{down}	U_{up}		m
	1~	3~						
TFKV-09	3×1×230 V AC	3×230/400 V AC	max. 20 V	5 A 230 V AC	160 V AC (fix)	260 V AC (fix)	5 min. - 15 min.	85 g
TFKV-10	3×1×230 V AC	3×230/400 V AC		10 A 24 V AC/DC	160 V AC (fix)	260 V AC (fix)	0 s – 10 s	85 g

This microcontroller-based relay protects against both over and under voltage. It is designed for three phase circuits, but can be used in one-phase circuits, too. It detects voltage in each phase and switches off if necessary. If the voltage in any phase falls under 160 V, the relay drops immediately. If the voltage
in all three phases rises over 180 V, after an adjustable delay time (0 … 15 minutes) the device switches on, and the line turns active again. If the voltage in any phase rises over 260 V, the relay switches off the system. If the voltage in all three phases turns back into the adjusted interval, after an adjustable delay time (0 … 15 minutes) the device switches on. When used in one-phase systems, the phase wire has to be connected to all existing inputs.

1 3

L1, L2, L3   2

RELEVANT STANDARD EN 60669-2	RELEVANT STANDARD EN 60730

U_{max}
U_{min}

R
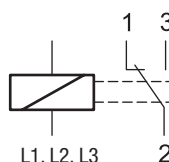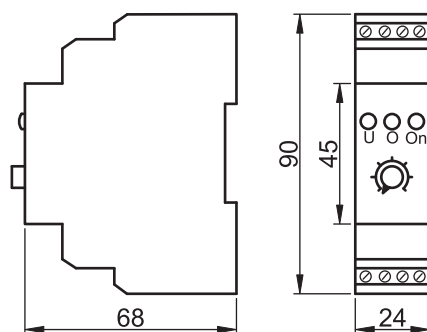
For application on one phase system

OFF   ON

Motor 1~

L
N
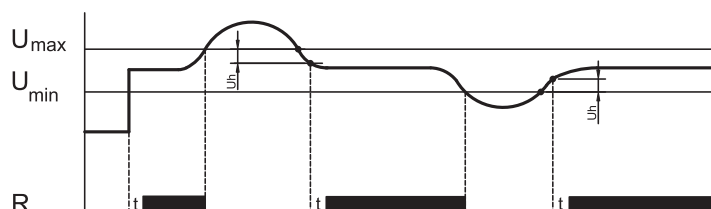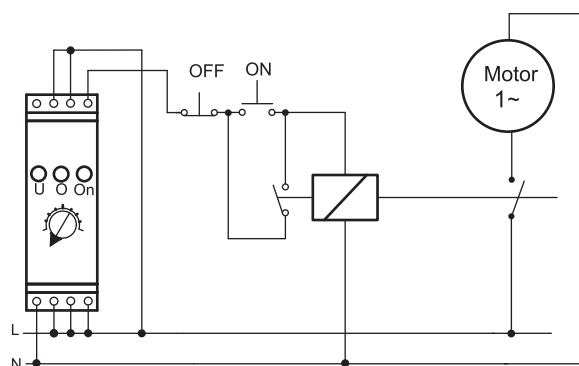
For application on three phase system

OFF   ON

Motor 3~

L1
L2
L3
N

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TRACON ELECTRIC®

Adjustable over/ under voltage protection relays for three phase lines

I_e (AC 1, 230 V)	[mm²]	IP	Ta				AUX		Pictograms	J/0
5 A	1-2,5	20	-25..+65°C	35×7.5			1×CO			

TRACON	U_m	U_h	VDC VAC A	U_{down}	U_{up}		L1 L2 L3	m
TFKV-11				100 V (fix)	390-490 V (adj.)	0,2-15 s (adj.)	–	
TFKV-12	3× 230/400 V AC	max. 15 V	5 A 230 V AC 10 A 24 V DC 10 A 24 V AC	270-370 V (adj.)	490 V (fix)	0,2-15 s (adj.)	–	280 g
TFKV-13				300-400 V (adj.)	420-495 V (adj.)	0,2-15 s (adj.)	–	
TFKV-14				300-400 V (adj.)	430-480 V (adj.)	0,2-15 s (adj.)	✓	

These microcontroller-based relays are designed to protect systems both against high voltage and high temperature. The **TFKV-14** version of the device is able to test phase sequence, too. When supply voltage is applied, the device starts operation after one second delay, allowed for voltage stabilization.

The device tests the voltage limits (and the phase sequence) at one-second intervals. If any malfunction is detected, the relay intervenes only after an adjustable time delay (0.1 … 15 seconds) to switch out the system. The relay switches on the system again, after the voltage turns back into the adjusted nominal range.

RELEVANT STANDARD
EN 60669-2

RELEVANT STANDARD
EN 60730

Use and safety

• Always use rated power supply
• Before mounting switch off the power supply!
• Always use suitable voltage meter to control voltage-free state the system!
• The servicing always has to be done by a professional technician according to standards!
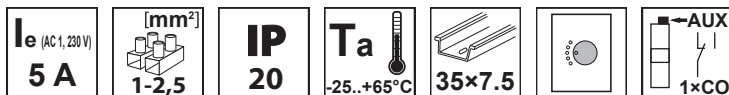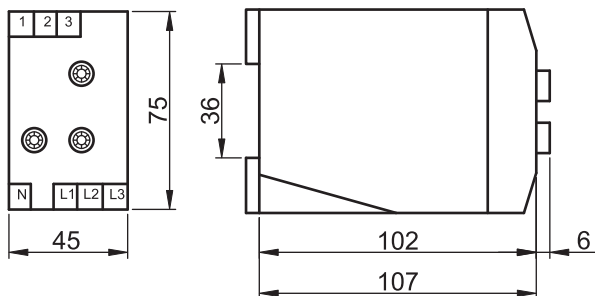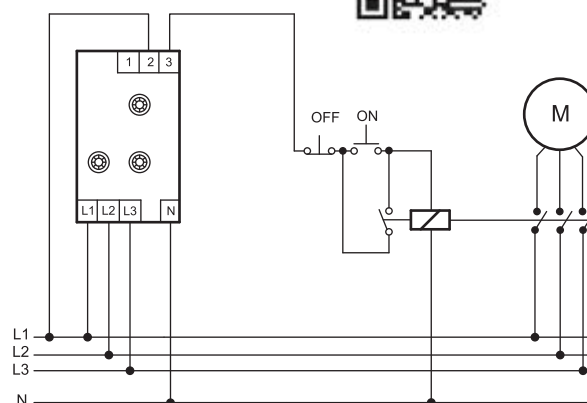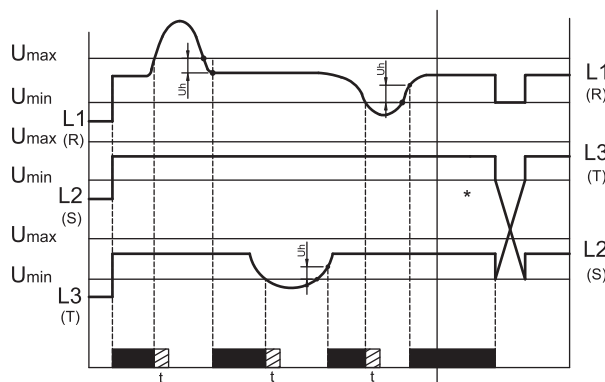
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Adjustable over/ under current protection relay

I_e (AC 1, 230 V) 5 A	[mm²] 1-2,5	IP 20	Ta -25..+65°C	35×7.5		AUX 1×CO

Pictograms   J/0

TRACON	U_m	VDC VAC A	I_{down}	I_{up}	t_1	t_2	m
TFKV-AKA05	230 V AC	5 A 230 V AC	–	0,5 – 5 A	0,5 – 8 s	0,5 – 15 s	280 g
TFKV-AKD05	230 V AC		0,5 – 5 A	–	0,5 – 8 s	0,5 – 15 s	

These protection relays were designed to protect motors or lines against over and under current. We advise to use the device over 100A load. The device have two adjustable time delays (start and relay-output), and adjustable current protection level. The device compares the metered current with the pre-adjusted protection level.
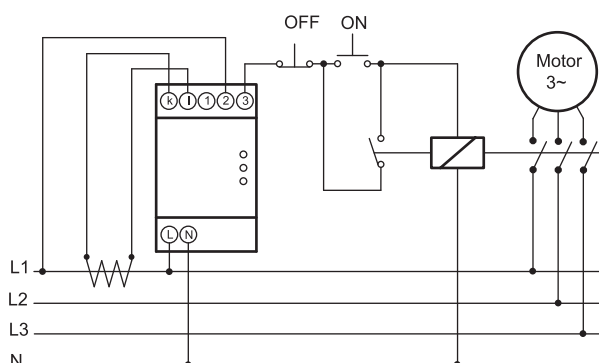
If the metered current is within the rated range, then the relay's contacts will not change state on the output. The device has to be associated with a current transformer of 5 A secondary value. If the metered current is different from the rated level, then the relay's contacts will change state on the output after pre-adjusted delay. When the current turns back to rated level during delay time, then the relay gets back to normal state
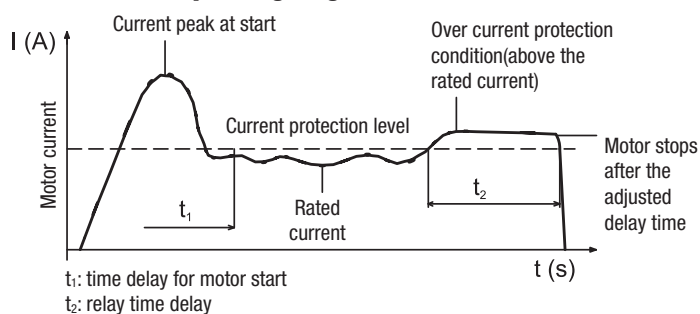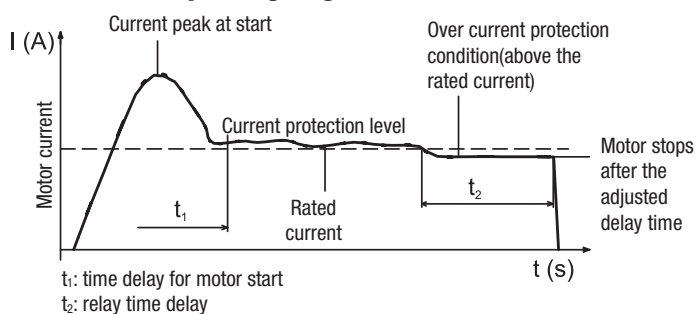
RELEVANT STANDARD
EN 60669-2

RELEVANT STANDARD
EN 60730

75
36
45
107

Operating diagrams - TFKV-AKA05

I (A)
Current peak at start
Over current protection condition(above the rated current)
Motor current
Current protection level
t_1
Rated current
t_2
Motor stops after the adjusted delay time
t_1: time delay for motor start
t_2: relay time delay
t (s)

Operating diagrams - TFKV-AKD05

I (A)
Current peak at start
Over current protection condition(above the rated current)
Motor current
Current protection level
t_1
Rated current
t_2
Motor stops after the adjusted delay time
t_1: time delay for motor start
t_2: relay time delay
t (s)

Protection wiring diagram for three-phase device

OFF ON
LOAD 3~
L1
L2
L3
N

L/26-L/29